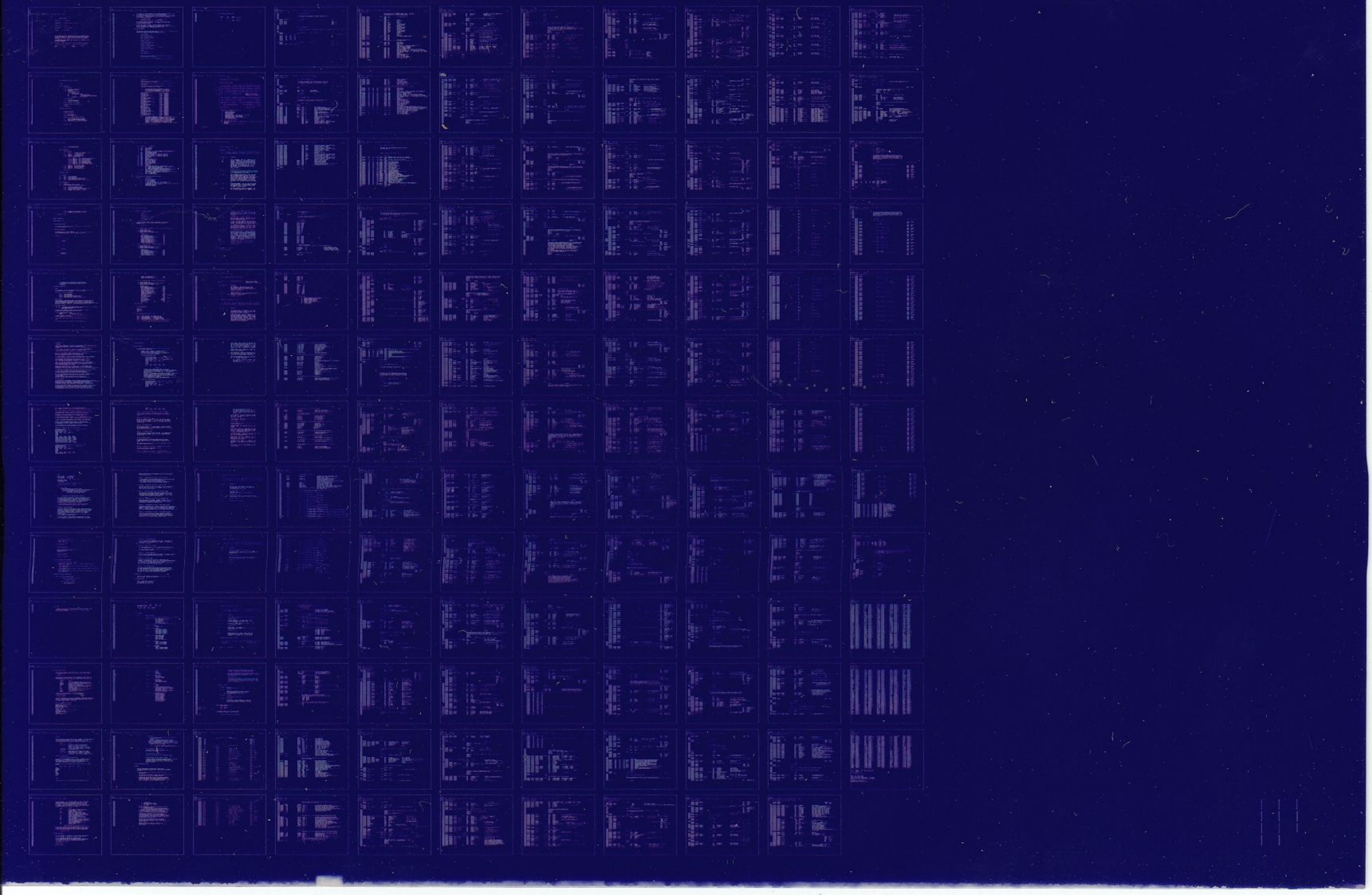
TSV05

TSV05 DATA REL
CVTSED0

AH-T179D-MC
1 OF 1 SEP 1987

digital
MADE IN USA



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.REM_
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IDENTIFICATION

PRODUCT ID: AC-T178D-MC

PRODUCT TITLE: CVTSEDO TSV05 DATA RELIABILITY

PRODUCT DATE: 4-JUN-87

MAINTAINER: CSS/PGG DIAGNOSTICS

AUTHOR: DICK GORDON

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```

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

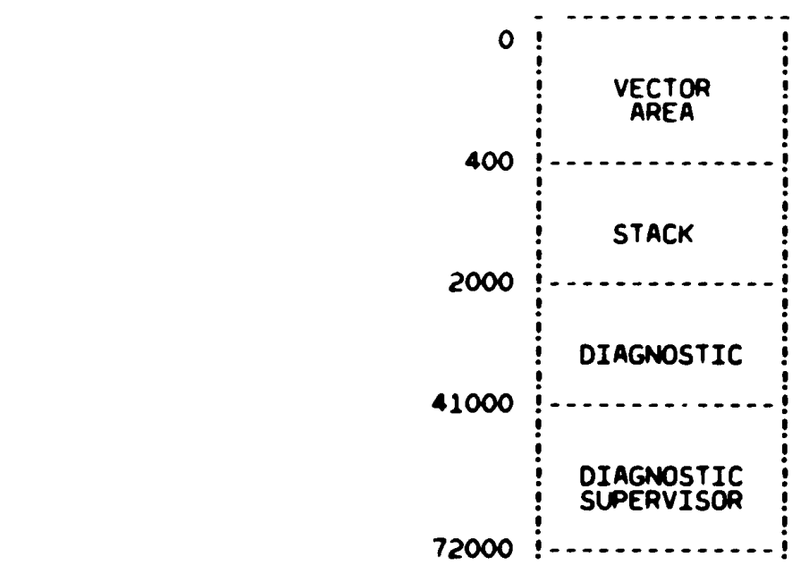
1.1.1 FUNCTIONAL DESCRIPTION

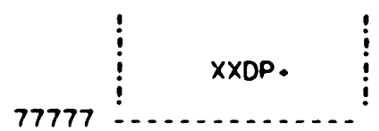
THIS PROGRAM CAN BE USED AS A BASIC FUNCTION TEST, A DATA RELIABILITY TEST, OR A COMPATABILITY TEST.

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
G SUSPECTED
                                    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
ABORTED.
                                    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
LL THE TESTS REQUESTED
                                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 ø:
                                                 6       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
```

```
447                                     THAT FIXED DELAY ELEMENT "L$DLY".
448
449                                     A PRESET COUNT OF 500 RESIDES AT "L$DLY" IN LOCATION 2116 OF THE
450                                     "HEADER" SECTION.
451
452
453                             1.2 SYSTEM REQUIREMENTS
454                                 -    ----          -
455
456
457                             1.2.1  HARDWARE REQUIREMENTS
458                                       -  --- -- -  - - -
459
460                                     PDP 11/23 PROCESSOR WITH 32K OR MORE OF MEMORY
461                                     CONSOLE DEVICE (VT52,LA36,ETC.)
462                                     PROGRAM LOAD DEVICE
463                                     TSV05/TS05
464
465
466                             1.2.2  SOFTWARE REQUIREMENTS
467                                       ------ -      - -
468
469                                     DIAGNOSTIC SUPERVISOR
470
471
472
473                             1.3 RELATED DOCUMENTS AND STANDARDS
474                                       --      -     - - - -
475
475                                     DIGITAL EQUIPMENT CORPORATION DOCUMENTS:
477
478                                     1.  CIQPMAO XXDP+  PROGRAMMER'S  MANUAL;   DOCUMENT  NUMBER AC S296A-AC
479                                         DATE: 14 JULY 1980.
480
481                                      2.  TSV05 TRANSPORT SUBSYSTEM USER'S GUIDE; DOCUMENT NUMBER EK-TSV05-UG 001
482                                         DATE: AUGUST 1982
483
484                                      3.  TSV05 TRANSPORT SUBSYSTEM TECHNICAL MANUAL; DOCUMENT NUMBER EK TSV05-TM-001
485                                         DATE: AUGUST 1982
486
487                                      4.  TSV05 TRANSPORT SUBSYSTEM INSTALLATION MANUAL; DOCUMENT NUMBER EK TSV05-IN-001
488                                         DATE: AUGUST 1982
489
490
491                         1.4 DIAGNOSTIC HIERARCHY PREREQUISITES
492                             -  --  ----  -    - ---------- --
493
494                                     ORDER OF HOST CPU DIAGNOSTIC USAGE:
495
496                                             1)  CONTROL LOGIC PROGRAM - ALL TESTS.
497
498                                                 (VTSA,VTSB,VTSC,VTSD)
499
500                                             2)  DATA RELIABILITY PROGRAM:
501
502                                                 A)  BASIC FUNCTION TEST.
503                                                 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 "CIQPMAO XXDP+ PROGRAMMERS MANUAL, NUMBER
AC-S296A-AC. THE USER ENTRY IS IN QUOTES.

BOOT THE DIAGNOSTIC XXDP MEDIA

```
CHMDLBO 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> "
LSI? N   " y<cr> "
THIS IS XXDP+. TYPE "H" OR "H/L" FOR DETAILS
R VTSE??
VTSEAOPINDRS LOADED
DIAG. RUN-TIME SERVICES REV D. APR 79
CVTSE-D-0
TSV05 DATA RELIABILITY
UNIT IS TSV05
```

```
573
574                                     SWITCHES
575                                     --------
576
577                                     THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION.
578                                     THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS.  ALL OF THE LEGAL
579                                     SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH.
580                                     IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".
581
582                                             SWITCH          EFFECT
583                                             ------          ------------------------  -  -
584                                             /TESTS:LIST     EXECUTE ONLY THOSE TESTS SPECIFIED IN
585                                                             THE LIST.  LIST IS A STRING OF TEST
586                                                             NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10.
587                                                             THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO
588                                                             BE RUN.  ALL OTHER TESTS WILL NOT BE RUN.
589                                             /PASS:DDDDD     EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
590                                             /FLAGS:FLGS     SET SPECIFIED FLAGS.
591
592                                             /EOP:DDDDD      REPORT END OF PASS MESSAGE AFTER EVERY
593                                                             DDDDD PASSES ONLY.  (DDDDD = 1 TO 64000)
594                                             /UNITS:LIST     TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED
595                                                             IN THE LIST.  LIST EXAMPLE - /UNITS:0:5:10 12
596                                                             USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)
597
598                                     EXAMPLE OF SWITCH USAGE:
599
600                                             START/TESTS:1-5/PASS:1000/EOP:100
601
602                                     THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE
603                                     EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF
604                                     PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY.  A
605                                     SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS.  YOU MAY,
606                                     FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".
607
608                                     BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH
609                                     COMMAND.
610
611                                             TESTS   PASS    FLAGS   EOP     UNITS
612                                             ------------------------------------
613                                     START     X       X       X       X       X
614                                     RESTART   X       X       X       X       X
615                                     CONTINUE          X       X       X
616                                     PROCEED                   X
617                                     DROP                                      X
618                                     ADD                                       X
619                                     PRINT
620                                     DISPLAY                                   X
621                                     FLAGS
622                                     ZFLAGS
623                                     EXIT
624
625
626                                     FLAGS
627                                     -----
628
629                                     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.

```
TSDB ADDRESS (0) 172520 ?

VECTOR (0) 224 ?

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

THE VALIDITY OF THESE PARAMETERS CAN BE CHECKED BEFORE RUNNING THE TESTS
BY SETTING THE FLAG "ADR" ON A STA, RES OR CON COMMAND.
THE SO CALLED AUTO DROP CODE SHALL THEN BE EXECUTED AFTER THE INIT CODE
AND BEFORE THE HARDWARE TESTS ARE RUN. THAT CODE FIRST TESTS THE ADRRESS
OF THE TSDB(S). IF NO RESPONSE, IT DROPS THE UNIT(S) IMMEDIATELY
WITH THE FOLLOWING MESSAGE:

        BUS TRAP AT XXXXXX   (XXXXXX = TSDB AD)
        INTERFACE BAD OR NOT SET TO ABOVE ADDRESS.

ON A RESPONSE FROM THE INTERFACE, THE UNITS THAT ARE NOT READY OR NOT
ON-LINE ARE DROPPED IMMEDIATELY. THE HARDWARE TESTS SHALL THEN
BE RUN ON RESPONDING UNITS.

IF THE "ADR" FLAG IS NOT SET, THE READY AND OFF LINE STATUS OF THE
DRIVE IS CHECKED. A MESSAGE SHALL BE PRINTED EVERY SO OFTEN
TO WARN THE OPERATOR OF DRIVES BEING NOT READY OR OFF-LINE. THESE DRIVES
SHALL BE DROPPED AFTER A REASONABLE AMOUNT OF TIME.

2.2 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED WHEN ONE ANSWERS YES TO THE CHANGE SOFTWARE
QUESTION ON A START, RESTART,OR CONTINUE.
THEY ALLOW FLEXABILITY IN THE WAY THE PROGRAM BEHAVES.

        CLEAR COUNTERS (L) Y ?

        RESET RANDOM VARIABLES (L) N ?

        PRINT RECOVERABLE ERRORS (L) N ?

        HALT AFTER EACH CMD (L) N ?

        INHIBIT RECOVERY (L) N ?

        BAD TAPE SPOT DETECTION (L) Y ?

        DISABLE INTERRUPTS (L) N ?

        INHIBIT RFC ERROR REPORTS (L) N ?

        CHANGE CMD SEQUENCE (L) N ?   (SEE NOTE1:)

        DEFAULT SWITCH SETTINGS (L) Y ?

        100IPS (L) N ?

        WRITE BUFFERING (L) N ?

        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 w'll 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)	(DFCIMAL)
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.
7	RANDOM DATA PATTERN.
8	NO PATTERN GENERATION.

2.3 EXAMPLES OF SOFTWARE DIALOGUE

```
                    CHANGE HW (L) ?

                    #UNITS (D)  ?

                    TSDB ADDRESS (O) 172520 ?

                    VECTOR (O) 224 ?

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

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 RECOVERABLE ERRORS  (L) N ?       Y<CR>
                    HALT AFTER EACH CMD (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>
                    RESCT 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 OPERATION.
```

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   TSO5 NOT READY:

        BEFORE ANY COMMAND IS ISSUED TO THE TSO5, 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 TSO5 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 INFOR MATION ON THE TYPE OF FATAL ERROR. THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

```
1139                    3.1.6   ERROR #13   RFC NON ZERO ERROR:
1140
1141                            IF, AFTER EXECUTION, THE RESIDUAL FRAME COUNT IS NON ZERO, THE
1142                            ERROR IS REPORTED AND A HARD ERROR IS LOGGED.  THE PROGRAM THEN
1143                            PROCEEDS NORMALLY.  THE REPORTING AND LOGGING OF THESE ERRORS
1144                            IS OPTIONAL.
1145
1146
1147                    3.1.7   ERROR #14   RETRY LIMIT EXCEEDED:
1148
1149                            ON A WRITE COMMAND THIS IS A FATAL DEVICE ERROR AND THE DEVICE
1150                            WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1151
1152                            ON A READ COMMAND THIS ERROR IS LOGGED AS A HARD ERROR AND
1153                            THE PROGRAM PROCEEDS NORMALLY.
1154
1155
1156                    3.1.8   ERROR #15   TOO MANY INTERRUPTS:
1157
1158                            IF MORE THAN ONE INTERRUPT OCCURS PER COMMAND, THIS ERROR IS REPORTED.
1159                            THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
1160                            THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1161
1162
1163                    3.1.9   ERROR #16 - CAPSTAN RUNAWAY:
1164
1165                            CAPSTAN DID NOT STOP WITHIN ACCEPTABLE WINDOW AFTER LAST
1166                            COMMAND.  THE PROGRAM WILL ISSUE A GET STATUS COMMAND BEFORE REPORTING
1167                            THE ERROR SO THAT THE DEAD TRACK FIELD IN EXTENDED STATUS REGISTER 2
1168                            WILL CONTAIN THE TACH COUNT WHEN THE TAPE STOPPED.
1169                            THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
1170                            THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1171
1172
1173                    3.1.10  ERROR #17 - DATA COMPARE ERROR:
1174
1175                            IF A DATA VALIDATION ERROR OCCURS DURING A WRITE/VERIFY COMMAND,
1176                            THE PROGRAM PRINTS WHAT THE DATA SHOULD HAVE BEEN AND WHAT THE
1177                            DATA WAS, AND PRINTS THE BYTE AND RECORD NUMBER THE ERROR OCCURRED
1178                            ON.  ONLY THE FIRST 10 BYTES IN ERROR PER RECORD ARE PRINTED.
1179                            THE TOTAL # OF BYTES IN ERROR PER RECORD IS ALSO PRINTED.  A
1180                            HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.
1181
1182
1183                    3.2 ERROR HALTS
1184                          -  ------
1185
1186                            ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION
1187                            WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.
1188
1189                    4.0 PERFORMANCE REPORT
1190                        --- - ------------
1191
1192                            UNIT X    PASS:XXXXX  RECORD:XXXXX
1193                            BYTES WRITTEN  XXX,XXX,XXX,XXX
1194                            BYTES READ REV XXX,XXX,XXX,XXX
1195                            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 TS05 FUNCTIONS.

                                SUBTEST 1  - SET CHAR, DRIVE INIT, GET STATUS.
                                                . SET CHARACTERISTIC 200.
                                                . DRIVE INITIATE.
                                                . SET CHARACTERISTIC  20.
                                                . GET STATUS
                                                . SET CHARACTERISTIC  40.
                                                . PRINT TS05 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.
```

```
                                        • SPACE 7 RECORDS REVERSE.

                                SUBTEST 7   - WRITE RETRY.
                                        • REWIND.
                                        • WRITE DATA.
                                        • WRITE RETRY.

                                SUBTEST 8   - READ REV RETRY.
                                        • READ REVERSE
                                        • READ NEXT REVERSE.
                                        • READ NEXT FORWARD.

                                SUBTEST 9     READ FWD RETRY.
                                        • READ FORWARD.
                                        • READ PREVIOUS FORWARD.
                                        • READ PREVIOUS REVERSE.

                                SUBTEST 10 - CLEAN.
                                        • CLEAN.
                                        • REWIND.

                                SUBTEST 11   - WRITE/VERIFY SWAPPED DATA BYTES.
                                        • WRITE/VERIFY EVEN LENGTH (RECORD 1).
                                        • WRITE/VERIFY ODD LENGTH (RECORD 2).
                                        • SET DATA BYTE SWAP.
                                        • WRITE/VERIFY EVEN LENGTH (RECORD 3).
                                        • WRITE/VERIFY ODD LENGTH (RECORD 4).
                                        • CLEAR DATA BYTE SWAP.

                                SUBTEST 12   - READ SWAPPED DATA BYTES.
                                        • READ REV RECORD 4.
                                        • READ REV RECORD 3.
                                        • SET DATA BYTE SWAP.
                                        • READ REV RECORD 2.
                                        • READ REV RECORD 1.
                                        • READ FWD RECORD 1.
                                        • READ FWD RECORD 2.
                                        • CLEAR DATA BYTE SWAP.
                                        • READ FWD RECORD 3.
                                        • 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:

1. COMMAND WORD
2. LOW ORDER BUFFER ADDRESS
3. HIGH ORDER BUFFER ADDRESS
4. BYTE COUNT

D. THE TSSR CONTAINS ALL THE INFORMATION WHICH WILL BE NECESSARY TO DETERMINE WHETHER:
   1. THE DRIVE IS READY TO ACCEPT ANOTHER COMMAND,
   2. THE PREVIOUS COMMAND WAS EXECUTED WITHOUT ERROR.

   IF EITHER OF THE ABOVE CONDITIONS IS UNTRUE AT "JOB DONE" OR "COMMAND INITIATION" TIME,IT MAY BE NECESSARY TO GET THE EXTENDED STATUS REGISTERS TO DETERMINE WHAT ACTION IS TO BE TAKEN AND/OR LOG THE ERROR INFORMATION.

E. EXTENDED STATUS REGISTERS ARE NOT READ DIRECTLY FROM DRIVE REGISTERS; RATHER, A "GET STATUS" COMMAND IS ISSUED WHICH WILL CAUSE THE TSO5 TO TRANSFER EXTENDED STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FIVE EXTENDED STATUS REGISTERS. SEE .3.

F. THE TSDB MUST BE WRITTEN WITH A DATO INSTRUCTION TO PROPERLY WRITE THE COMMAND POINTER. A DATOB WILL CAUSE A MAINTENANCE FUNCTION. A DATO TO THE TSSR WILL CAUSE SUBSYSTEM INIT.

G. COMMAND PACKETS MUST RESIDE ON DIVIDE BY FOUR MEMORY BOUNDARIES (AS OPPOSED TO DIVIDE BY 2 OR WORD BOUNDARIES) .

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):

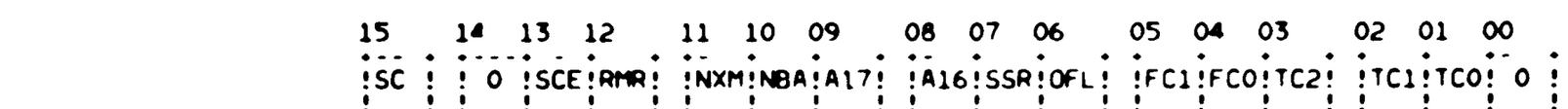
0 = NORMAL TERMINATION
1 = ATTENTION CONDITION
2 = TAPE STATUS ALERT
3 = FUNCTION REJECT
4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD DOWN TAPE FROM START OF FUNCTION
5 = RECOVERABLE ERROR TAPE NOT MOVED
6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
7 = FATAL CONTROLLER ERROR

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)

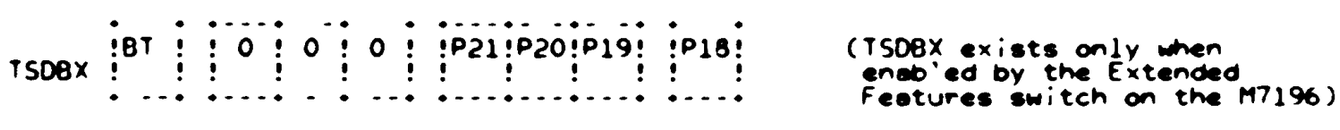
Q-BUS ADDRESS + 2 READ ONLY



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

```
1511                                                    COMMAND (IF A GOOD ADDRESS WAS GIVEN).
1512
1513                                09    A17     S     BUS ADDRESS BIT 17.  A17 AND A16 (BIT 08) TRACK
1514                                                    THE  VALUES  OF  BITS  17  AND  16  OF THE TSBA
1515                                                    REGISTER. LOADED FROM TSDB BITS 01 00 WHEN TSDB
1516                                                    IS WRITTEN.
1517
1518                                08    A16     S     BUS ADDRESS BIT 16.  SEE A17 (BIT 09).
1519
1520                                07    SSR     S     SUB SYSTEM READY.  WHEN SET, INDICATES THAT THE
1521                                                    TSV05/TS05 SUBSYSTEM IS NOT BUSY AND IS READY TO
1522                                                    ACCEPT A NEW COMMAND POINTER.
1523
1524                                06    OFL     S,1,3 OFF LINE.  WHEN SET, INDICATES THAT THE TS05 IS
1525                                                    OFF LINE  AND  UNAVAILABLE  FOR ANY TAPE MOTION
1526                                                    COMMANDS.  THIS BIT CAN CAUSE A TERMINATION CLASS
1527                                                    OF 1 (ON ATTN INTERRUPT) OR 3 (RESULTS IN NEF).
1528
1529                                05    FC1     7     FATAL TERMINATION CLASS 01.  FC1 AND  FC0  (BIT
1530                                                    04)  ARE  USED  TO  INDICATE  THE TYPE OF FATAL
1531                                                    ERROR WHICH HAS OCCURRED ON  THE  TS05.   THESE
1532                                                    BITS  ARE  VALID  ONLY  WHEN  SC IS SET AND THE
1533                                                    TERMINATION CLASS CODE BITS ARE ALL SET (111).
1534
1535                                04    FC0     7     FATAL TERMINATION CLASS 00.  SEE FC1 (BIT 05).
1536
1537                                03    TC2     S     TERMINATION CLASS BIT 02.  THIS BIT, ALONG WITH
1538                                                    THE  TC1  AND  TC0 BITS, ACT AS AN OFFSET VALUE
1539                                                    WHENEVER AN ERROR OR EXCEPTION CONDITION OCCURS
1540                                                    ON  A  COMMAND.   EACH  OF  THE  EIGHT POSSIBLE
1541                                                    VALUES OF THIS  FIELD  REPRESENT  A  PARTICULAR
1542                                                    CLASS  OF ERRORS OR EXCEPTIONS.  THE CONDITIONS
1543                                                    IN EACH CLASS HAVE SIMILAR SIGNIFICANCE AND, AS
1544                                                    APPLICABLE,   RECOVERY  PROCEDURES.   THE  CODE
1545                                                    PROVIDED  IN  THIS  FIELD  IS  EXPECTED  TO  BE
1546                                                    UTILIZED AS AN OFFSET INTO A DISPATCH TABLE FOR
1547                                                    HANDLING OF  THE  CONDITION.
1548
1549                                   02    TC1     S     TERMINATION CLASS BIT 01.  SEE TC2 (BIT 03).
1550
1551                                   01    TC0     S     TERMINATION CLASS BIT 00.  SEE TC2 (BIT 03).
1552
1553                                   00                  NOT USED. (ALWAYS A 0)
1554
1555
1556
1557
1558                             Q BUS ADDRESS + 2 - WRITE ONLY
1559
1560                                SUBSYSTEM INITIALIZE
```

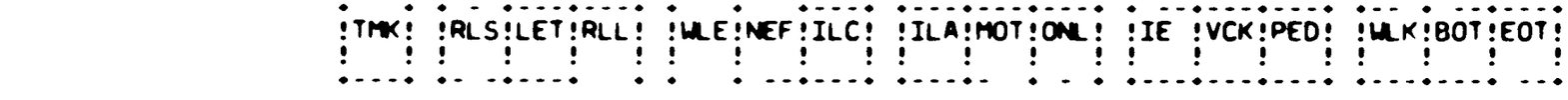
6.3.2.1 TSV05 EXTENDED DATA BUFFER REGISTER (TSDBX)



(TSDBX exists only when enab'ed 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)

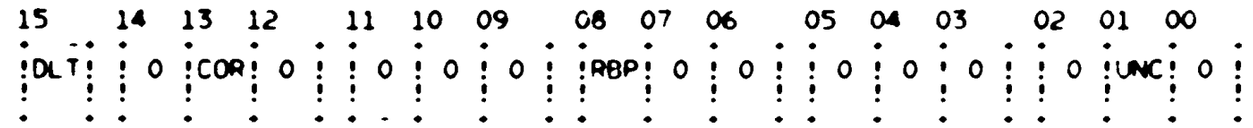


BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN 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.

```
1619
1620                                    13   LET    2        LOGICAL END OF TAPE.  SET ONLY ON THE SKIP TAPE
1621                                                         MARKS  COMMAND  WHEN EITHER TWO CONTIGUOUS TAPE
1622                                                         MARKS ARE DETECTED OR WHEN MOVING  OFF  OF  BOT
1623                                                         AND  THE  FIRST  RECORD  ENCOUNTERED  IS A TAPE
1624                                                         MARK.  THE SETTING OF THIS BIT WILL  NOT  OCCUR
1625                                                         UNLESS  THIS  MODE  OF  TERMINATION  IS ENABLED
1626                                                         THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
1627
1628                                    12   RLL    2        RECORD  LENGTH  LONG.   WHEN  SET,   THIS   BIT
1629                                                         INDICATES  THAT THE RECORD READ WAS LONGER THAN
1630                                                         THE BYTE COUNT SPECIFIED.
1631
1632                                    11   WLE    3,6      WRITE LOCK ERROR.  WHEN SET, INDICATES  THAT  A
1633                                                         WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE
1634                                                         DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT
1635                                                         LOCK SWITCH ACTIVATED DURING THE OPERATION.
1636
1637                                    10   NEF    3        NON-EXECUTABLE FUNCTION.  WHEN  SET,  INDICATES
1638                                                         THAT  THE  COMMAND COULD NOT BE EXECUTED DUE TO
1639                                                         ONE OF THE FOLLOWING CONDITIONS:
1640
1641                                                           - THE   COMMAND   SPECIFIED   REVERSE   TAPE
1642                                                           DIRECTION   BUT   THE   TAPE  WAS  ALREADY
1643                                                           POSITIONED AT BOT.
1644                                                           THE ISSUING OF ANY MOTION COMMAND EXCEPT
```

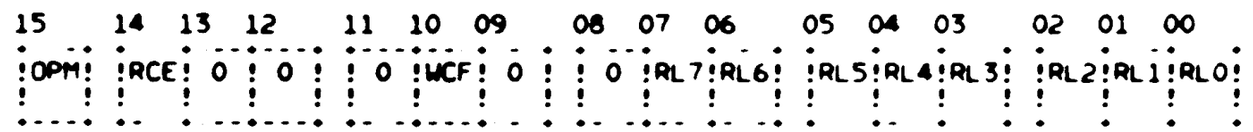
```
1646
1647
1648                                                    WHEN THE VOLUME CHECK BIT IS SET.
1649                                                -   ANY COMMAND, EXCEPT GET STATUS OR DRIVE
1650                                                    INITIALIZE, WHEN THE TS05 IS OFF-LINE.
1651                                                    ANY WRITE COMMAND WHEN THE TAPE DOES NOT
1652                                                    CONTAIN A WRITE ENABLE RING (WRITE LOCK
1653                                                    STATUS - WLS).
1654
1655                                  09   ILC   3     ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED
1656                                                    AND EITHER ITS COMMAND FIELD OR ITS COMMAND
1657                                                    MODE FIELD CONTAINS CODES WHICH ARE NOT
1658                                                    SUPPORTED BY THE TS05.
1659
1660                                  08   ILA   3     ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN
1661                                                    AN EVEN ADDRESS IS REQUIRED.)
1662
1663                                  07   MOT   S     TAPE IS MOVING.
1664
1665                                  06   ONL   S     ON LINE. WHEN SET, INDICATES THAT THE TS05 IS
1666                                                    ON LINE AND OPERABLE.
1667
1668                                  05   IE    S     INTERRUPT ENABLE. REFLECTS THE STATE OF THE
1669                                                    INTERRUPT ENABLE BIT SUPPLIED ON THE LAST
1670                                                    COMMAND.
1671
1672                                  04   VCK   S     VOLUME CHECK. WHEN SET, INDICATES THAT THE
1673                                                    DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED
1674                                                    OFF LINE. CLEARED BY THE CLEAR VOLUME CHECK
1675                                                    (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT
1676                                                    CAN CAUSE A TERMINATION CLASS OF 3.
1677
1678                                  03   PED   S     PHASE ENCODED DRIVE. ALWAYS SET, INDICATES THAT
1679                                                    THE TS05 IS CAPABLE OF READING AND WRITING ONLY
1680                                                    1600 BPI PHASE ENCODED DATA.
1681
1682                                  02   WLK   S,3   WRITE LOCKED. WHEN SET, INDICATES THAT THE
1683                                                    MOUNTED REEL OF TAPE DOES NOT HAVE A
1684                                                    WRITE ENABLE RING INSTALLED. THE TAPE IS,
1685                                                    THEREFORE, WRITE PROTECTED.
1686
1687                                  01   BOT   S,3   BEGINNING OF TAPE. WHEN SET, INDICATES THAT
1688                                                    THE TAPE IS POSITIONED AT THE LOAD POINT AS
1689                                                    DENOTED BY THE BOT REFLECTIVE STRIP ON THE
1690                                                    TAPE.
1691
1692                                  00   EOT   S,2   END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE
1693                                                    IS POSITIONED AT OR BEYOND THE END OF TAPE
1694                                                    REFLECTIVE STRIP.
```

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



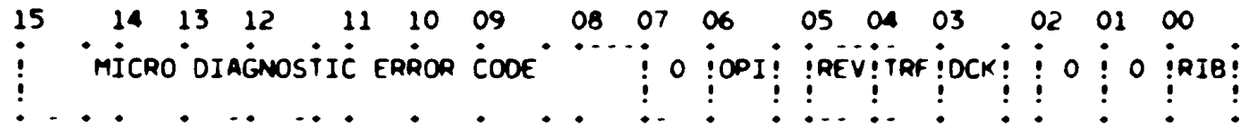
BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE FIFO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE Q BUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TSO5.
14			NOT USED. (ALWAYS A 0)
13	COR	S	CORRECTABLE DATA. CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12 09			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)



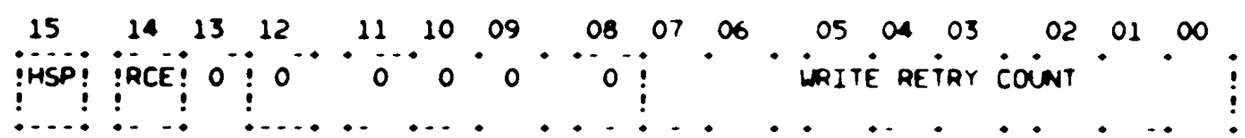
BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	RCE	7,F2	RAM CHECKSUM ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13-11			RESERVED (ALWAYS A 0)
10	WCF	7	WRITE CLOCK FAILURE. SET DURING A WRITE TO INDICATE THAT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

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

```
1822                                    15   HSP    S       High Speed. When set, indicates that the transport is
1823                                                        operating in high speed mode.(100ips) When clear,the
1824                                                        transport is operating in low speed mode.(25ips)
1825
1826                                    14   RCE    6       Retry Count Exceeded. When set,indicates that the controller
1827                                                        was buffering Write Data and could not sucessfully output
1828                                                        the buffered record within the specified number of retries.
1829                                                        Causes Tape Position Lost termination.
1830
1831                                    13 8                RESERVED (ALWAYS A 0)
1832
1833                                    7 0  WRC    S       Write Recount Count Statistic. This field indicates, when
1834                                                        the controller is buffering write data records, the total
1835                                                        number of controller initiated retries performed in order
1836                                                        to write the previous buffered record. This count is cleared
1837                                                        after it is displayed.
1838
1839
1840
1841                                 7.0 DIAGNOSTIC HISTORY
1842                                      -- ----  --------
1843
1844                                         REVISION A - MAR 1982
1845                                                    - MODIFIED CZTSHC FROM TS11 FOR TSV05
1846
1847                                         REVISION B - APR 1983
1848
1849                                                    - UPDATED THE DIAGNOSTIC TO SUPPLY THE CORRECT
1850                                                      RECORD NUMBER DURING EXECUTION OF TEST #2.
1851                                                      REF: CHMIELECKI TO MITCHELL "TSV05 DATA
1852                                                      RELIABILITY PROBLEM"; 21-JAN-83.
1853
1854                                         REVISION C - JUN 1984
1855
1856                                                      MINOR CHANGES  OR "ORION" CPU
1857
1858                                         REVISION D   APRIL 1987
1859
1860                                                      CHANGES MADE TO ALLOW DIAGNOSTICS TO WORK WITH
1861                                                      THE NEW TSV05 MICROCODE (REVISION 2). THE NEW
1862                                                      TSV05 MICROCODE ALWAYS IN EXTENDED FEATURE MODE.
1863                                                                                              -
1864
1865
1877                                 .TITLE PROGRAM HEADER AND TABLES
1878                                 .SBTTL  PROGRAM HEADER
1907
1909 000000                                      .ENABL  ABS,AMA
1910          002000                 .         =       2000
1912 002000                                      BGNMOD
1913
1914                                 ;++
1915                                 ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
1916                                 ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
1917                                 ;--
1918
1919 002000                                      POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU
```

M3

PROGRAM HEADER

```
                                        HEADER  CVTSE,D,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  104                                                             .ASCII  /D/
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  030014                                                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  030122                                                          .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$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                                                          .WORD   0
002046                          L$EXP1::                ;EXPANSION WORD
002046  000000                                                          .WORD   0
002050                          L$MREV::                ;SVC REV AND EDIT #
002050    003                                                           .BYTE   C$REVISION
002051    003                                                           .BYTE   C$EDIT
002052                          L$EF::                  ;DIAG. EVENT FLAGS
002052  000000                                                          .WORD   0
002054  000000                                                          .WORD   0
002056                          L$SPC::
002056  000000                                                          .WORD   0
002060                          L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  002164                                                          .WORD   L$DVTYP
002062                          L$REPP::                ;PTR. TO REPORT CODE
```

N3

PROGRAM HEADER

```
002062  017630
002064                  L$EXP4::                                        .WORD   L$RPT
002064  000000
002066                  L$EXP5::                                        .WORD   0
002066  000000
002070                  L$AUT::         ;PTR. TO ADD UNIT CODE          .WORD   0
002070  024112
002072                  L$DUT::         ;PTR. TO DROP UNIT CODE         .WORD   L$AU
002072  024040
002074                  L$LUN::         ;LUN FOR EXERCISERS TO FILL     .WORD   L$DU
002074  000000
002076                  L$DESP::        ;POINTER TO DIAG. DESCRIPTION   .WORD   0
002076  002136
002100                  L$LOAD::        ;GENERATE SPECIAL AUTOLOAD EMT  .WORD   L$DESC
002100  104035                                                          EMT     E$LOAD
002102                  L$ETP::         ;POINTER TO ERRTBL
002102  000000                                                          .WORD   0
002104                  L$ICP::         ;PTR. TO INIT CODE •            .WORD   L$INIT
002104  021364
002106                  L$CCP::         ;PTR. TO CLEAN-UP CODE          .WORD   L$CLEAN
002106  023776
002110                  L$ACP::         ;PTR. TO AUTO CODE              .WORD   L$AUTO
002110  023354
002112                  L$PRT::         ;PTR. TO PROTECT TABLE          .WORD   L$PROT
002112  021356
002114                  L$TEST::        ;TEST NUMBER                    .WORD   0
002114  000000
002116                  L$DLY::         ;DELAY COUNT                    .WORD   C
002116  000000
002120                  L$HIME::        ;PTR. TO HIGH MEM               .WORD   0
002120  000000
  1930
```

DISPATCH TABLE

```
   1937                                 .SBTTL  DISPATCH TABLE
   1938
   1939                                 ;++
   1940                                 ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
   1941                                 ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
   1942                                 ;--
   1943
   1944 002122                                  DISPATCH 5
        002122  000005                 L$DISPATCH::                                    .WORD   5
        002124                                                                          .WORD   T1
        002124  024216                                                                  .WORD   T2
        002126  025704                                                                  .WORD   T3
        002130  026540                                                                  .WORD   T4
        002132  026734                                                                  .WORD   T5
        002134  027114
   1945
   1952
   1953                                 .SBTTL  DESCRIPTIVE TEXT
   1954
   1955                                 ;++
   1956                                 ;2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVICE UNDER TES
T
   1957                                 ;--
   1958
   1959 002136                                  DESCRIPT        <DATA RELIABILITY TEST>
        002136                          L$DESC::
        002136  104     101     124                                                    .ASCIZ  /DATA RELIABILITY TE
ST/
        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
   1960 002164                                  DEVTYP          <TSV05>
        002164                          L$DVTYP::
        002164  124     123     126                                                    .ASCIZ  /TSV05/
        002167  060     065     000
                                                                                        .EVEN
```

DEFAULT HARDWARE P-TABLE

```
                                .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::

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

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  000052                                                                  .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).
```

D4

SOFTWARE P-TABLE

```
2018 002244  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2019 002246  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
2020 002250  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2021 002252  000002                        .WORD   2               ;COMMAND 5 (DEFAULT = READ FWD).
2022 002254  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2023 002256  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
2024 002260  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2025 002262  000015                        .WORD   13.             ;COMMAND 6 (DEFAULT = REWIND).
2026 002264  000001                        .WORD   1               ;BYTE COUNT
2027 002266  000001                        .WORD   1               ;NUMBER OF OPERATIONS
2028 002270  000007                        .WORD   RANP            ;PATTERN
2029 002272  000033                        .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
2030 002274  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2031 002276  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
2032 002300  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2033 002302  000033                        .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
2034 002304  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2035 002306  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
2036 002310  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2037 002312  000001              TS1MD::   .WORD   1               ;DEFAULT SWITCH SETTING
2038 002314  000000              RDBUF::   .WORD   0               ;ENABLE READ BUFFERING
2039 002316  000000              WTBUF::   .WORD   0               ;ENABLE WRITE BUFFERING
2040 002320  000000              HSSW::    .WORD   0               ;RUN AT 100ips SWITCH
2041 002322  000000              EXTFEA::  .WORD   0               ;EXTENDED FEATURES SOFTWARE SW 0=OFF;1=ON
2042 002324  000000              REV::     .WORD   0               ;MICROCODE REVISION LEVEL
2043 002326  000000              BENBSW::  .WORD   0               ;BUFFER ENABLE SOFTWARE SW 0=OFF;1=ON
2044
2045 002330                               ENDSW
     002330                     L10001:
2045
2047 002330                               ENDMOD
```

E4

SOFTWARE P TABLE

```
   2060
   2061                                 .TITLE GLOBAL AREAS
   2062                                 .SBTTL  GLOBAL EQUATES SECTION
   2071
   2072 002330                                  BGNMOD
   2073
   2074                                 ;++
   2075                                 ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
   2076                                 ; ARE USED IN MORE THAN ONE TEST.
   2077                                 ;
   2078
   2079 002330                                  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
```

F4

GLOBAL EQUATES SECTION

```
                000240                  PRIO5== 240
                000200                  PRIO4== 200
                000140                  PRIO3== 140
                000100                  PRIO2== 100
                000040                  PRIO1== 40
                000000                  PRIO0== 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
   2080
   2088
   2089                                 ; REGISTER USAGE.
   2090                                 ;
   2091                                 ;       R0   PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
   2092                                 ;       R1 - COMMAND SEQUENCE TABLE POINTER.
   2093                                 ;       R2 - GENERAL PURPOSE REGISTER.
   2094                                 ;       R3 - GENERAL PURPOSE REGISTER.
   2095                                 ;       R4 - GENERAL PURPOSE REGISTER.
   2096                                 ;       R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
   2097                                 ;       R6   STACK POINTER.
   2098                                 ;       R7   PROGRAM COUNTER.
```

GLOBAL EQUATES SECTION

```
2100
2101                            ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
2102
2103    100000                  TS.SC==100000                   ;SPECIAL CONDITION BIT.
2104    040000                  TS.UPE==40000                   ;UNIBUS PARITY ERROR
2105    020000                  TS.SPE==20000                   ;SERIAL BUS PARITY ERROR.
2106    010000                  TS.RMR==10000                   ;REGISTER MODIFICATION REFUSED.
2107    004000                  TS.NXM==4000                    ;NON-EXISTENT MEMORY.
2108    002000                  TS.NBA==2000                    ;NEED BUFFER ADDRESS.
2109    001000                  TS.A17==1000                    ;BUS ADDRESS BIT 17.
2110    000400                  TS.A16==400                     ;BUS ADDRESS BIT 16.
2111    000200                  TS.SSR==200                     ;UNIT READY BIT.
2112    000100                  TS.OFL==100                     ;OFF LINE.
2113    177717                  TSC.FCC==177717                 ;FATAL CLASS CODE MASK.
2114    177761                  TSC.TCC==177761                 ;TERMINATION CLASS CODE MASK.
2115
2116                            ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
2117
2118    100000                  ACK.C==100000                   ;ACKNOWLEDGE BIT
2119    040000                  CVC.C==40000                    ;CLEAR VOLUME CHECK.
2120    020000                  OPP.C==20000                    ;OPPOSITE BIT
2121    010000                  SWB.C==10000                    ;SWAP BYTE BIT
2122    004000                  MOD.C3==4000                    ;MODE BIT 3
2123    004000                  BRF.C==4000                     ;BYTE/RECORD/FILE COUNT FLAG BIT.  NOT USED
2124                                                            ;BY TSO5 BUT USED INTERNALLY BY THIS PROGRAM ONLY.
2125    002000                  MOD.C2==2000                    ;MODE BIT 2
2126    001000                  MOD.C1==1000                    ;MODE BIT 1
2127    000400                  MOD.C0==400                     ;MODE BIT 0
2128    000200                  IE.C==200                       ;INTERRUPT ENABLE
2129    000100                  FMT.C1==100                     ;FORMAT BIT 1
2130    000100                  VFY.C==100                      ;WRITE VERIFY FLAG BIT.  INTERNAL USE ONLY.
2131                                                            ;NOT USED BY TSO5.
2132    000040                  FMT.C0==40                      ;FORMAT BIT 0.
2133    000040                  JMP.C==40                       ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
2134                                                            ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
2135                                                            ;TABLE.  INTERNAL USE ONLY.
2136    000020                  CMD.C4==20                      ;COMMAND BIT 4
2137    000020                  DLY.C==20                       ;INSERT DELAY. INTERNAL USE ONLY.
2138    000010                  CMD.C3==10                      ;COMMAND BIT 3
2139    000004                  CMD.C2==4                       ;COMMAND BIT 2
2140    000002                  CMD.C1==2                       ;COMMAND BIT 1
2141    000001                  CMD.C0==1                       ;COMMAND BIT 0
2142
2143                            ;BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
2144
2145    000200                  CH.ESS==200                     ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT).
2146    000040                  CH.EAI==40                      ;ENABLE ATTENTION INTERRUPTS.
2147    000020                  CH.ERI==20                      ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
2148    000040                  DFTSCH==CH.EAI                  ;DEFAULT CHARACTERISTICS CODE.
```

GLOBAL EQUATES SECTION

```
2150
2151                                ;BIT DEFINITIONS FOR EXTENDED CONTROL WORD
2152
2153    000040                      EF.HSS==40                  ;ENABLE HIGH SPEED SELECT
2154    000030                      EF.RWB==30                  ;ENABLE BOTH READ & WRITE BUFFERING
2155    000020                      EF.RBO==20                  ;ENABLE READ BUFFERING ONLY
2156
2157                                ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
2158                                ;IN THE MESSAGE BUFFER.
2159
2160    000004                      MS.RFC==4                   ;RESIDUAL FRAME COUNT.
2161    000006                      MS.XS0==6                   ;EXT STATUS REG 0
2162    000010                      MS.XS1==10                  ;EXT STATUS REG 1
2163    000012                      MS.XS2==12                  ;EXT STATUS REG 2
2164    000014                      MS.XS3==14                  ;EXT STATUS REG 3
2165    000016                      MS.XS4==16                  ;EXT STATUS REG 4
2166
2167                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.
2168
2169    100000                      X0.TMK==100000              ;TAPE MARK.
2170    040000                      X0.RLS==40000               ;RECORD LENGTH SHORT.
2171    020000                      X0.LET==20000               ;LOGICAL EOT.
2172    010000                      X0.RLL==10000               ;RECORD LENGTH LONG.
2173    000100                      X0.ONL==100                 ;ON LINE BIT.
2174    000004                      X0.WLK==4                   ;WRITE LOCK BIT
2175    000002                      X0.BOT==2                   ;BOT BIT.
2176    000001                      X0.EOT==1                   ;EOT BIT.
2177
2178                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2.
2179
2180    100000                      X2.OPM==100000              ;OPERATION IN PROGRESS, TAPE MOVING
2181    000200                      X2 EFE==200                 ;EXTENDED FEATURES ENABLED
2182    000100                      X2.BFE==100                 ;BUFFERING ENABLED
2183
2184                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3.
2185
2186    000010                      X3.DCK==10                  ;DENSITY CHECK.
2187    157400                      X3.RNY==157400              ;CAPSTAN RUNAWAY UDIAG ERROR CODE.
2188
2189                                ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 4.
2190
2191    100000                      X4.HSS==100000              ;HIGH SPEED SWITCH INDICATING 100ips
2192    040000                      X4.RCE== 40000              ;RETRY COUNT EXCEEDED
2193
2194
2195                                ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
2196                                ;PACKET ENTRIES.
2197
2198    000000                      CP.CMD==0                   ;CMDPKT+0==TSO5 COMMAND.
2199    000002                      CP.ADL==2                   ;CMDPKT+2==BUFFER ADDRESS LOW.
2200    000004                      CP.ADH==4                   ;CMDPKT+4==BUFFER ADDRESS HIGH.
2201    000006                      CP.CNT==6                   ;CKDPKT+6==BYTE/FILE/RECORD COUNT
```

GLOBAL EQUATES SECTION

```
2203
2204                                ;MISCELLANEOUS DEFINITIONS.
2205
2206    000340                      INTPRI==PRIO7                   ;PRIORITY TO BE USED IN INTERRUPT STATE.
2207    000012                      SCHCNT==12                      ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
2208                                                                ;BUFFER LENGTH. (EVEN #)
2209    000020                      MSGCNT==20                      ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
2210    000020                      DIACNT==20                      ;DIAGNOSTIC COMMAND BUFFER EXTENT.
2211    004000                      DATCNT==2048.                   ;MAXIMUM RECORD LENGTH IN BYTES.
2212                                                                ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSURE
2213                                                                ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPER.
2214    177740                      RNOPSC==177740                  ;RANDOM # OF OPERATIONS MASK.
2215    000007                      RANP==7                         ;CODE TO SELECT RANDOM PATTERN.
2216    000020                      RRECL==16.                      ;READ RECOVERY ATTEMPT LIMIT.
2217    000020                      WRECL==16.                      ;WRITE RECOVERY ATTEMPT LIMIT.
2218    153624                      RANBC==153624                   ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
2219    032561                      RANSC==32561                    ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
2220    177774                      NINUSE==177774                  ;NOT IN USE CODE FOR DEVICE STATE TABLE.
2221    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
2222                                                                ;NOT "COMMAND" BITS.
2223
2224                                ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TSOS COMMAND.
2225
2226    100013                      DRI==   ACK.C!CMD.C3!CMD.C1!CMD.C0
2227                                                                ;DRIVE INIT.
2228
2229    104001                      RDF==   ACK.C!BRF.C!CMD.C0
2230                                                                ;READ FORWARD
2231
2232    104401                      RDR==   ACK.C!BRF.C!MOD.C0!CMD.C0
2233                                                                ;READ REVERSE
2234
2235    104005                      WRT==   ACK.C!BRF.C!CMD.C0!CMD.C2
2236                                                                ;WRITE COMMAND
2237
2238    104105                      WTV==   ACK.C!BRF.C!VFY.C!CMD.C0!CMD.C2
2239                                                                ;WRITE VERIFY
2240
2241    104010                      SRF==   ACK.C!BRF.C!CMD.C3
2242                                                                ;SPACE RECORD FORWARD
2243
2244    104410                      SRR==   ACK.C!BRF.C!MOD.C0!CMD.C3
2245                                                                ;SPACE RECORD REVERSE
2246
2247    105401                      RNR==   ACK.C!BRF.C!MOD.C1!MOD.C0!CMD.C0
2248                                        ;READ REV RETRY1   REREAD NEXT REVERSE, IF. SPACE FWD, READ REVERSE
2249
2250    125401                      RNF==   ACK.C!BRF.C!OPP.C!MOD.C1!MOD.C0!CMD.C0
2251                                        ;READ REV RETRY2   REREAD NEXT FORWARD, IE.READ FORWARD, SPACE REVERSE
2252
2253    105001                      RPF==   ACK.C!BRF.C!MOD.C1!CMD.C0
2254                                        ;READ FWD RETRY1   REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, READ FORWARD
2255
2256    125001                      RPR==   ACK.C!BRF.C!OPP.C!MOD.C1!CMD.C0
2257                                        ;READ FWD RETRY2   REREAD PREVIOUS REVERSE, IE. READ REVERSE, SPACE FORWARD
2258
2259    105005                      WRR==   ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.C0
```

J4

GLOBAL EQUATES SECTION

```
2260                                                    ;WRITE RETRY
2261
2262        102010          RWD==   ACK.C!MOD.C2!CMD.C3
2263                                                    ;REWIND COMMAND
2264
2265        100012          MBR==   ACK.C!CMD.C3!CMD.C1
2266                                                    ;MESSAGE BUFFER RELEASE
2267
2268        100011          WTM==   ACK.C!CMD.C3!CMD.C0
2269                                                    ;WRITE TAPE MARK.
2270
2271        101011          WTR==   ACK.C!MOD.C1!CMD.C3!CMD.C0
2272                                                    ;WRITE TAPE MARK RETRY.
2273
2274        105010          SFF==   ACK.C!BRF.C!MOD.C1!CMD.C3
2275                                                    ;SPACE FILE FORWARD
2276
2277        105410          SFR==   ACK.C!BRF.C!MOD.C0!MOD.C1!CMD.C3
2278                                                    ;SPACE FILE REVERSE
2279
2280        100017          GES==   ACK.C!CMD.C0!CMD.C1!CMD.C2!CMD.C3
2281                                                    ;GET EXTENDED STATUS
2282
2283        100411          ERS==   ACK.C!MOD.C0!CMD.C3!CMD.C0
2284                                                    ;ERASE 3 INCHES OF TAPE
2285
2286        100412          UNL==   ACK.C!MOD.C0!CMD.C3!CMD.C1
2287                                                    ;UNLOAD COMMAND
2288
2289        101012          CLN==   ACK.C!MOD.C1!CMD.C3!CMD.C1
2290                                                    ;ERASE TAPE.
2291
2292        140004          SCH==   ACK.C!CVC.C!CMD.C2      ;SET DEVICE CHARACTERISTICS.
2293
2294        140006          WSM==   ACK.C!CVC.C!CMD.C2!CMD.C1       ;WRITE SUB SYS MEM
2295
2296        100006          DIA==   ACK.C!CMD.C2!CMD.C1     ;DIAGNOSTICS.
2297
2298        000040          JMP==   JMP.C                   ;JUMP TO "N"TH COMMAND
2299
2300        000020          DLY==   DLY.C                   ;DELAY "N" MS.
2301
2302        177777          END==   177777                  ;END OF COMMAND SEQUENCES
```

GLOBAL DATA SECTION

```
                                .SBTTL  GLOBAL DATA SECTION
                                ;++
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;
                                ;       COMMAND PACKET.
002330                          .       =       <.+3>&177774    ;MUST BE ON MOD 4 BOUNDRY.
002330  000000                  CMDPKT:: 0                      ;1ST WORD IS TSO5 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
```

L4

SEQ 0050

GLOBAL DATA SECTION

```
                                ;       TSO5 REGISTER ADDRESSES.
002514                          TSDB::  .BLKW    4              ;TSO5 DATA BUFFER ADDRESSES.
002524                          TSSR::  .BLKW    4              ;TSO5 STATUS REGISTER ADDRESSES.
002534                          TSVCT:: .BLKW    4              ;TSO5 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  010074                  TS5INT:: TS5IN0                 ;DEVICE 0.
002556  010102                           TS5IN1                 ;DEVICE 1.
002560  010110                           TS5IN2                 ;DEVICE 2.
002562  010116                           TS5IN3                 ;DEVICE 3.

                                ;       TSO5 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

                                ;       TSO5 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
002602  000000                          0                       ;DEVICE 3

                                ;       UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
                                ;       WHEN DEVICE IS NOT IN USE, IT,S LOCATION WILL = 3.
                                ;       R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
002604  177774                  DEVTBL:: .WORD  NINUSE
002606  177774                           .WORD  NINUSE
002610  177774                           .WORD  NINUSE
002612  177774                           .WORD  NINUSE
002614  177777                           .WORD  END

                                ;       BAD TAPE TABLE POINTER: USED BY WRITE RETRY ROUTINE
                                ;       "WRTY" TO LOG BAD TAPE SPOTS ON UNITS UNDER TEST
002616  003046                  BTADDR:: BT0
002620  003120                           BT1
002622  003172                           BT2
002624  003244                           BT3
```

```
GLOBAL DATA SECTION

                                ;       COUNTER AREA.

                        002626  CNTBGN=.
002626                  002626  WRBC::  .BLKW   20              ;BYTES WRITTEN.
002666                  002666  RRBC::  .BLKW   20              ;BYTES READ REV.
002726                  002726  RFBC::  .BLKW   20              ;BYTES READ FWD.
002766                  002766  WRREC:: .BLKW   4               ;RECOVERABLE WRITE ERRORS.
002776                  002776  WRUNR:: .BLKW   4               ;UNRECOVERABLE WRITE ERRORS.
003006                  003006  RRREC:: .BLKW   4               ;RECOVERABLE READ REV ERRORS.
003016                  003016  RRUNR:: .BLKW   4               ;UNRECOVERABLE READ REV ERRORS.
003026                  003026  RFREC:: .BLKW   4               ;RECOVERABLE READ FWDERRORS.
003036                  003036  RFUNR:: .BLKW   4               ;UNRECOVERABLE READ FWD ERRORS.
003046                  003046  BTO::   .BLKW   21.             ;UNIT 0 BAT TAPE SPOTS LOG
003120                  003120  BT1::   .BLKW   21.             ;UNIT 1 BAT TAPE SPOTS LOG
003172                  003172  BT2::   .BLKW   21.             ;UNIT 2 BAT TAPE SPOTS LOG
003244                  003244  BT3::   .BLKW   21.             ;UNIT 3 BAT TAPE SPOTS LOG
003316                  003316  WRTYCT:: .BLKW  4               ;WRITE RETRY COUNTER
003326                  003326  PASCNT:: .BLKW  4               ;PASS COUNT.
003336                  003336  SCCNT:: .BLKW   4               ;SPECIAL CONDITION COUNT.
003346                  003346  VFYCNT:: .BLKW  4               ;COUNT OF TSO5 DATA COMPARE ERRORS.
003356                  003356  HRDCNT:: .BLKW  4               ;COUNT OF HARD ERRORS.
003366                  003366  FTLCNT:: .BLKW  4               ;COUNT OF FATAL ERRORS.
                        003376  CNTEND=.                        ;END OF STATICTICAL COUNTERS.
003376                  003376  RECCNT:: .BLKW  4               ;NUMBER OF RECORDS FROM BOT: CLEARED  ON REWIND
                                                                ;AND WHEN RESTARTING OR CONTINUING TEST 2.
                        000550  CNTLEN=:CNTEND CNTBGN           ;LENGTH OF STATISTICAL COUNTER AREA.


                                ;       THE FOLLOWING ARE THE DEFINITIONS OF VARIABLES
                                ;       USED BY THE PROGRAM.

003406          000000  003406  DATAWT:: .WORD  0               ;WRITE BUFFER ADDRESS.
                        003406  DIABLK=:DATAWT                  ;WRITE BUFFER ALSO USED FOR DIAG CMD.
003410          000000  003410  DATARD:: .WORD  0               ;READ BUFFER ADDRESS.
003412          000000  003412  NCNT::  .WORD   0               ;STORAGE FOR VALUE OF N.
003414          000000  003414  NCNT1:: .WORD   0               ;TEMP STORAGE FOR VALUE OF N.
003416          000000  003416  BRFCNT:: .WORD  0               ;STORAGE FOR BPCR VALUE.
003420          177777  003420  CMDWRD:: .WORD  END             ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
003422          177777  003422  CMDSAV:: .WORD  END             ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVERY
003424          177777  003424  PCMDWD:: .WORD  END             ;CONTAINS PREVOUS COMMAND WORD.
003426          000000  003426  CMDLG:: .WORD   0               ;CURRENT COMMAND LOGGING CODE.
003430          000000  003430  LENMSK:: .WORD  0               ;RANDOM WRITE LENGTH MASK, TO BE SET UP BY TESTS
003432          153624  003432  RANB::  .WORD   153624          ;RANDOM # GENERATOR BASE.
003434          032561  003434  RANS::  .WORD   32561           ;RANDOM # SAVE LOCATION.
003436          000000  003436  TIME1:: .WORD   0               ;TIME COUNT 1.
003440          000000  003440  TIME2:: .WORD   0               ;TIME COUNT 2.
003442          000000  003442  JLOOP:: .WORD   0               ;JMP COMMAND LOOP COUNT.
003444          000000  003444  JLOC::  .WORD   0               ;JMP COMMAND LOCATION COUNT.
003446          000000  003446  PATERN:: .WORD  0               ;PATTERN SELECT CODE.
003450          000000  003450  CTCC::  .WORD   0               ;CURRENT TERMINATION CLASS CODE.
003452          000000  003452  R5SAVE:: .WORD  0               ;LOCATION FOR SAVING CURRENT DEVICE POINTER.
003454          000000  003454  TSSREG:: .WORD  0               ;CURRENT STATUS REGISTER.
003456          000000  003456  WTMFLG:: .WORD  0               ;WRITE TAPE MARK FLAG
```

GLOBAL DATA SECTION

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

                 003460         BGNFLG=.
003460 000000                   RETRYC:: .WORD  0               ;# OF RECOVERY ATTEMPTS EXECUTED.
003462    000                   RPTCNT:: .BYTE  0               ;WRITE REPEAT ON SAME SPOT CNTR: 4 PER WRITE RETRY
003463    000                   WRTYFG:: .BYTE  0               ;WRITE RETRY ON SAME SPOT IN PROGRESS FLAG
003464    000                   WRTYER:: .BYTE  0               ;WRITE RETRY ON SAME SPOT ERROR FLAG
003465    000                   RECLOG:: .BYTE  0               ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
003466    000                   ERLOG::  .BYTE  0               ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS RECORD.
003467    000                   RWERR::  .BYTE  0               ;READ/WRITE ERROR HAS OCCURED.
003470    000                   UNREC::  .BYTE  0               ;UNRECOVERABLE ERROR HAS OCCURED.
003471    000                   ERRREC:: .BYTE  0               ;ERROR RECOVERY MODE.
                                        .EVEN
                 003472         ENDERF=.

                                ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.

003472                          INTFLG:: .BLKW  4               ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
003502                          EOTFLG:: .BLKW  4               ;EOT/BOT FLAGS FOR EACH DEVICE (XSTATO).
003512 000000                   BTPT::   .WORD  0               ;BAD TAPE SPOT POINTER TO BT0-BT3 VIA BTADDR
003514    000                   EXPBOT:: .BYTE  0               ;BOT IS EXPECTED, DO NOT ABORT ON BOT/FUNC RTI.
003515    000                   RANDOM:: .BYTE  0               ;RANDOM EVERYTHING FLAG.
003516    000                   VFYFLG:: .BYTE  0               ;SET DURING WRITE/VERIFY COMMAND.
003517    000                   RPTFLG:: .BYTE  0               ;PERFORMANCE REPORT HAS BEEN REQUESTED.
003520    000                   SWBFLG:: .BYTE  0               ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZERO.
003521    000                   IRE::    .BYTE  0               ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
003522    000                   DROPED:: .BYTE  0               ;CURRENT UNIT HAS BEEN DROPPED
003523    000                   T1SWB::  .BYTE  0               ;TEST1 SWAP BYTES FLAG
003524    000                   ALLEOT:: .BYTE  0               ;ALL UNITS  @ EOT FLAG
003525    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.

003526    000                   STAFLG:: .BYTE  0               ;START FLAG - SET BY INIT CODE IF STARTING.
003527    000                   PWRFLG:: .BYTE  0               ;POWER FAILURE FLAG - SET ONLY DURING INIT.
003530    000                   TRAPD4:: .BYTE  0               ;TRAPED AT 4 FLAG
003531    000                   MISCFG:: .BYTE  0               ;MISCELLANEOUS FLAG
003532 000000                   TSUNT::  .WORD  0               ;NUMBER OF THE UNIT UNDER TEST PLUS HSSP&BUF
003534 000000                   TSNP::   .WORD  0               ;FOR PRINT OUT UNIT # ONLY

                                ;       OPERATOR FLAG SETTINGS PASSED BY DIAG. SUPERVISOR IN A 16 BIT WORD
                                ;       SEE GLOBAL EQUATES SECTION FOR FLAG BIT LIST

003536 000000                   OPFLAG:: .WORD  0       ;READ ONLY OPERATOR FLAG WORD
                                        .EVEN
```

GLOBAL DATA SECTION

```
                                        ;THE FOLLOWING IS THE COMMAND SEQUENCE TABLE.  THE TABLE
                                        ;HAS DEFAULT VALUES AT PROGRAM LOAD AS SHOWN.  THESE VALUES
                                        ;CAN BE UPDATED BY A TEST OR BY OPERATOR INPUT.

003540  140004          CMDSEQ:: .WORD  SCH             ;SET CHARACTERISTICS.
003542  000040                   .WORD  CH.EAI
003544  000001                   .WORD  1
003546  000000                   .WORD  0
003550  102010          CMDSE2:: .WORD  RWD             ;REWIND.
003552  000001                   .WORD  1               ;BYTE COUNT.
003554  000001                   .WORD  1               ;ONCE.
003556  000007                   .WORD  RANP            ;PATTERN.
003560  104005                   .WORD  WRT             ;WRITE.
003562  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003564  076400                   .WORD  32000.          ;32,000 RECORDS.
003566  000007                   .WORD  RANP            ;RANDOM PATTERN.
003570  104401                   .WORD  RDR             ;READ REV.
003572  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003574  076400                   .WORD  32000.          ;32,000 RECORDS
003576  000007                   .WORD  RANP            ;RANDOM PATTERN.
003600  104001                   .WORD  RDF             ;READ FWD.
003602  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003604  076400                   .WORD  32000.          ;32,000 RECORDS.
003606  000007                   .WORD  RANP            ;RANDOM PATTERN.
003610  102010                   .WORD  RWD             ;REWIND.
003612  000001                   .WORD  1               ;BYTE COUNT.
003614  000001                   .WORD  1               ;ONCE.
003616  000007                   .WORD  RANP            ;PATTERN.
003620                           .BLKW  40.             ;EXTENSTION TO DOUBLE BUFFER SIZE
003740  177777          SEQEND:: .WORD  END             ;SOFT END OF SEQUENCE TABLE.
003742  177777                   .WORD  END
003744  177777                   .WORD  END
003746  177777                   .WORD  END
003750  177777                   .WORD  END             ;HARD END OF SEQUENCE TABLE.
                                ;THE FOLLOWING IS THE TS05 COMMAND TABLE

003752  100013          CMDTBL:: .WORD  DRI             ;DRIVE INIT.
003754  104001                   .WORD  RDF             ;READ FORWARD.
003756  104401                   .WORD  RDR             ;READ REVERSE.
003760  104005                   .WORD  WRT             ;WRITE
003762  104105                   .WORD  WTV             ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND
                                                        ;CHECK DATA ON ALL RECORDS, RDF AND
                                                        ;CHECK DATA ON ALL RECORDS.)
003764  104010                   .WORD  SRF             ;SPACE "N" RECORDS FORWARD.
003766  104410                   .WORD  SRR             ;SPACE "N" RECORDS REVERSE.
003770  105401                   .WORD  RNR             ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERSE.
003772  125401                   .WORD  RNF             ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
003774  105001                   .WORD  RPF             ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, READ FORWARD
003776  125001                   .WORD  RPR             ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPACE FORWARD
004000  105005                   .WORD  WRR             ;WRITE RETRY.
004002  102010                   .WORD  RWD             ;REWIND.
004004  100012                   .WORD  MBR             ;MESSAGE BUFFER RELEASE
004006  100011                   .WORD  WTM             ;WRITE TAPE MARK
004010  101011                   .WORD  WTR             ;WRITE TAPE MARK RETRY.
004012  105010                   .WORD  SFF             ;SPACE "N" FILES FORWARD.
004014  105410                   .WORD  SFR             ;SPACE "N" FILES REVERSE.
004016  100017                   .WORD  GES             ;GET EXTENDED STATUS.
```

GLOBAL DATA SECTION

```
2571 004020  100411                          .WORD   ERS             ;ERASE 3 INCHES OF TAPE.
2572 004022  100412                          .WORD   UNL             ;REWIND AND UNLOAD.
2573 004024  101012                          .WORD   CLN             ;CLEAR TAPE.
2574 004026  140004                          .WORD   SCH             ;SET CHARACTERISTICS.
2575 004030  100006                          .WORD   DIA             ;DIAGNOSTIC COMMAND.
2576 004032  000040                          .WORD   JMP             ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
2577 004034  000020                          .WORD   DLY             ;DELAY "N" MS.
2578 004036  177777                          .WORD   END             ;END OF COMMAND TABLE
2579
2580                                  ;       THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.
2581
2582 004040      104     122     111  CMDASC:: .ASCII /DRI/           ;DRIVE INIT.
2583 004043      122     104     106          .ASCII  /RDF/           ;READ FORWARD.
2584 004046      122     104     122          .ASCII  /RDR/           ;READ REVERSE.
2585 004051      127     122     124          .ASCII  /WRT/           ;WRITE
2586 004054      127     124     126          .ASCII  /WTV/           ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND CHECK DATA
2587                                                                 ;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECORDS.)
2588 004057      123     122     106          .ASCII  /SRF/           ;SPACE "N" RECORDS FORWARD.
2589 004062      123     122     122          .ASCII  /SRR/           ;SPACE "N"  RECORDS REVERSE.
2590 004065      122     116     122          .ASCII  /RNR/           ;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE.
2591 004070      122     116     106          .ASCII  /RNF/           ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
2592 004073      122     120     106          .ASCII  /RPF/           ;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ FORWARD
2593 004076      122     120     122          .ASCII  /RPR/           ;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE FORWARD
2594 004101      127     122     122          .ASCII  /WRR/           ;WRITE RETRY.
2595 004104      122     127     104          .ASCII  /RWD/           ;REWIND.
2596 004107      115     102     122          .ASCII  /MBR/           ;MESSAGE BUFFER RELEASE
2597 004112      127     124     115          .ASCII  /WTM/           ;WRITE TAPE MARK
2598 004115      127     124     122          .ASCII  /WTR/           ;WRITE TAPE MARK RETRY.
2599 004120      123     106     106          .ASCII  /SFF/           ;SPACE "N" FILES FORWARD.
2600 004123      123     106     122          .ASCII  /SFR/           ;SPACE "N" FILES REVERSE.
2601 004126      107     105     123          .ASCII  /GES/           ;GET EXTENDED STATUS.
2602 004131      105     122     123          .ASCII  /ERS/           ;ERASE 3 INCHES OF TAPE.
2603 004134      125     116     114          .ASCII  /UNL/           ;REWIND AND UNLOAD.
2604 004137      103     114     116          .ASCII  /CLN/           ;CLEAN TAPE.
2605 004142      123     103     110          .ASCII  /SCH/           ;SET CHARACTERISTICS.  WHERE BRF=200, 40, 20, 0.
2606                                                                 ;SEE TSV05/TS05 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
2607 004145      104     111     101          .ASCII  /DIA/           ;DIAGNOSTICS.  SEE TSV05/TS05 PROGRAMMING SPECIFICATION
2608                                                                 ;FOR DESCRIPTION.  ODT MUST BE USED TO LOAD DIAGNOSTIC DATA
2609                                                                 ;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
2610 004150      112     115     120          .ASCII  /JMP/           ;JUMP TO THE NTH COMMAND IN THE COMMAND
2611                                                                 ;SEQUENCE TABLE, WHERE N IS DEFINED IN
2612                                                                 ;THE # OF OPERATIONS.
2613 004153      104     114     131          .ASCII  /DLY/           ;DELAY "N" MS, WHERE N IS DEFINED IN
2614                                                                 ;THE # OF OPERATIONS.
2615 004156      105     116     104          .ASCII  /END/           ;END OF COMMAND SEQUENCE.
2616                                          .EVEN
2617
```

GLOBAL TEXT SECTION

```
                                .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 TSO5 CODE LEVEL %O3%N%N/
004231  045  116  045  SWSET::   .ASCIZ  /%N%AUNIT %D1%A TSO5 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/
004521  122  106  103  RFCERM::  .ASCIZ /RFC NON ZERO/
004536  124  123  126  NSSRM::   .ASCIZ  /TSV05 NOT READY/
004556  122  105  124  RLEXM::   .ASCIZ  /RETRY LIMIT EXCEEDED/
004603  104  122  111  ATTNM::   .ASCIZ  /DRIVE OFF LINE/
004622  106  125  116  FUNRM::   .ASCIZ  /FUNCTION REJECT/
004642  106  101  124  FATSM::   .ASCIZ  /FATAL SUBSYSTEM ERROR/
004670  116  117  040  NOINTM::  .ASCIZ /NO INTERRUPT/
004705  124  101  120  TSAM::     ASCIZ  /TAPE STATUS ALERT/
004727  124  117  117  TOOMM::   .ASCIZ  /TOO MANY INTERRUPTS/
004753  103  101  120  RNYM::    .ASCIZ  /CAPSTAN RUNAWAY-GET STATUS RESULTS:/
005017  122  105  103  RERM::    .ASCIZ  /RECOVERABLE ERROR/
005041  125  116  122  URERM::   .ASCIZ  /UNRECOVERABLE ERROR/
005065  045  116  045  DROPDM::  .ASCIZ /%N%ADROPPED UNIT %D1%N/
005114  045  116  045  AUDRPM::  .ASCIZ /%N%AALL UNITS DROPPED%N%N/
005146  045  116  045  AUDRUN::  .ASCIZ /%N%ADIAGNOSTIC ONLY SUPPORTS ONE CONTROLLER%N%N/
005226  045  116  045  DTAER2::  .ASCIZ "%N%ABYTE:%D4%S2%AWAS:%B8%S2%AS/B:%B8%N"
005275  045  104  064  DTAER3::  .ASCIZ "%D4%A BYTES IN ERROR OUT OF %D4%N"
005337  045  101  116  DTAER4::  .ASCIZ /%AND DATA READ%N/
005360  045  101  122  DTAER5::  .ASCIZ /%RECORD TOO LONG: >%O4%A BYTES%N/
005422  045  101  122  NURTY1::  .ASCIZ /%ARECOVERED ON RETRY #%D2%N/
005456  045  101  104  OFLINM::  .ASCIZ /%ADRIVE %D1%A OFF LINE%N/
005507  045  101  107  GETSTM::  .ASCIZ /%AGET STATUS CMD RESULTS:%N/
005543  045  116  045  NODEV::   .ASCII  /%N%ABUS TRAP AT %O6%N/
005570  045  101  111            .ASCIZ  /%AINTERFACE BAD OR TSD8 NOT SET TO ABOVE ADDRESS%N/
005653  040  052  052  UNIWLK:   .ASCIZ  / *****TAPE IS WRITE-LOCKED AND WILL CAUSE ERRORS*****/
005741  045  116  000  CRLF::    .ASCIZ  /%N/
005744  045  116  045  CRLFSP::  .ASCIZ /%N%S7/
                                .LIST   BEX
                                .EVEN
```

GLOBAL ERROR REPORT SECTION

```
                                .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..
                                ; -


005752                                  BGNMSG  DTAERM
005752                          DTAERM::
005752                          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$PNTB
006002  062706  000012                                                  ADD     #12,SP
006006                                  PRINTB  #STAER7
006006  012746  006530                                                  MOV     #STAER7,-(SP)
006012  012746  000001                                                  MOV     #1,-(SP)
006016  010600                                                          MOV     SP,R0
006020  104414                                                          TRAP    C$PNTB
006022  062706  000004                                                  ADD     #4,SP
006026  010237  007066                  MOV     R2,RECRED               ;SAVE R2
006032  010337  003436                  MOV     R3,TIME1                ;SAVE R3
006036  010437  003440                  MOV     R4,TIME2                ;SAVE R4
006042  004737  010124                  JSR     PC,RECTAP                       ;RETRIEVE RECORD READ
006046  013702  007066                  MOV     RECRED,R2               ;RESTORE R2
006052  010337  007066                  MOV     R3,RECRED               ;SAVE RECORD READ
006056  013703  003436                  MOV     TIME1,R3                ;RESTORE R3
006062  013704  003440                  MOV     TIME2,R4                ;RESTORE R4
006066                                  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$PNTB
006106  062706  000006                                                  ADD     #6,SP
006112                                  EXIT    MSG
006112  000167                                                          .WORD   J$JMP
006114  000000                                                          .WORD   L10002-2-.

                                .EVEN

                                ENDMSG
006116                          L10002:
006116  104423                                                          TRAP    C$MSG

                                BGNMSG  STAERM
006120                          STAERM::
006120                          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)
```

GLOBAL ERROR REPORT SECTION

```
        006140  012746  000004                                                  MOV     #4,-(SP)
        006144  010600                                                          MOV     SP,R0
        006146  104414                                                          TRAP    C$PNTB
        006150  062706  000012                                                  ADD     #12.SP
   2712 006154                          PRINTB  #STAER7
        006154  012746  006530                                                  MOV     #STAER7,-(SP)
        006160  012746  000001                                                  MOV     #1,-(SP)
        006164  010600                                                          MOV     SP,R0
        006166  104414                                                          TRAP    C$PNTB
        006170  062706  000004                                                  ADD     #4,SP
   2713 006174  013702  002330          MOV     CMDPKT,R2
   2714 006200  042702  177740          BIC     #177740,R2
   2715 006204  005302                  DEC     R2                      ;IF CMD IS A READ
   2716 006206  005702                  TST     R2
   2717 006210  001016                  BNE     50000$
   2718 006212  004737  010124          JSR     PC,RECTAP                       ;THEN RETRIEVE
   2719 006216  010337  010124          MOV     R3,RECTAP               ;AND
   2720 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$PNTB
        006242  062706  000006                                                  ADD     #6,SP
   2721 006246                  50000$: PRINTX  #STAER2
        006246  012746  006616                                                  MOV     #STAER2,-(SP)
        006252  012746  000001                                                  MOV     #1,-(SP)
        006256  010600                                                          MOV     SP,R0
        006260  104415                                                          TRAP    C$PNTX
        006262  062706  000004                                                  ADD     #4,SP
   2722 006266                          PRINTX  #STAER3,CMDPKT,@TSDB(R5),MSGPKT+MS.RFC,TSSREG,CTCC
        006266  013746  003450                                                  MOV     CTCC,-(SP)
        006272  013746  003454                                                  MOV     TSSREG,-(SP)
        006276  013746  002360                                                  MOV     MSGPKT+MS.RFC,-(SP)
        006302  017546  002514                                                  MOV     @TSDB(R5),-(SP)
        006306  013746  002330                                                  MOV     CMDPKT,-(SP)
        006312  012746  006675                                                  MOV     #STAER3,-(SP)
        006316  012746  000006                                                  MOV     #6,-(SP)
        006322  010600                                                          MOV     SP,R0
        006324  104415                                                          TRAP    C$PNTX
        006326  062706  000016                                                  ADD     #16,SP
   2723 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
   2724 006366                          PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3,MSGPKT+MS.XS
4
        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)
```

```
GLOBAL ERROR REPORT SECTION

        006416  012746  000006                                                  MOV     #6, (SP)
        006422  010600                                                          MOV     SP,R0
        006424  104415                                                          TRAP    C$PNTX
        006426  062706  000016                                                  ADD     #16,SP
  2725  006432                          EXIT    MSG
        006432  000167                                                          .WORD   J$JMP
        006434  000432                                                          .WORD   L10003 2 .
  2726
  2727                                  .NLIST  BEX
  2728  006436    045     101     130   STAER1: .ASCIZ  /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
  2729                                  .EVEN
  2730  006530    045     101     120   STAER7: .ASCIZ  /%APREVIOUS CMD WAS  XXX  /
  2731  006562    045     123     061   STAER6: .ASCIZ  /%S11%A* RECORD READ:%D5%A */
  2732  006616    045     116     045   STAER2: .ASCIZ  /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/
  2733  006675    045     117     066   STAER3: .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%D1%N/
  2734  006733    045     117     066   STAER4: .ASCII  /%06%N/
  2735  006740    045     117     066           .ASCII  /%06%N/
  2736  006745    045     117     066           .ASCIZ  /%06%N/
  2737  006753    045     101     130   STAER5: .ASCII  /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%S4%AXST4%N/
  2738  007027    045     117     066           .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%06%N/
  2739                                  .LIST   BEX
  2740                                  .EVEN
  2741  007066  000000                RECRED: .WORD   0                       ;RECORD READ FROM TAPE
  2742
  2743  007070                                ENDMSG
        007070                          L10003:
        007070  104423                                                          TRAP    C$MSG
  2744
  2745                                  .SBTTL  GLOBAL SUBROUTINES SECTION
  2746
  2747                                  ;++
  2748                                  ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
  2749                                  ; THAT ARE USED IN MORE THAN ONE TEST.
  2750                                  ; -
  2751
  2752
  2753
  2754                                  ;+
  2755                                  ;
  2756                                  ;ROUTINE TO DO A SOFT INITIALIZE OF THE CONTROLLER
  2757                                  ;BY WRITING INTO THE TSSR REGISTER. AFTER THE INIT,
  2758                                  ;THE TSSR REGISTER IS TESTED FOR ERRORS. ANY ERRORS
  2759                                  ;DETECTED SHOULD BE TREATED AS DEVICE FATAL ERRORS.
  2760                                  ;
  2761                                  ;INPUTS:
  2762                                  ;
  2763                                  ;       R5      CURRENT UNIT NUMBER
  2764                                  ;
  2765                                  ;
  2766                                  ;OUTPUTS:
  2767                                  ;
  2768                                  ;       R0      CONTENTS OF TSSR, IF ERROR
  2769                                  ;       CARRY   SET IF INIT WAS OKAY
  2770                                  ;               CLEAR IF FATAL ERROR
  2771                                  ;
  2772                                  ;CALLING SEQUENCE:
  2773                                  ;       JSR     PC,FIRSTU
```

H5

GLOBAL SUBROUTINES SECTION

```
                                        ;       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  012740                      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)+
```

```
GLOBAL SUBROUTINES SECTION

        007226  000000                                                                  .WORD   0
        007230  013727  002116                                                        MOV     L$DLY,(PC)+
        007234  000000                                                                  .WORD   0
        007236  005367  177772                                                        DEC     6(PC)
        007242  001375                                                                BNE     .-4
        007244  005367  177756                                                        DEC     22(PC)
        007250  001367                                                                BNE     .-20
  2821  007252  005316                        DEC     (SP)            ;REDUCE DELAY COUNT
  2822  007254  001356                        BNE     2$              ;RETRY UNTIL TIMER EXPIRES
  2823  007256  000241                        CLC                     ; C = 0, CONTROLLER STILL RUNNING...
  2824  007260  000401                        BR      4$              ;...OR HUNG UP AFTER 300 MSEC.
  2825  007262  000261               3$:     SEC                     ; C = 1, CONTROLLER IS STOPPED.
  2826  007264  005326               4$:     DEC     (SP)+           ;RESTORE STACK WITHOUT CHANGING CARRY BIT
  2827  007266  000207                       RTS     PC
  2828
  2829
  2830
  2831                                  ;+
  2832                                  ;
  2833                                  ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND AND CHECK FEATURES
  2834                                  ;
  2835                                  ;INPUT:
  2836                                  ;
  2837                                  ;       R4      ADDRESS OF COMMAND PACKET
  2838                                  ;       R5      CURRENT UNIT NUMBER
  2839                                  ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
  2840                                  ;
  2841                                  ;OUTPUT:
  2842                                  ;
  2843                                  ;       R0      TSSR CONTENTS
  2844                                  ;       CARRY   SET   WRITE CHARACTERISTICS COMMAND OK
  2845                                  ;               CLR   WRITE CHARACTERISTICS FAILED
  2846                                  ;
  2847                                  ;IMPLICIT OUTPUT:
  2848                                  ;
  2849                                  ;       SOFTWARE SWITCHES SET AS FOLLOWS:
  2850                                  ;               EXTFEA = EXTENDED FEATURES PRESENT
  2851                                  ;               BENBSW = BUFFER ENABLE SWITCH ON OR OFF
  2852                                  ;
  2853                                  ;
  2854                                  ;SIDE EFFECTS:
  2855                                  ;
  2856                                  ;
  2857                                  ;-
  2858
  2859  007270                          WRTCHK::
  2860  007270  010475  002514       10$:     MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
  2861  007274  004737  007204               JSR     PC,WAITF                ;WAIT FOR SSR
  2862  007300  103401                       BCS     40$                     ;BR, IF SSR IS SET AND OK
  2863  007302  000441                       BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
  2864  007304  005724               40$:    TST     (R4)+                   ;STEP IT
  2865  007306  011402                       MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
  2866  007310  011203                       MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
  2867  007312  032763  000200  000012       BIT     #X2.EFE,MS.XS2(R3)      ;EXTENDED FEATURES BIT SET?
  2868  007320  001402                       BEQ     45$                     ;BR IF NO
  2869  007322  005237  002322               INC     EXTFEA                  ;SET EXTENDED FEATURES SW SWITCH
  2870  007326                        45$:
```

```
GLOBAL SUBROUTINES SECTION

 2871 007326  032763  000100  000012          BIT     #X2.BFE,MS.XS2(R3)      ;BUFFER ENABLE SWITCH SET
 2872 007334  001402                          BEQ     50$                     ;BR, IF SWITCH NOT SET
 2873 007336  005237  002326                  INC     BENBSW                  ;SET SOFTWARE SWITCH FOR ENABLED
 2874 007342                          50$:
 2875 007342  016337  000000G 002324          MOV     XST2(R3),REV            ;MICROCODE REV LEVEL
 2876 007350  042737  017700  002324          BIC     #17700,REV              ;CLEAR UNWANTED BITS
 2877 007356  022737  000001  002324          CMP     #1,REV                  ;IS IT A NEW MICROCODE
 2878 007364  001406                          BEQ     55$                     ;NO BR
 2879 007366  012737  000001  002322          MOV     #1,EXTFEA               ;ALWAY EXTENDED FEATURE FOR NEW
 2880                                                                         ;MICROCODE
 2881 007374  052763  000000G 000000G          BIS     #X2.EXTF,XST2(R3)       ;EXTENDED FEATURE ALWAYS SET IN
 2882                                                                         ;MICROCODE
 2883 007402  000261                  55$:    SEC                             ;SET CARRY NO TROUBLE
 2884 007404  000401                          BR      70$                     ;EXIT
 2885 007406  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
 2886 007410  017500  002524          70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
 2887 007414  000207                          RTS     PC                      ;RETURN
 2888
 2889                                 ;*
 2890                                 ;
 2891                                 ;ROUTINE TO CHECK WRITE LOCK CONDITION
 2892                                 ;
 2893                                 ;INPUT:
 2894                                 ;
 2895                                 ;       R4      ADDRESS OF COMMAND PACKET
 2896                                 ;       R5      CURRENT UNIT NUMBER
 2897                                 ;
 2898                                 ;
 2899 007416                          WLKCHK::
 2900 007416  010475  002514          10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
 2901 007422  004737  007204                  JSR     PC,WAITF                ;WAIT FOR SSR
 2902 007426  103401                          BCS     40$                     ;BR, IF SSR IS SET AND OK
 2903 007430  000420                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
 2904 007432  005724                  40$:    TST     (R4)+                   ;STEP IT
 2905 007434  011402                          MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
 2906 007436  011203                          MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
 2907 007440  032763  000004  000006          BIT     #X0.WLK,MS.XS0(R3)      ;IS UNIT WRITE LOCKED?
 2908 007446  001407                          BEQ     55$                     ;NO,PROCEED WITH TESTING
 2909 007450                                  ERRHRD  1,UNIWLK                ;TAPE IS WRITE LOCKED
      007450  104456                                                                  TRAP    C$ERHRD
      007452  000001                                                                  .WORD   1
      007454  005653                                                                  .WORD   UNIWLK
      007456  000000                                                                  .WORD   0
 2910 007460  004737  017240                  JSR     PC,DROPU                ;DROP IT
 2911 007464  000402                          BR      60$                     ;EXIT WITH CARRY=0
 2912 007466  000261                  55$:    SEC                             ;SET CARRY NO TROUBLE
 2913 007470  000401                          BR      70$                     ;EXIT
 2914 007472  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
 2915 007474                          70$:
 2916 007474  000207                          RTS     PC                      ;RETURN
 2917
 2918
 2919                                 ;*
 2920                                 ;
 2921                                 ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND
 2922                                 ;
 2923                                 ;INPUT:
```

GLOBAL SUBROUTINES SECTION

```
                                ;
                                ;       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:
                                ;
                                ;
                                ;-
007476                          WRTCHR::
007476  010475  002514          10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
007502  004737  007204                  JSR     PC,WAITF                ;WAIT FOR SSR
007506  103401                          BCS     50$                     ;BR, IF SSR IS SET AND OK
007510  000402                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
007512                          50$:
007512  000261                          SEC                             ;SET CARRY NO TROUBLE
007514  000401                          BR      70$                     ;EXIT
007516  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
007520  017500  002524          70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
007524  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
                                ;
                                ;
                                ;
007526                          MDSET:: BREAK                           ; DO A SUPVSR BREAK FIRST.
007526  104422                                                                  TRAP    C$BRK
007530  004737  010026                  JSR     PC,SETDEF               ;RESTORE DEFAULT
```

GLOBAL SUBROUTINES SECTION

```
2980 007534  004737  007416              JSR     PC,WLKCHK       ;CHECK WRITE LOCK
2981 007540  103416                      BCS     1$              ;C=1 IS O.K.
2982 007542                              DELAY   1               ;WAIT
     007542  012727  000001                                              MOV     #1,(PC)+
     007546  000000                                                      .WORD   0
     007550  013727  002116                                              MOV     L$DLY,(PC)+
     007554  000000                                                      .WORD   0
     007556  005367  177772                                              DEC     6(PC)
     007562  001375                                                      BNE     .-4
     007564  005367  177756                                              DEC     22(PC)
     007570  001367                                                      BNE     .-20
2983 007572                              BREAK                           ;BREAK TO SUPER
     007572  104422                                                      TRAP    C$BRK
2984 007574                              DOCLN                           ;DO CLEAN AND ABORT
     007574  104444                                                      TRAP    C$DCLN
2985 007576  005737  002312          1$: TST     TS1MD           ;RUN IN DEFAULT MODE?
2986 007602  001064                      BNE     10$             ;YES,RETURN
2987 007604  004737  010026              JSR     PC,SETDEF       ;RESTORE DEFAULT
2988 007610  004737  007270              JSR     PC,WRTCHK       ;GO DO SWITCH CHECK
2989 007614  005737  002320              TST     HSSW            ;DO WE RUN AT 100ips?
2990 007620  001415                      BEQ     3$              ;NO
2991 007622  052737  000040  003532      BIS     #EF.HSS,TSUNT   ;YES,SET THE BIT
2992 007630  005737  002322              TST     EXTFEA          ;ARE WE SET?
2993 007634  001002                      BNE     2$              ;YES
2994 007636  004737  007764              JSR     PC,INVRT        ;INVERT THE SWITCH
2995 007642  004737  010026          2$: JSR     PC,SETDEF       ;NOW SET THE MODES
2996 007646  004737  007476              JSR     PC,WRTCHR       ;DO IT
2997 007652  000443                      BR      11$
2998 007654  005737  002316          3$: TST     WTBUF           ;RUN WITH WRITE BUFFERING?
2999 007660  001415                      BEQ     5$              ;NO
3000 007662  052737  000030  003532      BIS     #EF.RWB,TSUNT   ;YES SET THE BITS
3001 007670  005737  002322              TST     EXTFEA          ;ARE WE SET?
3002 007674  001002                      BNE     4$              ;YES
3003 007676  004737  007764              JSR     PC,INVRT        ;INVERT THE SWITCH
3004 007702  004737  010026          4$: JSR     PC,SETDEF       ;NOW SET THE MODES
3005 007706  004737  007476              JSR     PC,WRTCHR       ;DO IT
3006 007712  000423                      BR      11$
3007 007714  005737  002314          5$: TST     RDBUF           ;RUN WITH READ BUFFERING?
3008 007720  001415                      BEQ     10$             ;NO
3009 007722  052737  000020  003532      BIS     #EF.RBO,TSUNT   ;YES SET THE BITS
3010 007730  005737  002322              TST     EXTFEA          ;ARE WE SET?
3011 007734  001002                      BNE     6$              ;YES
3012 007736  004737  007764              JSR     PC,INVRT        ;INVERT THE SWITCH
3013 007742  004737  010026          6$: JSR     PC,SETDEF       ;NOW SET THE MODES
3014 007746  004737  007476              JSR     PC,WRTCHR       ;DO IT
3015 007752  000403                      BR      11$
3016
3017 007754  013737  003532  002504 10$: MOV     TSUNT,SCHBK+10  ;AND UNIT #
3018
3019 007762  000207                  11$: RTS     PC              ;RETURN
3020
3021
3022                                     ;
3023                                     ; SUBROUTINE TO INVERT SENSE OF EXT'D FEATURES SWITCH
3024                                     ;
3025                                     ;INPUTS:
3026                                     ;
```

```
GLOBAL SUBROUTINES SECTION

                                        ;
                                        ;
                                        ;OUTPUTS:
                                        ;


                                        INVRT::
007764                                          MOV     #WSM,CMDPKT+CP.CMD      ;WRT SUB-SYS MEM
007764  012737  140006  002330                  MOV     #WSMBK,CMDPKT+CP.ADL    ;MSG BUF ADDR
007772  012737  000006  002336                  MOV     #6,CMDPKT+CP.CNT        ;BYTE COUNT
010000  012737  100010  002506                  MOV     #100010,WSMBK           ;INVERT THE SWITCH
010006  012704  002330                          MOV     #CMDPKT,R4              ;
010014  004737  007476                          JSR     PC,WRTCHR               ;DO IT
010020  000207                                  RTS     PC                      ;RETURN

                                        ;
                                        ; SUBROUTINE TO SETUP DEFAULT SET CHAR CMD
                                        ;
                                        ;INPUTS:
                                        ;
                                        ;
                                        ;
                                        ;OUTPUTS:
                                        ;
                                        ;       R4      ADDRESS OF COMMAND PACKET

010026                                  SETDEF::
010026  012701  140004                          MOV     #SCH,R1                 ;WRITE CHAR CMD
010032  010137  002330                          MOV     R1,CMDPKT+CP.CMD        ;SET UP COMMAND
010036  012737  002474  002332                  MOV     #SCHBK,CMDPKT+CP.ADL    ;SET UP ADR LO TO POINT TO MSG BUF(MSGPKO)
010044  012737  000012  002336                  MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
010052  012737  000040  002502                  MOV     #DFTSCH,SCHBK+6         ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
010060  013737  003532  002504                  MOV     TSUNT,SCHBK+10          ;UNIT #
010066  012704  002330                          MOV     #CMDPKT,R4              ;ADDRESS OF CMD PACKET
010072  000207                                  RTS     PC                      ;RETURN


                                        ;       MODULES TO HANDLE TS05 INTERRUPTS.


                                                BGNSRV  TS5IN0
010074                                  TS5IN0::
010074  005237  003472                          INC     INTFLG                  ;SET INTERRUPT OCCURRED FLAG.
010100                                          ENDSRV
010100                                  L10004:
010100  000002                                                                  RTI

                                                BGNSRV  TS5IN1
010102                                  TS5IN1::
010102  005237  003474                          INC     INTFLG+2        ;SET INTERRUPT OCCURRED FLAG.
010106                                          ENDSRV
010106                                  L10005:
010106  000002                                                                  RTI

                                                BGNSRV  TS5IN2
010110                                  TS5IN2::
010110  005237  003476                          INC     INTFLG+4        ;SET INTERRUPT OCCURRED FLAG.
```

GLOBAL SUBROUTINES SECTION

```
3077 010114                            ENDSRV
     010114                      L10006:
     010114  000002                                                        RTI
3078
3079 010116                            BGNSRV  TS5IN3
     010116                      TS5IN3::
3080 010116  005237  003500            INC     INTFLG+6        ;SET INTERRUPT OCCURRED FLAG.
3081 010122                            ENDSRV
     010122                      L10007:
     010122  000002                                                        RTI
3082
3083                                ;       SUBROUTINE TO RETRIEVE RECORD COUNT READ FROM TAPE FOR ERROR
3084                                ;       PRINTS.
3085                                ;       INPUTS:
3086                                ;       OUTPUTS:  R3 = RECORD COUNT READ
3087                                ;       REGISTERS:  R2, R3, R4
3088                                ;       CALLS:
3089
3090 010124  032737  000400  003420 RECTAP::BIT     @MOD.CO,CMDWRD                  ;READ REV FETCH
3091 010132  001430                    BEQ     50001$
3092 010134  013702  002360            MOV     MSGPKT+MS.RFC,R2                ;FIND LAST READ AD.
3093 010140  063702  003410            ADD     DATARD,R2
3094 010144  032702  000001            BIT     @BIT00,R2                       ;ODD AD., REASSEMBLE
3095 010150  001417                    BEQ     50002$
3096 010152  005202                    INC     R2                              ;REC COUNT STARTING
3097 010154  111203                    MOVB    (R2),R3                         ;WITH UPPER BYTE FETCH
3098 010156  142703  177400            BICB    @177400,R3
3099 010162  000303                    SWAB    R3
3100 010164  005302                    DEC     R2              ;LET R2 := R2 - @1          ;LOWER BYTE AD.
3101 010166  105737  003520            TSTB    SWBFLG          ;IFB SWBFLG NE @0 THEN
3102 010172  001401                    BEQ     50003$
3103 010174  005302                    DEC     R2                ;LET R2 := R2 - @1                ;LOWER BYTE AD. ON SWAP
3104
3105 010176                      50003$:
3106 010176  111204                    MOVB    (R2),R4                 ;FETCH LOWER BYTE
3107 010200  142704  177400            BICB    @177400,R4
3108 010204  050403                    BIS     R4,R3
3109 010206  000401                    BR      50004$
3110 010210                      50002$:
3111 010210  011203                    MOV     (R2),R3     ;LET R3 := (R2)             ;EVEN AD. FETCH
3112 010212                      50004$:
3113 010212  000402                    BR      50005$
3114 010214                      50001$:
3115 010214  017703  173170            MOV     @DATARD,R3          ;LET R3 := @DATARD              ;READ FWD FETCH
3116
3117 010220                      50005$:
3118 010220  000207                    RTS     PC
3119
3120                                ;       SUBROUTINE TO STORE A  SET CHARACTERISTIC COMMAND AS
3121                                ;       THE FIRST ENTRY IN THE SEQUENCE TABLE.
3122                                ;       INPUTS:
3123                                ;       OUTPUTS:
3124                                ;       REGISTERS:
3125                                ;       CALLS:
3126
3127 010222                      SETCH::
3128 010222  012701  003540            MOV     @CMDSEQ,R1              ;INIT CMD SEQUENCE TABLE POINTER.
```

```
GLOBAL SUBROUTINES SECTION

   3129 010226  012721  140004                 MOV     #SCH,(R1)+              ;THIS CODE SETS UP A SET CHARACTERISTIC
   3130 010232  012721  000040                 MOV     #DFTSCH,(R1)+           ;COMMAND AS THE FIRST COMMAND IN THE
   3131 010236  012721  000001                 MOV     #1,(R1)+                ;SEQUENCE TABLE.
   3132 010242  005721                         TST     (R1)+                   ;SKIP PATTERN LOCATION.
   3133 010244  000207                         RTS PC
   3134
   3135                                 ;      SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
   3136                                 ;      INPUTS:
   3137                                 ;      OUTPUTS:
   3138                                 ;      REGISTERS:
   3139                                 ;      CALLS:
   3140
   3141 010246  012721  102010         SETRW:: MOV     #RWD,(R1)+                      ;CMD = REWIND.
   3142 010252  012721  000001                 MOV     #1,(R1)+                        ;BRF.
   3143 010256  012721  000001                 MOV     #1,(R1)+                        ;# OF OPERATIONS.
   3144 010262  005721                         TST     (R1)+                   ;SKIP PATTERN.
   3145 010264  000207                         RTS     PC                      ;RETURN
   3146
   3147                                 ;      SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
   3148                                 ;      DEVICES.
   3149                                 ;      INPUTS:
   3150                                 ;      OUTPUTS:        R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
   3151                                 ;      REGISTERS:
   3152                                 ;      CALLS:          CMDAC,SETUP,EXSUB,CKHAE,NEXTU,FIRSTU,VFYDAT.
   3153
   3154 010266  012701  003540         EXALL:: MOV     #CMDSEQ,R1      ;INIT SEQUENCE TABLE POINTER.
   3155 010272                         50006$:
   3156 010272  021127  177777                 CMP     (R1),#END       ;WHILE THERE ARE CMDS IN THE SEQUENCE TABLE.
   3157 010276  001530                         BEQ     50007$
   3158 010300  004737  011232                 JSR     PC,SETUP        ;GO SETUP THE COMMAND BLOCK.
   3159 010304                         50010$: BREAK                   ; DO A SUPVSR BREAK FIRST.
        010304  104422                                                                  TRAP    C$BRK
   3160 010306  023737  003412  003414         CMP     NCNT,NCNT1      ;WHILE THERE ARE RECORDS REMAINING:
   3161 010314  002116                         BGE     50011$
   3162 010316  004737  011124                 JSR     PC,CMDAC        ;STORE CMD ASCII IN ERROR MESSAGE.
   3163 010322  105737  003515                 TSTB    RANDOM          ;IF IN RANDOM MODE:
   3164 010326  001435                         BEQ     50012$
   3165 010330  023727  003420  104005         CMP     CMDWRD,#WRT     ;IF CMD IS A WRITE THEN:
   3166 010336  001031                         BNE     50013$
   3167 010340  105737  003516                 TSTB    VFYFLG          ;IF DATA IS NOT TO BE VERIFIED THEN:
   3168 010344  001026                         BNE     50014$
   3169 010346  063737  003434  003432         ADD     RANS,RANB       ;LET RANB := RANB + RANS  ;GENERATE
   3170 010354  063737  003432  003434         ADD     RANB,RANS       ;LET RANS := RANS + RANB  ;RANDOM
   3171 010362  013737  003434  003416         MOV     RANS,BRFCNT     ;LET BRFCNT := RANS        ;LENGTH
   3172 010370  043737  003430  003416         BIC     LENMSK,BRFCNT   ;MASK RANDOM LENGTH.
   3173 010376  023727  003416  000022         CMP     BRFCNT,#18.     ;DO NOT ALLOW BYTE COUNT OF LESS THAN 18
   3174 010404  002003                         BGE     50015$
   3175 010406  012737  000022  003416         MOV     #18.,BRFCNT     ;CHANGE COUNT OF 0-17 TO 18.
   3176
   3177 010414                         50015$:
   3178 010414  013737  003416  002336         MOV     BRFCNT,CMDPKT+CP.CNT    ;MOVE BRF TO CMD PACKET.
   3179
   3180 010422                         50014$:
   3181
   3182 010422                         50013$:
   3183
   3184 010422                         50012$:
```

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GLOBAL SUBROUTINES SECTION

```
3185 010422  004737  010564                JSR     PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
3186 010426  004737  017540                JSR     PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
3187 010432  012702  000001                MOV     #1,R2           ;LET R2 := #1           ;SET ALL UNITS AT BOT/EOT.
3188 010436  004737  017142                JSR     PC,FIRSTU               ;FIND FIRST UNIT.
3189
3190 010442                        50016$:
3191 010442  026527  002604  177777        CMP     DEVTBL(R5),#END         ;WHILE THERE ARE MORE UNITS:
3192 010450  001426                        BEQ     50017$
3193 010452  032737  000400  003420        BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
3194 010460  001406                        BEQ     50020$
3195 010462  032765  000002  003502        BIT     #XO.BOT,EOTFLG(R5)      ;IF NOT AT BOT THEN:
3196 010470  001001                        BNE     50021$
3197 010472  005002                        CLR     R2                  ;LET R2 := #0 ;CLEAR EOT/BOT FLAG.
3198
3199 010474                        50021$:
3200 010474  000411                        BR      50022$                          ;ELSE IF CMD IS NOT REVERSE:
3201 010476                        50020$:
3202 010476  032765  000001  003502        BIT     #XO.EOT,EOTFLG(R5)
3203 010504  001404                        BEQ     50023$
3204 010506  032737  000001  003420        BIT     #CMD.CO,CMDWRD
3205 010514  001001                        BNE     50024$
3206 010516                        50023$:
3207                                                ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
3208 010516  005002                        CLR     R2                  ;CLEAR EOT/BOT FLAG.
3209
3210 010520                        50024$:
3211
3212 010520                        50022$:
3213 010520  004737  017210                JSR     PC,NEXTU                ;FIND NEXT UNIT
3214 010524  000746                        BR      50016$
3215 010526                        50017$:
3216 010526  020227  000001                CMP     R2,#1                   ;IF ALL UNIT ARE AT EOT/BOT THEN:
3217 010532  001001                        BNE     50025$
3218 010534  000412                        BR      EXARTN          ;RETURN WITH R2 = #1.
3219
3220 010536                        50025$:
3221 010536  005237  003412                INC     NCNT            ;LET NCNT := NCNT + #1      ;UPDATE RECORD COUNT.
3222 010542  013737  003420  003424        MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
3223
3224 010550  000655                        BR      50010$
3225 010552                        50011$:
3226 010552  004737  016126                JSR     PC,VFYDAT       ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
3227                                                ;VERIFY THE LAST N RECORDS OF DATA.
3228
3229 010556  000645                        BR      50006$
3230 010560                        50007$:
3231 010560  005002                        CLR     R2      ;LET R2 := #0   ;SET NORMAL RETURN INDICATOR.
3232 010562  000207                EXARTN: RTS PC                          ;RETURN.
3233
3234
3235
3236                                ;       SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
3237                                ;       ALL INTERRUPTS, AND CHECK ALL STATUS.
3238                                ;       INPUTS:
3239                                ;       OUTPUTS:
3240                                ;       REGISTERS:
3241                                ;       CALLS:          EXCUTE,GOWAIT,NEXTU,FIRSTU.
```

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GLOBAL SUBROUTINES SECTION

```
3242
3243 010564  004737  017142          EXSUB:: JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
3244 010570                          50026$:
3245 010570  026527  002604  177777          CMP     DEVTBL(R5),#END         ;WHILE THERE ARE MORE DEVICES:
3246 010576  001465                          BEQ     50027$
3247 010600  032737  000400  003420          BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
3248 010606  001421                          BEQ     50030$
3249 010610  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)      ;IF NOT AT BOT
3250 010616  001014                          BNE     50031$
3251 010620  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)      ;BUT IF AT EOT
3252 010626  001406                          BEQ     50032$
3253 010630  105737  003524                  TSTB    ALLEOT                  ;AND ALL OTHERS AT EOT
3254 010634  001402                          BEQ     50033$
3255 010636  004737  012114                  JSR     PC,EXCUTE                       ;THEN EXECUTE REV CMD
3256                                                                 ;IF NOT ALL AT EOT, FREEZE UNIT(S) AT EOT
3257 010642                          50033$:
3258 010642  000402                          BR      50034$          ;IF NOT AT BOT AND
3259 010644                          50032$:
3260 010644  004737  012114                  JSR     PC,EXCUTE                       ;NOT AT EOT, EXEC REV CMD
3261
3262 010650                          50034$:
3263
3264 010650                          50031$:
3265 010650  000435                          BR      50035$                          ;ELSE IF CMD IS NOT REVERSE:
3266 010652                          50030$:
3267 010652  023727  003426  000002          CMP     CMDLG,#2
3268 010660  001011                          BNE     50036$
3269 010662  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)
3270 010670  001405                          BEQ     50036$
3271                                                                 ;CLEAR BAD SPOT COUNTS WHEN WRITING FROM BOT
3272 010672  016537  002616  003512          MOV     BTADDR(R5),BTPT         ;LET BTPT := BTADDR(R5)
3273 010700  005077  172606                  CLR     @BTPT           ;LET @BTPT := #0
3274
3275 010704                          50036$:
3276 010704  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)
3277 010712  001404                          BEQ     50037$
3278 010714  032737  000001  003420          BIT     #CMD.CO,CMDWRD
3279 010722  001003                          BNE     50040$
3280 010724                          50037$:
3281                                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
3282 010724  004737  012114                  JSR     PC,EXCUTE               ;ISSUE CMD TO TSO5
3283
3284 010730  000405                          BR      50041$
3285 010732                          50040$:
3286 010732  105737  003524                  TSTB    ALLEOT          ;IFB ALLEOT NE #0 THEN
3287 010736  001402                          BEQ     50042$
3288 010740  004737  012114                  JSR     PC,EXCUTE
3289
3290 010744                          50042$:
3291
3292 010744                          50041$:
3293
3294 010744                          50035$:
3295 010744  004737  017210                  JSR     PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
3296
3297 010750  000707                          BR      50026$
3298 010752                          50027$:
```

GLOBAL SUBROUTINES SECTION

```
3299 010752  105737  003517            TSTB    RPTFLG          ;IF REPORT HAS BEEN REQUESTED THEN:
3300 010756  001403                    BEQ     50043$
3301 010760  105037  003517            CLRB    RPTFLG                  ;CLR THE FLAG,
3302 010764                            DORPT                   ;PRINT THE PERFORMANCE REPORT.
     010764  104424                                                    TRAP    C$DRPT
3303 010766                    50043$:
3304 010766  004737  017142            JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
3305 010772                    50044$:
3306 010772  026527  002604  177777    CMP     DEVTBL(R5),#END   ;WHILE THERE ARE MORE DEVICES:
3307 011000  001450                    BEQ     50045$
3308 011002  032737  000400  003420    BIT     #MOD.CO,CMDWRD      ;IF CMD IS REVERSE THEN:
3309 011010  001421                    BEQ     50046$
3310 011012  032765  000002  003502    BIT     #X0.BOT,EOTFLG(R5)  ;IF NOT AT BOT
3311 011020  001014                    BNE     50047$
3312 011022  032765  000001  003502    BIT     #X0.EOT,EOTFLG(R5)      ;BUT IF AT EOT
3313 011030  001406                    BEQ     50050$
3314 011032  105737  003524            TSTB    ALLEOT                          ;AND ALL OTHERS AT EOT
3315 011036  001402                    BEQ     50051$
3316 011040  004737  012424            JSR     PC,GOWAIT                       ;THEN WAIT FOR CMD END
3317                                                                           ;IF NOT ALL AT EOT, DO NOT WAIT
3318 011044                    50051$:
3319                                                                           ;NOT AT BOT, AND NOT AT EOT
3320 011044  000402                    BR      50052$
3321 011046                    50050$:
3322 011046  004737  012424            JSR     PC,GOWAIT                       ;WAIT FOR INT,CHECK STAT
3323
3324 011052                    50052$:
3325
3326
3327 011052                    50047$:
3328 011052  000420                    BR      50053$                          ;ELSE IF CMD IS FORWARD:
3329 011054                    50046$:
3330 011054  032765  000001  003502    BIT     #X0.EOT,EOTFLG(R5)
3331 011062  001404                    BEQ     50054$
3332 011064  032737  000001  003420    BIT     #CMD.CO,CMDWRD
3333 011072  001003                    BNE     50055$
3334 011074                    50054$:
3335                                                   ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
3336 011074  004737  012424            JSR     PC,GOWAIT                       ;WAIT FOR INT,CHECK STATUS.
3337
3338 011100  000405                    BR      50056$
3339 011102                    50055$:
3340 011102  105737  003524            TSTB    ALLEOT              ;IFB ALLEOT NE #0 THEN
3341 011106  001402                    BEQ     50057$
3342 011110  004737  012424            JSR     PC,GOWAIT
3343
3344 011114                    50057$:
3345
3346 011114                    50056$:
3347
3348 011114                    50053$:
3349 011114  004737  017210            JSR     PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
3350
3351 011120  000724                    BR      50044$
3352 011122                    50045$:
3353 011122  000207                    RTS     PC                      ;RETURN.
3354
```

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GLOBAL SUBROUTINES SECTION

```
3355                                    ;       THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
3356                                    ;       COMMAND IN THE STANDARD ERROR MESSAGE.  ON ENTRY LOCATION CMDWRD
3357                                    ;       CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
3358                                    ;       INPUTS:
3359                                    ;       OUTPUTS:
3360                                    ;       REGISTERS:      R3, R4.
3361                                    ;       CALLS:          GCMDA
3362
3363 011124  013704  003420            CMDAC:: MOV     CMDWRD,R4;LET R4 := CMDWRD              ;R4 = CMD BINARY.
3364 011130  004737  011176                    JSR     PC,GCMDA                ;GET CMD ASCII.
3365 011134  112337  006440                    MOVB    (R3)+,STAER1+2          ;MOVE CMD ASCII
3366 011140  112337  006441                    MOVB    (R3)+,STAER1+3          ;
3367 011144  111337  006442                    MOVB    (R3),STAER1+4           ;INTO MSG.
3368 011150  013704  003424                    MOV     PCMDWD,R4                       ;R4 = PREVIOUS CMD BINARY.
3369 011154  004737  011176                    JSR     PC,GCMDA                ;GET CMD ASCII.
3370 011160  112337  006554                    MOVB    (R3)+,STAER7+24                 ;MOVE CMD ASCII
3371 011164  112337  006555                    MOVB    (R3)+,STAER7+25
3372 011170  111337  006556                    MOVB    (R3),STAER7+26                  ;INTO MSG.
3373 011174  000207                            RTS     PC                      ;RETURN. GO EXECUTE NEXT FUNCTION.
3374
3375
3376                                    ;       SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
3377                                    ;       ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
3378                                    ;       INPUTS:         R4 = PRESENT COMMAND WORD.
3379                                    ;       OUTPUTS:        R3 = ADDRESS OF PRESENT COMMAND ASCII.
3380                                    ;       REGISTERS:
3381                                    ;       CALLS:
3382
3383 011176  005003                    GCMDA:: CLR     R3;LET R3 := #0                 ;INIT CMD TBL POINTER.
3384 011200                            50060$:
3385 011200  026304  003752                    CMP     CMDTBL(R3),R4           ;UNTIL CURRENT CMD IS FOUND:
3386 011204  001403                            BEQ     50061$
3387 011206  062703  000002                    ADD     #2,R3   ;LET R3 := R3 + #2              ;SEARCH CMD TABLE.
3388 011212  000772                            BR      50060$
3389 011214                            50061$:
3390 011214  010304                            MOV     R3,R4   ,LET R4 := R3
3391 011216  006203                            ASR     R3                      ;POINT TO ASCII FOR THAT COMMAND
3392 011220  000240                            NOP
3393 011222  060403                            ADD     R4,R3
3394 011224  062703  004040                    ADD     #CMDASC,R3
3395 011230  000207                            RTS     PC                      ;RETURN.
3396
3397                                    ;       THIS SUBROUTINE LOADS THE TSO5 COMMAND PACKET FROM ONE
3398                                    ;       ENTRY IN THE SEQUENCE TABLE.
3399                                    ;       INPUTS:
3400                                    ;       OUTPUTS:
3401                                    ;       REGISTERS:      R2, R3.
3402                                    ;       CALLS:          GENPAT.
3403
3404 011232  005037  003426            SETUP:: CLR     CMDLG                   ;CLR CMD LOGGING CODE(DISABLES LOGGING)
3405 011236  012137  002330                    MOV     (R1)+,CMDPKT            ;LOAD THE COMMAND WORD.
3406 011242  011137  002336                    MOV     (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
3407 011246  011137  003416                    MOV     (R1),BRFCNT             ;SAVE BRF FOR THIS COMMAND.
3408 011252  013702  002330                    MOV     CMDPKT,R2               ;GET CMD.
3409 011256  042702  177740                    BIC     #NCMD.C,R2              ;CLR ALL BUT CMD BITS.
3410 011262  010203                            MOV     R2,R3                   ;SAVE IT TWICE.
3411 011264  162703  000010                    SUB     #CMD.C3,R3              ;POSITION COMMAND?
```

GLOBAL SUBROUTINES SECTION

```
3412 011270  001003                        BNE     2$                      ;BR IF NOT.
3413 011272  011137  002332                MOV     (R1),CMDPKT+2           ;MOVE BPCR IN 2ND PKT WORD FOR POSITION CMD.
3414 011276  000464                        BR      3$
3415 011300  023727  002330  100011  2$:   CMP     CMDPKT,#WTM             ;IF CMD IS A WRITE TAPE MARK THEN:
3416 011306  001003                        BNE     50062$
3417 011310  012737  000002  003426        MOV     #2,CMDLG                  ;WTM LOGGING CODE IS 2.
3418
3419 011316                          50062$:
3420 011316  010203                        MOV     R2,R3
3421 011320  162703  000001                SUB     #CMD.CO,R3              ;IS IT A READ?
3422 011324  001017                        BNE     1$                      ;BR IF NOT.
3423 011326  013737  003410  002332        MOV     DATARD,CMDPKT+CP.ADL    ;IF SO, LOAD THE BUFFER ADDR.
3424 011334  032737  000400  002330        BIT     #MOD.CO,CMDPKT          ;IF CMD IS A READ REV THEN:
3425 011342  001404                        BEQ     50063$
3426 011344  012737  000004  003426        MOV     #4,CMDLG                ;LOGGING CODE IS 4.
3427                                                                        ;ELSE - IF CMD IS A READ FWD:
3428 011352  000403                        BR      50064$
3429 011354                          50063$:
3430 011354  012737  000006  003426        MOV     #6,CMDLG                        ;LOGGING CODE IS 6.
3431
3432 011362                          50064$:
3433 011362  000432                        BR      3$                      ;CONTINUE.
3434 011364  010203                  1$:   MOV     R2,R3                   ;IS IT
3435 011366  162703  000004                SUB     #CMD.C2,R3              ;A SET CHARACTERISTICS CMD?
3436 011372  001014                        BNE     4$                      ;BR IF NOT.
3437 011374  012737  002474  002332        MOV     #SCHBK,CMDPKT+CP.ADL    ;SET UP ADR LO FOR SET CHAR.
3438 011402  012737  000012  002336        MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
3439 011410  011137  002502                MOV     (R1),SCHBK+6            ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
3440 011414  013737  003532  002504        MOV     TSUNT,SCHBK+10          ;UNIT #
3441 011422  000412                        BR      3$                      ;CONTINUE.
3442 011424  010203                  4$:   MOV     R2,R3                   ;IS IT
3443 011426  162703  000006                SUB     #CMD.C1!CMD.C2,R3       ;A DIAGNOSTIC (DIA) CMD?
3444 011432  001006                        BNE     3$                      ;BR IF NOT.
3445 011434  012737  000020  002336        MOV     #DIACNT,CMDPKT+CP.CNT   ;LOAD BUFFER EXTENT.
3446 011442  012737  003406  002332        MOV     #DIABLK,CMDPKT+CP.ADL   ;LOAD BUFFER ADR LOW.
3447 011450  005721                  3$:   TST     (R1)+                   ;POINT TO N (NUMBER OF TIMES TO EXECUTE THIS INS
3448 011452  012137  003414                MOV     (R1)+,NCNT1             ;SAVE NUMBER OF OPERATIONS
3449 011456  005037  003412                CLR     NCNT                    ;CLEAR OPERATION COUNTER.
3450 011462  012137  003446                MOV     (R1)+,PATERN            ;SAVE PATTERN CODE FOR CURRENT CMD.
3451 011466  010203                        MOV     R2,R3                   ;IS IT
3452 011470  162703  000005                SUB     #CMD.CO!CMD.C2,R3       ;A WRITE?
3453 011474  001010                        BNE     5$                      ;BR IF NOT.
3454 011476  013737  003406  002332        MOV     DATAWT,CMDPKT+CP.ADL    ;LOAD WRITE BUFFER LO ORDER.
3455 011504  004737  011616                JSR     PC,GENPAT               ;GO GENERATE THE WRITE PATTERN.
3456 011510  012737  000002  003426        MOV     #2,CMDLG                ;WRITE LOGGING CODE IS 2.
3457 011516  032737  000100  002330  5$:   BIT     #VFY.C,CMDPKT           ;IF DATA VERIFICATION IS REQUIRED:
3458 011524  001407                        BEQ     50065$
3459 011526  112737  000001  003516        MOVB    #1,VFYFLG               ;SET VERIFY FLAG.
3460 011534  042737  000100  002330        BIC     #VFY.C,CMDPKT           ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
3461                                                                        ;IF DATA VERIFICATION IS NOT REQUIRED:
3462 011542  000402                        BR      50066$
3463 011544                          50065$:
3464 011544  105037  003516                CLRB    VFYFLG                  ;CLR VERIFY FLAG.
3465
3466 011550                          50066$:
3467 011550  013737  003420  003424        MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS CMD WORD.
3468 011556  013737  002330  003420        MOV     CMDPKT,CMDWRD           ;SAVE PRESENT CMD WORD.
```

GLOBAL SUBROUTINES SECTION

```
3469 011564  105737  003520                TSTB    SWBFLG                  ;IF SWAP BYTES IS ENABLED:
3470 011570  001403                        BEQ     50067$
3471 011572  052737  010000  002330        BIS     #SWB.C,CMDPKT           ;SET SWAP BIT IN COMMAND.
3472
3473 011600                        50067$:
3474 011600  042737  004000  002330        BIC     #BRF.C,CMDPKT           ;CLR BRF BIT (INTERNAL ONLY).
3475 011606  013737  002330  003422        MOV     CMDPKT,CMDSAV           ;SAVE 1ST WORD OF COMMAND PACKET.
3476 011614  000207                        RTS     PC                      ;RETURN.
3477
3478                                ;       THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERATE
3479                                ;       THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
3480                                ;       INPUTS:
3481                                ;       OUTPUTS:
3482                                ;       REGISTERS:      R2, R3, R4.
3483                                ;       CALLS:          PATR0   PATR7
3484
3485 011616  013703  003446        GENPAT::MOV     PATERN,R3               ;SETUP PATTERN ROUTINE POINTER
3486 011622  006303                        ASL     R3
3487 011624  013704  003416                MOV     BRFCNT,R4               ;SET LENGTH OF WRITE BFR
3488 011630  005204                        INC     R4
3489 011632  042704  000001                BIC     #1,R4                   ;ROUNDED UP TO NEXT WORD
3490 011636  162704  000002                SUB     #2,R4                   ;WITH FIRST WORD RESERVED
3491 011642  013702  003406                MOV     DATAWT,R2               ;FOR RECORD COUNT
3492 011646  062702  000002                ADD     #2,R2
3493 011652  004773  011660                JSR     PC,@PATTBL(R3)  ;GO GENERATE THE APPROPRIATE PATTERN.
3494 011656  000207                        RTS     PC                      ;RETURN TO SETUP SUBROUTINE.
3495
3496                                        ;TS05 WRITE PATTERN LOOKUP TABLE.  USED TO JSR TO THE
3497                                        ;CORRECT DATA PATTERN GENERATING ROUTINE.
3498
3499 011660  011702                PATTBL: PATR0
3500 011662  011740                        PATR1
3501 011664  011760                        PATR2
3502 011666  011770                        PATR3
3503 011670  012014                        PATR4
3504 011672  012026                        PATR5
3505 011674  012040                        PATR6
3506 011676  012060                        PATR7
3507 011700  012112                        PATR8
3508
3509                                        ;INCREMENTING PATTERN.  0 - 377.
3510
3511 011702  012703  000400        PATR0:: MOV     #400,R3;LET R3 := #400
3512 011706  162704  000002        1$:     SUB     #2,R4;LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
3513 011712  100411                        BMI     2$                      ;BR IF DONE.
3514 011714  010322                        MOV     R3,(R2)+                ;STORE DATA WORD.
3515 011716  062703  001002                ADD     #1002,R3                ;UPDATE PATTERN.
3516 011722  020327  001000                CMP     R3,#1000                ;IF PATTERN HAS WRAPPED AROUND THEN:
3517 011726  001002                        BNE     50070$
3518 011730  012703  000400                MOV     #400,R3                   ;INIT THE PATTERN AGAIN.
3519
3520 011734                        50070$:
3521 011734  000764                        BR      1$                      ;DO IT AGAIN.
3522
3523 011736  000207                2$:     RTS     PC                      ;RETURN.
3524
3525                                        ;ALL ONE'S PATTERN.
```

GLOBAL SUBROUTINES SECTION

```
3526
3527 011740  012703  177777          PATR1:: MOV     #-1,R3          ;ALL ONES PATTERN;.
3528 011744  162704  000002          ZROPAT: SUB     #2,R4           ;DECREMENT BYTE COUNT.
3529 011750  100402                          BMI     1$              ;DONE?,BR IF YES.
3530 011752  010322                          MOV     R3,(R2)+        ;IF NOT LOAD NEXT BYTE WITH PATTERN.
3531 011754  000773                          BR      ZROPAT          ;DO IT AGAIN.
3532
3533 011756  000207                  1$:     RTS     PC              ;RETURN.
3534
3535                                          ;ALL ZEROES PATTERN.
3536
3537 011760  005003                  PATR2:: CLR     R3              ;CLR PATTERN REGISTER.
3538 011762  004737  011744                  JSR     PC,ZROPAT       ;GO GENERATE IT.
3539 011766  000207                          RTS     PC              ;RETURN.
3540
3541                                          ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
3542
3543 011770  012703  000401          PATR3:: MOV     #401,R3         ;INIT PATTERN REGISTER.
3544 011774  162704  000002          WLKZRO: SUB     #2,R4;LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
3545 012000  100404                          BMI     1$              ;BR IF DONE.
3546 012002  010322                          MOV     R3,(R2)+        ;LOAD DATA.
3547 012004  006303                          ASL     R3              ;SHIFT PATTERN.
3548 012006  005503                          ADC     R3              ;ADD CARRY BACK INTO PATTERN.
3549 012010  000771                          BR      WLKZRO          ;DO IT AGAIN.
3550 012012  000207                  1$:     RTS     PC              ;RETURN.
3551
3552                                          ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
3553
3554 012014  012703  177376          PATR4:: MOV     #177376,R3      ;INIT PATTERN REGISTER.
3555 012020  004737  011774                  JSR     PC,WLKZRO       ;GO GENERATE ;IT.
3556 012024  000207                          RTS     PC              ;RETURN.
3557
3558                                          ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
3559                                          ;COMPLEMENTED.
3560
3561 012026  012703  125125          PATR5:: MOV     #125125,R3      ;INIT PATTERN REGISTER.
3562 012032  004737  011744                  JSR     PC,ZROPAT       ;GO GENERATE IT.
3563 012036  000207                          RTS     PC              ;RETURN.
3564
3565                                          ;ALTERNATING BYTES OF 000 AND 377.
3566
3567 012040  012703  177400          PATR6:: MOV     #177400,R3      ;INIT PATTERN REGISTER.
3568 012044  162704  000002          1$:     SUB     #2,R4           ;DECREMENT WORD COUNT.
3569 012050  100402                          BMI     2$              ;BR IF DONE.
3570 012052  010322                          MOV     R3,(R2)+        ;LOAD DATA.
3571 012054  000773                          BR      1$              ;DO IT AGAIN.
3572 012056  000207                  2$:     RTS     PC              ;RETURN.
3573
3574                                          ;RANDOM PATTERN GENERATOR
3575
3576 012060  162704  000002          PATR7:: SUB     #2,R4           ;DECREMENT WORD COUNT
3577 012064  100411                          BMI     GIT             ;BR IF DONE.
3578 012066  063737  003434  003432          ADD     RANS,RANB
3579 012074  063737  003432  003434          ADD     RANB,RANS       ;GET NEW #.
3580 012102  013722  003434                  MOV     RANS,(R2)+      ;SAVE #.
3581 012106  000764                          BR      PATR7           ;CONTINUE.
3582 012110  000207                  GIT:    RTS     PC              ;RETURN
```

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GLOBAL SUBROUTINES SECTION

```
3583
3584                                    ;       NO PATTERN GENERATION.
3585
3586 012112  000207                    PATR8:: RTS     PC              ;RETURN.
3587
3588                                    ;       THIS SUBROUTINE INITIATES TSO5 COMMAND EXECUTION
3589                                    ;       AND CHECKS FOR TSO5 RESPONSE.
3590                                    ;       INPUTS:
3591                                    ;       OUTPUTS:
3592                                    ;       REGISTERS:      R2, R3.
3593                                    ;       CALLS:          DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.
3594
3595 012114  012737  177777  003436    EXCUTE:: MOV    # 1,TIME1               ;INIT TIMEOUT COUNTER.
3596 012122                            50071$: ;REPEAT                         ;WAIT -
3597 012122  005337  003436                    DEC     TIME1                   ;UPDATE TIMEOUT COUNTER.
3598 012126  005737  003436                    TST     TIME1                   ;IF TIMED OUT:
3599 012132  001011                            BNE     50072$
3600 012134  004737  012774                    JSR     PC,MOVMSG               ;MOVE CURRENT PACKET MSG.
3601 012140                                    ERRDF   2,NSSRM,STAERM          ;REPORT TSO5 NOT READY
     012140  104455                                                                    TRAP    C$ERDF
     012142  000002                                                                    .WORD   2
     012144  004536                                                                    .WORD   NSSRM
     012146  006120                                                                    .WORD   STAERM
3602 012150  004737  017240                    JSR     PC,DROPU                ;DROP THE UNIT.
3603 012154  000522                            BR      EXCRTN                  ;RETURN.
3604
3605 012156                            50072$:
3606 012156  032775  000200  002524            BIT     #TS.SSR,@TSSR(R5)       ;WAIT UNTIL DEVICE IS READY.
3607 012164  001756                            BEQ     50071$
3608 012166  023727  003420  140004            CMP     CMDWRD,#SCH             ;IF WE ARE DOING A SET CHAR CMD THEN:
3609 012174  001022                            BNE     50073$
3610 012176  010537  003452                    MOV     R5,R5SAVE                 ;SAVE CURRENT DEVICE POINTER.
3611 012202  004737  017142                    JSR     PC,FIRSTU                 ;FIND FIRST UNIT.
3612 012206                            50074$:
3613 012206  026527  002604  177777            CMP     DEVTBL(R5),#END ;WHILE DEVTBL(R5) NE #END DO
3614 012214  001405                            BEQ     50075$
3615 012216  004737  012740                    JSR     PC,WSSR                   ;WAIT FOR UNIT READY OR TIME OUT.
3616 012222  004737  017210                    JSR     PC,NEXTU                  ;FIND NEXT UNIT.
3617
3618 012226  000767                            BR      50074$
3619 012230                            50075$:
3620 012230  013705  003452                    MOV     R5SAVE,R5                 ;RESTORE CURRENT DEVICE POINTER.
3621 012234  016537  002544  002474            MOV     MSGPKA(R5),SCHBK          ;SET UP ADR OF MSG PKT IN SCH BLOCK.
3622
3623 012242                            50073$:
3624 012242  016503  002544                    MOV     MSGPKA(R5),R3           ;ADR OF THIS UNIT'S MSG PACKET.
3625 012246  005002                            CLR     R2                              ;CLR COUNTER.
3626 012250                            50076$:
3627 012250  020227  000020                    CMP     R2,#MSGCNT              ;WHILE THERE ARE MORE LOCATIONS:
3628 012254  001405                            BEQ     50077$
3629 012256  012723  177777                    MOV     # 1,(R3)+               ;INIT THE MSG PACKET WITH ALL 1'S
3630 012262  062702  000002                    ADD     #2,R2                   ;UPDATE COUNTER.
3631
3632 012266  000770                            BR      50076$
3633 012270                            50077$:
3634 012270  105737  002212                    TSTB    DINT                    ;ARE INTERRUPTS DISABLED.
3635 012274  001023                            BNE     1$                      ;BR IF YES.
```

```
GLOBAL SUBROUTINES SECTION

3636 012276  126527  003472  000001          CMPB    INTFLG(R5),#1           ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
3637 012304  003412                          BLE     50100$
3638 012306  017537  002524  003454          MOV     @TSSR(R5),TSSREG        ;FREEZE THE CURRENT STATUS REG FOR PRINT
3639 012314                                  ERRDF   15,TOOMM,STAERM  ;REPORT TOO MANY INTERRUPTS.
     012314  104455                                                              TRAP    C$ERDF
     012316  000017                                                              .WORD   15
     012320  004727                                                              .WORD   TOOMM
     012322  006120                                                              .WORD   STAERM
3640 012324  004737  017240                  JSR     PC,DROPU                        ;DROP THE UNIT
3641 012330  000434                          BR      EXCRTN                  ;RETURN   UNIT HAS BEEN DROPPED.
3642
3643 012332                          50100$:
3644 012332  005065  003472                  CLR     INTFLG(R5)              ;CLR INTERRUPT FLAG FOR THIS DEV.
3645 012336  052737  000200  002330          BIS     #IE.C,CMDPKT            ;SET INT ENABLE BIT.
3646 012344  105737  003471          1$:     TSTB    ERRREC;IFB ERRREC EQ #0 THEN            ;IF NOT RETRYING
3647 012350  001005                          BNE     50101$
3648 012352  005265  003376                  INC     RECCNT(R5)              ;LET RECCNT(R5) := RECCNT(R5) + #1
3649 012356  016577  003376  171022          MOV     RECCNT(R5),@DATAWT      ;THEN UPDATE REC COUNT TO WRITE IT ON TAPE
3650
3651 012364                          50101$:
3652 012364  012775  002330  002514          MOV     #CMDPKT,@TSDB(R5)       ;LOAD TSDB WITH CMDPKT ADDRESS
3653                                                                         ;THIS INITIATES COMMAND EXECUTION.
3654 012372  032775  000200  002524          BIT     #TS.SSR,@TSSR(R5)       ;IF READY DID NOT DROP THEN:
3655 012400  001410                          BEQ     50102$
3656 012402  004737  012774                  JSR     PC,MOVMSG               ;MOVE CURRENT MESSAGE PACKET TO COMMON.
3657 012406                                  ERRDF   3,TOERM,STAERM          ;REPORT NO TSO5 RESPONSE.
     012406  104455                                                              TRAP    C$ERDF
     012410  000003                                                              .WORD   3
     012412  004453                                                              .WORD   TOERM
     012414  006120                                                              .WORD   STAERM
3658 012416  004737  017240                  JSR     PC,DROPU                ;DROP THE UNIT
3659
3660 012422                          50102$:
3661 012422  000207                  EXCRTN: RTS     PC                      ;RETURN.
3662
3663                                 ;       THIS SUBROUTINE WAITS FOR THE TSO5 INERRUPT OR DONE BIT TO SET AND ALLOWS THE
3664                                 ;       OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
3665                                 ;       UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
3666                                 ;       LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
3667                                 ;       INPUTS:
3668                                 ;       OUTPUTS:
3669                                 ;       REGISTERS:      R2, R3.
3670                                 ;       CALLS:          DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
3671
3672 012424  012737  177777  003436  GOWAIT:: MOV    #-1,TIME1               ;INIT TIME OUT COUNTER.
3673 012432                          50103$: ;REPEAT                         ;REPEAT UNTIL INTERRUPT OCCURES:
3674 012432                                  BREAK                           ;GO TO THE SUPER TO ALLOW TTY INPUT.
     012432  104422                                                              TRAP    C$BRK
3675 012434  023727  003420  102010          CMP     CMDWRD,#RWD             ;IF COMMAND WAS REWIND THEN:
3676 012442  001014                          BNE     50104$
3677 012444                                  DELAY   10.                     ;WAIT  EXTRA MSECS EACH LOOP.
     012444  012727  000012                                                      MOV     #10.,(PC)+
     012450  000000                                                              .WORD   0
     012452  013727  002116                                                      MOV     L$DLY,(PC)+
     012456  000000                                                              .WORD   0
     012460  005367  177772                                                      DEC     -6(PC)
     012464  001375                                                              BNE     .-4
```

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GLOBAL SUBROUTINES SECTION

```
        012466  005367  177756                                                  DEC     22(PC)
        012472  001367                                                          BNE     . 20
  3678  012474                          50104$:
  3679  012474  023727  003420  105010          CMP     CMDWRD,#SFF     ;IF CMDWRD EQ #SFF OR CMDWRD EQ #SFR THEN
  3680  012502  001404                          BEQ     50105$
  3681  012504  023727  003420  105410          CMP     CMDWRD,#SFR
  3682  012512  001014                          BNE     50106$
  3683  012514                          50105$:
  3684  012514                          DELAY   12.             ;ADD DELAY FOR SPACE TAPE MARK COMMANDS
        012514  012727  000014                                                  MOV     #12.,(PC)+
        012520  000000                                                          .WORD   0
        012522  013727  002116                                                  MOV     L$DLY,(PC)+
        012526  000000                                                          .WORD   0
        012530  005367  177772                                                  DEC     6(PC)
        012534  001375                                                          BNE     . 4
        012536  005367  177756                                                  DEC     22(PC)
        012542  001367                                                          BNE     . 20
  3685  012544                          50106$:
  3686  012544  105737  002212          TSTB    DINT                    ;IF INTERRUPTS ARE ENABLED.
  3687  012550  001003                  BNE     50107$
  3688  012552  016502  003472          MOV     INTFLG(R5),R2   ;FETCH INTERRUPT OCCURRED FLAG.
  3689
  3690  012556  000406                  BR      50110$
  3691  012560                          50107$:
  3692  012560  012703  000200          MOV     #TS.SSR,R3      ;SET UP A MASK FOR THE DONE BIT.
  3693  012564  005103                  COM     R3
  3694  012566  017502  002524          MOV     @TSSR(R5),R2      ;FETCH DONE BIT.
  3695  012572  040302                  BIC     R3,R2
  3696
  3697  012574                          50110$:
  3698  012574  005337  003436          DEC     TIME1           ;UPDATE TIMEOUT COUNTER.
  3699  012600  005702                  TST     R2              ;REPEAT UNTIL INTERRUPT OR READY OCCURES.
  3700  012602  001003                  BNE     50111$
  3701  012604  005737  003436          TST     TIME1
  3702  012610  001310                  BNE     50103$
  3703  012612                          50111$:
  3704  012612  005737  003436          TST     TIME1                   ;IF TIME OUT HAS OCCURRED:
  3705  012616  001022                  BNE     50112$
  3706  012620  016577  003376  170560  MOV     RECCNT(R5),@DATAWT
  3707  012626  005377  170554          DEC     @DATAWT
  3708  012632  004737  012774          JSR     PC,MOVMSG       ;MOVE CURRENT MSG PACKET TO COMMON AREA.
  3709  012636                          ERRDF   4,NOINTM,STAERM ;REPORT NO INTERRUPT.
        012636  104455                                                          TRAP    C$ERDF
        012640  000004                                                          .WORD   4
        012642  004670                                                          .WORD   NOINTM
        012644  006120                                                          .WORD   STAERM
  3710  012646  004737  017240          JSR     PC,DROPU                ;DROP THE UNIT.
  3711  012652  012703  003472          MOV     #ENDERF,R3      ;LET R3 := #ENDERF
  3712  012656  004737  012724          JSR     PC,CLRERR                       ;CLEAR ALL ERROR FLAGS
  3713
  3714  012662  000417                  BR      50113$
  3715  012664                          50112$:
  3716  012664  004737  012774          JSR     PC,MOVMSG       ;MOVE CURRENT MSG. PACKET TO COMMON AREA.
  3717  012670  004737  013060          JSR     PC,RECUD        ;UPDATE THE RECORD COUNT.
  3718  012674  004737  013250          JSR     PC,CHKERR       ;CHECK FOR STATUS ERRORS.
  3719  012700  105737  003463          TSTB    WRTYFG          ;IFB WRTYFG EQ #0 THEN
  3720  012704  001006                  BNE     50114$
```

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GLOBAL SUBROUTINES SECTION

 3721 012706  004737  015626                  JSR     PC,LOG          ;LOG BYTES AND ERRORS.
 3722 012712  012703  003472                  MOV     @ENDERF,R3      ;LET R3 := @ENDERF
 3723 012716  004737  012724                  JSR     PC,CLRERR       ;CLEAR ALL ERROR FLAGS
 3724
 3725 012722                          50114$:
 3726
 3727 012722                          50113$:
 3728 012722  000207                        RTS     PC                      ;RETURN IF DONE.
 3729
 3730                                 ;       SUBROUTINE TO CLEAR FLAGS.
 3731                                 ;       INPUTS:         R3 = LWA TO BE CLEARED + 2.
 3732                                 ;       OUTPUTS:
 3733                                 ;       REGISTERS:      R2
 3734                                 ;       CALLS:
 3735
 3736 012724  012702  003460          CLRERR:: MOV    @BGNFLG,R2      ;LET R2 := @BGNFLG
 3737 012730                          50115$: ;REPEAT
 3738 012730  005022                        CLR     (R2)+           ;LET (R2)+ := @0
 3739 012732  020203                        CMP     R2,R3           ;UNTIL R2 EQ R3
 3740 012734  001375                        BNE     50115$
 3741 012736  000207                        RTS     PC
 3742
 3743
 3744                                 ;       SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
 3745                                 ;       INPUTS:
 3746                                 ;       OUTPUTS:
 3747                                 ;       REGISTERS:
 3748                                 ;       CALLS:
 3749
 3750 012740                          WSSR::
 3751 012740  012737  177777  003436        MOV     @-1,TIME1               ;INIT TIMEOUT COUNTER.
 3752 012746                          50116$:                                 ;REPEAT UNTIL DEV READY OR TIMEOUT:
 3753 012746                                BREAK                             ;BREAK TO THE SUPERVISOR.
      012746  104422                                                                      TRAP    C$BRK
 3754 012750  005337  003436                DEC     TIME1                   ;UPDATE TIMEOUT COUNTER.
 3755 012754  032775  000200  002524        BIT     @TS.SSR,@TSSR(R5) ;UNTIL @TS.SSR SETIN @TSSR(R5) OR TIME1 EQ @0
 3756 012762  001003                        BNE     50117$
 3757 012764  005737  003436                TST     TIME1
 3758 012770  001366                        BNE     50116$
 3759 012772                          50117$:
 3760 012772  000207                        RTS     PC                      ;RETURN.
 3761
 3762
 3763
 3764                                 ;       SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
 3765                                 ;       TO UPDATE THE CURRENT TERMINATION CLASS CODE.
 3766                                 ;       INPUTS:
 3767                                 ;       OUTPUTS:
 3768                                 ;       REGISTERS:      R2, R3.
 3769                                 ;       CALLS:
 3770
 3771 012774  017537  002524  003454  MOVMSG::MOV     @TSSR(R5),TSSREG        ;FREEZE THE STATUS REG CONTENTS
 3772 013002  013702  003454                MOV     TSSREG,R2               ;EXTRACT THE TERMINATION CLASS CODE.
 3773 013006  042702  177761                BIC     @TSC.TCC,R2
 3774 013012  010237  003450                MOV     R2,CTCC                 ;AND SAVE IT
 3775 013016  006237  003450                ASR     CTCC
 3776 013022  016503  002544                MOV     MSGPKA(R5),R3           ;ADR OF THIS DEVICE'S MSG.
```

GLOBAL SUBROUTINES SECTION

```
3777 013026  005002                        CLR     R2                              ;CLR COUNTER.
3778 013030                          50120$:
3779 013030  020227  000020                CMP     R2,#MSGCNT                ;WHILE THERE ARE MORE LOCATIONS:
3780 013034  001405                        BEQ     50121$
3781 013036  012362  002354                MOV     (R3)+,MSGPKT(R2)          ;MOVE MSG TO COMMON AREA.
3782 013042  062702  000002                ADD     #2,R2                     ;UPDATE COUNTER.
3783
3784 013046  000770                        BR      50120$
3785 013050                          50121$:
3786 013050  013737  002362  003502        MOV     MSGPKT+MS.XS0,EOTFLG      ;MOVE XSTAT0 TO EOT FLAG.
3787 013056  000207                        RTS     PC
3788
3789                                 ;      SUBROUTINE TO ADJUST THE RECORD COUNT.
3790                                 ;      INPUTS:
3791                                 ;      OUTPUTS:
3792                                 ;      REGISTERS:
3793                                 ;      CALLS:
3794
3795 013060  105737  003465          RECUD:: TSTB    RECLOG            ;IF RECORD HAS NOT BEEN LOGGED:
3796 013064  001070                        BNE     50122$
3797 013066  005365  003376                DEC     RECCNT(R5)          ;LET RECCNT(R5) := RECCNT(R5) - #1
3798 013072  032737  000001  003450        BIT     #BIT0,CTCC        ;IF TAPE MOVED
3799 013100  001057                        BNE     50123$
3800 013102  032737  100000  002366        BIT     #X2.OPM,MSGPKT+MS.XS2
3801 013110  001453                        BEQ     50123$
3802 013112  105237  003465                INCB    RECLOG                    ;SET RECORD LOGGED
3803 013116  023727  003420  102010        CMP     CMDWRD,#RWD               ;IF THIS IS A REWIND CMD:
3804 013124  001003                        BNE     50124$
3805 013126  005065  003376                CLR     RECCNT(R5)                ;CLEAR RECORD COUNT.
3806
3807 013132  000442                        BR      50125$
3808 013134                          50124$:
3809 013134  032737  004000  003420        BIT     #BRF.C,CMDWRD             ;IF BRF USED, UPDATE RECORD COUNT.
3810 013142  001436                        BEQ     50126$
3811 013144  032737  000400  003420        BIT     #MOD.CO,CMDWRD              ;IF A FORWARD CMD:
3812 013152  001007                        BNE     50127$
3813 013154  032737  000400  003424        BIT     #MOD.CO,PCMDWD              ;IF PREV CMD WAS A FWD ALSO:
3814 013162  001002                        BNE     50130$
3815 013164  005265  003376                INC     RECCNT(R5)                  ;INCREMENT RECORD COUNT.
3816
3817 013170                          50130$:
3818                                                                          ;IF REVERSE CMD:
3819 013170  000423                        BR      50131$
3820 013172                          50127$:
3821 013172  032737  000400  003424        BIT     #MOD.CO,PCMDWD            ;IF PREVIOUS CMD WAS A REV ALSO:
3822 013200  001417                        BEQ     50132$
3823 013202  032765  000002  003502        BIT     #X0.BOT,EOTFLG(R5)        ;WHEN NOT AT BOT THEN
3824 013210  001013                        BNE     50133$
3825 013212  105737  003471                TSTB    ERRREC                     ;CHECK THE ERROR RETRY INDICATOR
3826 013216  001406                        BEQ     2$                         ;BR, IF WE ARE NOT NOW IN ERROR RETRY
3827 013220  105737  003516                TSTB    VFYFLG                     ;CHECK THE WRITE VERIFY INDICATOR
3828 013224  001403                        BEQ     2$                         ;BR, IF WE ARE NOT IN WRT/VFY MODE
3829 013226  105737  003465                TSTB    RECLOG                     ;CHECK IF THIS RECORD HAS BEEN COUNTED
3830 013232  001002                        BNE     10$                        ;BR, IF HAVE ALREADY BUMPED RECORD CNTR.
3831 013234  005365  003376          2$:     DEC     RECCNT(R5)                 ;DECREMENT RECORD COUNT.
3832 013240                          10$:
3833
```

GLOBAL SUBROUTINES SECTION

```
3834 013240                          50133$:
3835
3836 013240                          50132$:
3837
3838 013240                          50131$:
3839
3840
3841 013240                          50126$:
3842
3843 013240                          50125$:
3844
3845 013240                          50123$:
3846 013240  016577  003376  170140          MOV     RECCNT(R5),@DATAWT        ;LET @DATAWT := RECCNT(R5)
3847
3848 013246                          50122$:
3849 013246  000207                          RTS     PC                        ;RETURN.
3850
3851                                  ;       THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
3852                                  ;       SUBROUTINE IS CALLED TO CHECK THE TS05 STATUS.
3853                                  ;       IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
3854                                  ;       IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
3855                                  ;       THEN AN ERROR RFC IS REPORTED.
3856                                  ;       INPUTS:
3857                                  ;       OUTPUTS:
3858                                  ;       REGISTERS:      R2, R4.
3859                                  ;       CALLS:          TCC0-TCC7.
3860
3861 013250  032737  100000  003454  CHKERR:: BIT     @TS.SC,TSSREG             ;IF SPECIAL COND STATUS IS SET THEN:
3862 013256  001441                          BEQ     50134$
3863 013260  023727  003450  000002          CMP     CTCC,@2                     ;IF TCC IS NOT 2 THEN:
3864 013266  001405                          BEQ     50135$
3865 013270  105737  003471                  TSTB    ERRREC                  ;IF NOT IN ERROR RECOVERY:
3866 013274  001002                          BNE     50136$
3867 013276  005265  003336                  INC     SCCNT(R5)               ;INC SC COUNTER.
3868
3869 013302                          50136$:
3870
3871 013302                          50135$:
3872 013302  032737  004000  003454          BIT     @TS.NXM,TSSREG            ;WHEN NON-EXISTANT MEMO
3873 013310  001004                          BNE     50137$
3874 013312  032737  040000  003454          BIT     @TS.UPE,TSSREG
3875 013320  001412                          BEQ     50140$
3876 013322                          50137$:
3877 013322  032737  100000  002366          BIT     @X2.OPM,MSGPKT+MS.XS2           ;AND TAPE NOT MOVED
3878 013330  001003                          BNE     50141$
3879 013332  012702  000005                  MOV     @5,R2                           ;SET TCC5 INDEX
3880
3881 013336  000402                          BR      50142$
3882 013340                          50141$:
3883 013340  012702  000004                  MOV     @4,R2                   ;TAPE MOVED, SET TCC4 INDEX
3884
3885 013344                          50142$:
3886
3887 013344  000402                          BR      50143$
3888 013346                          50140$:
3889 013346  013702  003450                  MOV     CTCC,R2                         ;SET DETECTED TCC INDEX
3890
```

```
GLOBAL SUBROUTINES SECTION

3891 013352                          50143$:
3892 013352  006302                          ASL     R2                      ;CURRENT TCC X 2.
3893 013354  004772  013454                  JSR     PC,@TCCRA(R2)           ;GO TO THE TCC HANDLING SUBROUTINE.
3894
3895 013360  000426                          BR      50144$
3896 013362                          50134$:
3897 013362  032737  004000  003420          BIT     #BRF.C,CMDWRD           ;IF BRF IS USED IN THIS CMD THEN:
3898 013370  001422                          BEQ     50145$
3899 013372  005737  002360                  TST     MSGPKT+MS.RFC             ;IF THERE IS AN RFC THEN:
3900 013376  001417                          BEQ     50146$
3901 013400  105737  003515                  TSTB    RANDOM          ;IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
3902 013404  001403                          BEQ     50147$
3903 013406  105737  003516                  TSTB    VFYFLG
3904 013412  001411                          BEQ     50150$
3905 013414                          50147$:                                 ;IF NOT IN RANDOM OR IF CMD IS WTV:
3906
3907 013414  105737  003521                  TSTB    IRE                   ;IF RFC ERROR REPORTS ARE ALLOWED:
3908 013420  001006                          BNE     50151$
3909 013422  005265  003356                  INC     HRDCNT(R5)              ;UPDATE HARD ERROR COUNT
3910 013426                                  ERRHRD  13,RFCERM,STAERM        ;REPORT RFC ERROR
     013426  104456                                                                  TRAP    C$ERHRD
     013430  000015                                                                  .WORD   13
     013432  004521                                                                  .WORD   RFCERM
     013434  006120                                                                  .WORD   STAERM
3911
3912 013436                          50151$:
3913
3914 013436                          50150$:
3915
3916 013436                          50146$:
3917
3918 013436                          50145$:
3919
3920 013436                          50144$:
3921 013436  105737  003467                  TSTB    RWERR                   ;IF A READ/WRITE ERROR HAS OCCURRED THEN:
3922 013442  001403                          BEQ     50152$
3923 013444  013737  003422  002330          MOV     CMDSAV,CMDPKT             ;RESTORE CMD PACKET AFTER ERROR RECOV.
3924
3925 013452                          50152$:
3926 013452  000207                          RTS     PC                      ;RETURN.
3927
3928                                  ;       ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
3929
3930 013454  013474          TCCRA:  TCC0
3931 013456  013512                  TCC1
3932 013460  013530                  TCC2
3933 013462  013640                  TCC3
3934 013464  013656                  TCC4
3935 013466  014272                  TCC5
3936 013470  014370                  TCC6
3937 013472  014532                  TCC7
3938
3939                                  ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
3940                                  ;       CONDITION ERROR.
3941                                  ;       INPUTS:
3942                                  ;       OUTPUTS:
3943                                  ;       REGISTERS:
```

```
GLOBAL SUBROUTINES SECTION

                                        ;       CALLS:
                                        ;
013474  005265  003356                  TCC0::  INC     HRDCNT(R5)              ;UPDATE HARD ERROR COUNT.
013500                                          ERRHRD  5,SCERM,STAERM          ;REPORT SPECIAL CONDITION ERROR.
013500  104456                                                                          TRAP    C$ERHRD
013502  000005                                                                          .WORD   5
013504  004475                                                                          .WORD   SCERM
013506  006120                                                                          .WORD   STAERM
013510  000207                                  RTS PC                          ;RETURN.
                                        ;
                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
                                        ;       THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
                                        ;       SUCH AS GOING OFFLINE OR COMING ONLINE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2,R4
                                        ;       CALLS:          DROPU
                                        ;
013512                                  TCC1::  ERRDF   6,ATTNM,STAERM          ;REPORT ATTENTION UNIT OFF LINE.
013512  104455                                                                          TRAP    C$ERDF
013514  000006                                                                          .WORD   6
013516  004603                                                                          .WORD   ATTNM
013520  006120                                                                          .WORD   STAERM
013522  004737  017240                          JSR     PC,DROPU                        ;DROP THE UNIT.
013526  000207                                  RTS     PC                              ;RETURN.
                                        ;
                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
                                        ;       A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SICNIFICANCE
                                        ;       TO THE PROGRAM.  BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, BOT, EOT.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:
                                        ;
013530  032737  000002  002362          TCC2::  BIT     #XO.BOT,MSGPKT+MS.XSO
013536  001404                                  BEQ     50153$
013540  105737  003514                          TSTB    EXPBOT
013544  001401                                  BEQ     50153$
                                                                                ;IF AT BOT AND BOT IS EXPECTED:
013546  000433                                  BR      TC2RTN                  ;RETURN-TCC2 CAUSED BY EXPECTED BOT.
                                        ;
013550                                  50153$:
013550  032737  170002  002362                  BIT     #XO.RLS!XO.RLL!XO.TMK!XO.LET!XO.BOT,MSGPKT+MS.XSO
                                                ;IF #XO.RLS!XO.RLL!XO.TMK!XO.LET!XO.BOT SETIN MSGPKT+MS.XSC THEN
                                        ;
013556  001427                                  BEQ     50154$
                                                                                ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
013560  105737  003515                          TSTB    RANDOM          ;IFB RANDOM EQ #0 CRB VFYFLG NE #0 THEN
013564  001403                                  BEQ     50155$
013566  105737  003516                          TSTB    VFYFLG
013572  001421                                  BEQ     50156$
013574                                  50155$:
                                                                                ;IF NOT IN RANDOM OR IF CMD IS WTV:
013574  105737  003521                          TSTB    IRE                     ;IF RFC ERROR REPORTS ARE ALLOWED:
013600  001016                                  BNE     50157$
013602  105737  003471                          TSTB    ERRREC                  ;IF WE ARE IN ERROR RECOVERY THEN:
```

```
GLOBAL SUBROUTINES SECTION

 3993 013606  001403                        BEQ     50160$
 3994 013610  105237  003470                INCB    UNREC               ;SET UNRECOVERABLE FLAG FOR LOG.
 3995                                                                          ;ELSE   IF NOT IN ERROR RECOVERY:
 3996 013614  000402                        BR      50161$
 3997 013616                          50160$:
 3998 013616  005265  003336                INC     SCCNT(R5)           ;INCREMENT THE SPEC COND COUNTER.
 3999
 4000 013622                          50161$:
 4001 013622  005265  003356                INC     HRDCNT(R5)            ;UPDATE HARD ERROR COUNT.
 4002 013626                                ERRHRD  7,TSAM,STAERM               ;REPORT TAPE STATUS ALERT.
      013626  104456                                                                TRAP    C$ERHRD
      013630  000007                                                                .WORD   7
      013632  004705                                                                .WORD   TSAM
      013634  006120                                                                .WORD   STAERM
 4003
 4004 013636                          50157$:
 4005
 4006 013636                          50156$:
 4007
 4008 013636                          50154$:
 4009
 4010 013636  000207                  TC2RTN:   RTS   PC                                  ;RETURN.
 4011
 4012
 4013                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 3, FUNCTION REJECT.
 4014                                 ;       THE SPECIFIED FUNCTION WAS NOT INITIATED.  BITS OF INTEREST ARE
 4015                                 ;       RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
 4016                                 ;       INPUTS:
 4017                                 ;       OUTPUTS:
 4018                                 ;       REGISTERS:      R2,R4
 4019                                 ;       CALLS:          DROPU
 4020
 4021 013640                          TCC3::  ERRDF   8,FUNRM,STAERM          ;REPORT FUNCTION REJECT.
      013640  104455                                                                TRAP    C$ERDF
      013642  000010                                                                .WORD   8
      013644  004622                                                                .WORD   FUNRM
      013646  006120                                                                .WORD   STAERM
 4022 013650  004737  017240                JSR     PC,DROPU                            ;DROP THE UNIT.
 4023 013654  000207                        RTS     PC                                  ;RETURN.
 4024
 4025                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
 4026                                 ;       TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
 4027                                 ;       THE FUNCTION WAS INITIATED.  RECOVERY PROCEDURE IS TO LOG THE
 4028                                 ;       ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
 4029                                 ;       2 WRITE-ERROR RECOVERY ALGORITHMS CAN BE SELECTED:
 4030                                 ;       THE FIRST ONE, VIA BADTSW SWITCH,  DOES DETECT BAD SPOTS ON TAPE.
 4031                                 ;       IT CALLS A WRITE RETRY SUBR UNTIL THE RECORD IS RECOVERED
 4032                                 ;       OR 20 BAD SPOTS HAVE BEEN LOGGED. ON REACHING 20 BAD
 4033                                 ;       SPOTS LOGGED, A BAD TAPE OVERFLOW MSG IS PRINTED AND THE
 4034                                 ;       UNIT DROPPED.
 4035                                 ;       THE SECOND ALGORITHM ISSUES THE TSO5 WRITE RETRY COMMAND
 4036                                 ;       UP TO 16 TIMES BEFORE DROPPING THE UNIT OR PROCEEDING
 4037                                 ;       WITH THE NEXT RECORD ON RECOVERY.
 4038                                 ;       INPUTS:
 4039                                 ;       OUTPUTS:
 4040                                 ;       REGISTERS:      R2,R4.
 4041                                 ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU, WRTY
```

F7

GLOBAL SUBROUTINES SECTION

```
4042
4043 013656  023727  003426  000002  TCC4::  CMP     CMDLG,#2        ;IF CMDLG EQ #2 ANDB BADTSW NE #0 THEN
4044 013664  001125                          BNE     50162$
4045 013666  105737  002210                  TSTB    BADTSW
4046 013672  001522                          BEQ     50162$
4047 013674  105737  003471                  TSTB    ERRREC      ;IFB ERRREC EQ #0 ANDB ERCVER NE #0 THEN
4048 013700  001007                          BNE     50163$
4049 013702  105737  002207                  TSTB    ERCVER
4050 013706  001404                          BEQ     50163$
4051 013710                                  ERRSOFT 9,RERM,STAERM   ;
     013710  104457                                                          TRAP    C$ERSOFT
     013712  000011                                                          .WORD   9
     013714  005017                                                          .WORD   RERM
     013716  006120                                                          .WORD   STAERM
4052
4053 013720                          50163$:
4054 013720  105737  002213                  TSTB    IREC        ;IFB IREC EQ #0 THEN
4055 013724  001102                          BNE     50164$
4056 013726  105237  003471                  INCB    ERRREC      ;RETRY FLAG FOR EXCUTE SUBR: DON'T UPDATE REC CN
4057 013732  105237  003464                  INCB    WRTYER      ;REWRITE ERROR FLAG FOR WRTY SUBR
4058 013736  105737  003463                  TSTB    WRTYFG      ;FIRST RETRY ON THIS RECORD: SUBSEQUENT
4059 013742  001072                          BNE     50165$
4060                                                 ;RETRIES WITH TCC4 ERRORS BY PASS THIS SECTION
4061 013744  013737  003420  015146          MOV     CMDWRD,WTYWRD   ;SAVE WRITE COMMAND PACKET
4062 013752  013737  002330  015144          MOV     CMDPKT,WTYCMD
4063 013760  013737  002336  015150          MOV     CMDPKT+CP.CNT,WTYBRF
4064 013766  105237  003467                  INCB    RWERR           ;LOG SUBR FLAG: COUNT WRT ERRORS
4065 013772  105237  003463                  INCB    WRTYFG          ;RETRY IN PROGRESS FLAG
4066
4067 013776                          50166$:     ;REPEAT
4068 013776  005265  003316                  INC     WRTYCT(R5)      ;COUNT GLOBAL WRITE RETRIES
4069 014002  005037  003460                  CLR     RETRYC          ;CLEAR # OF RETRIES PER RECORD
4070 014006  105037  003462                  CLRB    RPTCNT          ;CLEAR # OF REPEATS
4071 014012  004737  014676                  JSR     PC,WRTY         ;CALL WRITE RETRY
4072 014016  105737  003464                  TSTB    WRTYER          ;REPEAT RETRIES ON SAME RECORD
4073 014022  001404                          BEQ     50167$
4074 014024  027727  167462  000050          CMP     @BTPT,#40.
4075 014032  103761                          BLO     50166$
4076 014034                          50167$:
4077                                                                ;UNTIL RECOVERED OR 20 BAD SPOTS
4078 014034  027727  167452  000050          CMP     @BTPT,#40.      ;WHEN 20 BAD SPOTS LOGGED
4079 014042  103423                          BLO     50170$
4080 014044                                  PRINTB  #BTMSG2         ;PRINT BAD TAPE OVERFLOW MSG
     014044  012746  015237                                                MOV     #BTMSG2, (SP)
     014050  012746  000001                                                MOV     #1, (SP)
     014054  010600                                                        MOV     SP,R0
     014056  104414                                                        TRAP    C$PNTB
     014060  062706  000004                                                ADD     #4,SP
4081 014064  004737  015356                  JSR     PC,BORERS       ;ERASE BAD RECORD
4082 014070  005365  003376                  DEC     RECCNT(R5)
4083 014074  004737  017240                  JSR     PC,DROPU        ;DROP UNIT
4084 014100  005065  003376                  CLR     RECCNT(R5)
4085 014104  012775  002350  002514          MOV     #RWCPK,@TSDB(R5)        ;REWIND UNIT
4086
4087 014112                          50170$:
4088 014112  105037  003463                  CLRB    WRTYFG          ;RETRY COMPLETE FLAG
4089 014116  105237  003531                  INCB    MISCFG          ;DO NOT HALT ON THIS CMD FLG
```

GLOBAL SUBROUTINES SECTION

```
4090 014122  013737  015146  003424          MOV     WTYWRD,PCMDWD           ;RESTORE ORIGINAL WRT CMD AFTER RECOVERY
4091
4092 014130                          50165$:
4093
4094 014130  000402                          BR      50171$
4095 014132                          50164$:
4096 014132  105237  003470                  INCB    UNREC       ;LET UNREC :B= UNREC + #1    ;
4097
4098 014136                          50171$:
4099
4100 014136  000454                          BR      50172$
4101 014140                          50162$:
4102 014140  004737  014550                  JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED.
4103 014144  023727  003426  000002          CMP     CMDLG,#2                        ;IF READ CMD THEN:
4104 014152  003411                          BLE     50173$
4105 014154  012702  000020                  MOV     #RRECL,R2               ;R2=READ RETRY COUNT LIMIT / 2
4106 014160  006202                          ASR     R2
4107 014162  023702  003460                  CMP     RETRYC,R2       ;IF RETRY COUNT IS MORE THAN HALF LIMIT:
4108 014166  002403                          BLT     50174$
4109 014170  052737  020000  002330          BIS     #OPP.C,CMDPKT           ;SET OPPOSITE BIT FOR RETRY2.
4110
4111 014176                          50174$:
4112
4113 014176                          50173$:
4114 014176  005737  003460                  TST     RETRYC      ;IF THIS IS THE ORIGINAL ERROR THEN:
4115 014202  001007                          BNE     50175$
4116 014204  105737  002207                  TSTB    ERCVER
4117 014210  001404                          BEQ     50175$
4118 014212                                  ERRSOFT 9,RERM,STAERM   ;REPORT RECOVERABLE ERROR
     014212  104457                                                          TRAP    C$ERSOFT
     014214  000011                                                          .WORD   9
     014216  005017                                                          .WORD   RERM
     014220  006120                                                          .WORD   STAERM
4119                                                                ;PROVIDED OPERATOR HAS ENABLED THE REPORT
4120 014222                          50175$:
4121 014222  005237  003460                  INC     RETRYC          ;UPDATE RETRY COUNT.
4122 014226  052737  001000  002330          BIS     #MOD.C1,CMDPKT  ;SET RETRY BIT IN CMD PACKET.
4123 014234  105737  002213                  TSTB    IREC            ;IF ERROR RECOVERY ENABLED:
4124 014240  001011                          BNE     50176$
4125 014242  105237  003471                  INCB    ERRREC          ;SET ERROR RECOVERY FLAG.
4126 014246  012602                          MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
4127 014250  012602                          MOV     (SP)+,R2
4128 014252  004737  012114                  JSR     PC,EXCUTE                       ;GO EXECUTE THE RETRY COMMAND.
4129 014256  000137  012424                  JMP     GOWAIT                  ;GO WAIT FOR INTERRUPT + CHECK STATUS.
4130                                                                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
4131 014262  000402                          BR      50177$
4132 014264                          50176$:
4133 014264  105237  003470                  INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.
4134
4135 014270                          50177$:
4136
4137 014270                          50172$:
4138 014270  000207                          RTS PC                          ;RETURN
4139
4140                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
4141                                 ;       TAPE POSITION HAS NOT CHANGED.  RECOVERY PROCEDURE IS TO LOG THE
4142                                 ;       ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
```

GLOBAL SUBROUTINES SECTION

```
4143                                    ;       INPUTS:
4144                                    ;       OUTPUTS:
4145                                    ;       REGISTERS:      R2,R4.
4146                                    ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU.
4147
4148 014272  004737  014550            TCC5::  JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED
4149 014276  005737  003460                    TST     RETRYC                  ;IF THIS IS THE ORIGINAL ERROR THEN:
4150 014302  001004                            BNE     50200$
4151 014304                                    ERRSOFT 10,RERM,STAERM  ;REPORT RECOVERABLE ERROR.
      014304  104457                                                                    TRAP    C$ERSOFT
      014306  000012                                                                    .WORD   10
      014310  005017                                                                    .WORD   RERM
      014312  006120                                                                    .WORD   STAERM
4152 014314                            50200$:
4153 014314  005237  003460                    INC     RETRYC          ;UPDATE RETRY COUNTER.
4154 014320  105737  002213                    TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED:
4155 014324  001016                            BNE     50201$
4156 014326  105237  003471                    INCB    ERRREC          ;SET ERROR RECOVERY FLAG.
4157 014332  005265  003376                    INC     RECCNT(R5)      ;UPDATE REC COUNT
4158 014336  016577  003376  167042            MOV     RECCNT(R5),@DATAWT              ;AND INSERT IT INTO WRT BFR
4159 014344  012602                            MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
4160 014346  012602                            MOV     (SP)+,R2
4161 014350  004737  012114                    JSR     PC,EXCUTE                       ;GO RE ISSUE THE COMMAND.
4162 014354  000137  012424                    JMP     GOWAIT                  ;GO WAIT FOR INTERRUPT + CHECK STATUS.
4163                                                                            ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
4164 014360  000402                            BR      50202$
4165 014362                            50201$:
4166 014362  105237  003470                    INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.
4167
4168 014366                            50202$:
4169 014366  000207                            RTS     PC                              ;RETURN.
4170
4171
4172                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR.
4173                                    ;       TAPE POSITION HAS BEEN LOST.  THE ONLY VALID RECOVERY PROCEDURE
4174                                    ;       IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR
4175                                    ;       SEQUENCE NUMBERS.  THIS DIAGNOSTIC WILL REWIND AND RETRY THE
4176                                    ;       COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
4177                                    ;       DROPPED FROM THE TEST SEQUENCE.
4178                                    ;       INPUTS:
4179                                    ;       OUTPUTS:
4180                                    ;       REGISTERS:      R2, R4
4181                                    ;       CALLS:          RTLE, WSSR, EXCUTE, GOWAIT, DROPU
4182
4183 014370  033737  000010  002370    TCC6::  BIT     X3 DCK,MSGPKT+MS.XS3;IF X3.DCK NOTSETIN MSGPKT+MS.XS3 THEN
4184 014376  001016                            BNE     50203$
4185                                                                            ;IF THERE IS NO DENSITY CHECK THEN:
4186 014400  005737  003426                    TST     CMDLG                     ;IF CMD IS A READ OR WRITE THEN:
4187 014404  001404                            BEQ     50204$
4188 014406  105237  003467                    INCB    RWERR                   ;SET RD/WR ERROR FLAG,
4189 014412  105237  003470                    INCB    UNREC                   ;SET UNRECOVERABLE ERROR FLAG.
4190
4191 014416                            50204$:
4192 014416                                    ERRDF   11,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
      014416  104455                                                                    TRAP    C$ERDF
      014420  000013                                                                    .WORD   11
      014422  005041                                                                    .WORD   URERM
```

```
014424  006120                                                                   .WORD   STAERM
014426  004737  017240                  JSR     PC,DROPU                  ;REPORT ERROR + DROP UNIT.
                                                                  ;ELSE-IF THERE IS DENSITY CHECK:
014432  000436                          BR      50205$
014434                          50203$:
014434  004737  014550                  JSR     PC,RTLE                     ;CHECK FOR RETRY LIMIT EXCEEDED.
014440  005737  003460                  TST     RETRYC                      ;IF THIS IS THE ORIGINAL ERROR THEN:
014444  001004                          BNE     50206$
014446                                  ERRSOFT 11,URERM,STAERM           ;REPORT DENSITY CHECK ERROR
014446  104457                                                                   TRAP    C$ERSOFT
014450  000013                                                                   .WORD   11
014452  005041                                                                   .WORD   URERM
014454  006120                                                                   .WORD   STAERM

014456                          50206$:
014456  005237  003460                  INC     RETRYC                      ;UPDATE RETRY COUNT.
014462  105737  003521                  TSTB    IRE                         ;IF ERROR RECOVERY IS ENABLED THEN:
014466  001016                          BNE     50207$
014470  105237  003471                  INCB    ERRREC                        ;SET ERROR RECOVERY FLAG.
014474  012775  002350  002514          MOV     #RWCPK,@TSDB(R5)              ;ISSUE A REWIND COMMAND.
014502  004737  012740                  JSR     PC,WSSR                       ;WAIT FOR SUBSYSTEM READY.
014506  012602                          MOV     (SP)+,R2                  ;POP 2 RTN ADRS FROM STACK.
014510  012602                          MOV     (SP)+,R2
014512  004737  012114                  JSR     PC,EXCUTE                     ;REISSUE THE COMMAND.
014516  000137  012424                  JMP     GOWAIT                        ;WAIT FOR INTERRUPT
                                                                    ;ELSE IF ERR REC DISABLED:
014522  000402                          BR      50210$
014524                          50207$:
014524  105237  003470                  INCB    UNREC                   ;SET UNRECOVERABLE ERROR FLAG.

014530                          50210$:

014530                          50205$:
014530  000207                          RTS     PC                                ;RETURN

                                ;       SUBROUTINE TO HANDLE 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.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2, R4
                                ;       CALLS:

014532                          TCC7::  ERRDF   12,FATSM,STAERM           ;REPORT FATAL SUBSYSTEM ERROR.
014532  104455                                                                   TRAP    C$ERDF
014534  000014                                                                   .WORD   12
014536  004642                                                                   .WORD   FATSM
014540  006120                                                                   .WORD   STAERM
014542  004737  017240                  JSR     PC,DROPU                          ;DROP THE UNIT.
014546  000207                          RTS     PC                                ;RETURN.


                                ;       SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED.  PRINTS ERROR MESSAGE
                                ;       IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
                                ;       INPUTS:
```

J7

SEQ 0087

GLOBAL SUBROUTINES SECTION

```
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R4.
                                        ;       CALLS:          DROPU
                                        RTLE::  TST     CMDLG           ;IF CMD IS NOT A READ OR WRITE THEN:
                                                BNE     50211$
                                                ERRDF   11.,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
014556  104455                                                                  TRAP    C$ERDF
014560  000013                                                                  .WORD   11
014562  005041                                                                  .WORD   URERM
014564  006120                                                                  .WORD   STAERM
                                                JSR     PC,DROPU                        ;DROP THE UNIT.
                                                MOV     (SP)+,R2                ;POP  RTN ADRS FROM STACK.
                                                BR      RTLRTN                  ;AND RETURN.

                                        50211$:
                                                INCB    RWERR           ;SET READ/WRITE ERROR FLAG.
                                                CMP     CMDLG,#2                ;IF CMD IS A WRT OR WTM:
                                                BNE     50212$
                                                CMP     RETRYC,#WRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
                                                BNE     50213$
                                                INCB    UNREC           ;SET UNRECOVERABLE FLAG
                                                ERRDF   14.,RLEXM,STAERM ;REPORT RETRY LIMIT EXCEEDCD.
014626  104455                                                                  TRAP    C$ERDF
014630  000016                                                                  .WORD   14
014632  004556                                                                  .WORD   RLEXM
014634  006120                                                                  .WORD   STAERM
                                                JSR     PC,DROPU                ;DROP THE UNIT.
                                                MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
                                        50213$:
                                                                                ;ELSE   CMD IS A READ:
                                                BR      50214$
                                        50212$:
                                                CMP     RETRYC,#RRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
                                                BNE     50215$
                                                INCB    UNREC           ;SET UNRECOVERABLE FLAG
                                                ERRHRD  14.,RLEXM,STAERM ;REPORT RECOVERABLE ERROR.
014662  104456                                                                  TRAP    C$ERHRD
014664  000016                                                                  .WORD   14
014666  004556                                                                  .WORD   RLEXM
014670  006120                                                                  .WORD   STAERM
                                                MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
                                        50215$:

                                        50214$:
                                        RTLRTN: RTS     PC                              ;RETURN

                                        ;       SUBR TO REWRITE A BAD, BUT RECOVERABLE WRITTEN RECORD.
                                        ;       REWRITE RECORD ON SAME SPOT: REPEAT 4 TIMES.
                                        ;       IF ALL 4 REPEATS GOOD, RECORD IS RECOVERED
                                        ;       AND A RECOVERABLE WRITE ERROR IS LOGGED.
                                        ;       IF ANY OF 4 REPEATS BAD, ERASE BAD RECORD, LOG SUSPECTED
                                        ;       BAD SPOT, RETRY AGAIN. RETRY 4 TIMES, UP TO 4 REPEATS EACH.
                                        ;       IF RECORD NOT GOOD AFTER 4 RETRIES, ERASE IT, EXIT WITH
                                        ;       ERROR FLAG WRTYER SET, PRINTING RETRY FAILED.
                                        ;       THIS ALL SCHEME IS REENTERED 20 TIMES MAX, IE 20 BAD
                                        ;       SPOTS MAX ARE ALLOWED.
```

GLOBAL SUBROUTINES SECTION

```
                                        ;
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R3,R4
                                        ;       CALLS:          BORERS, REWRT
                                        ;
                                        WRTY::  ;BEGIN RETRY        ;REPEAT
                                        ;
                                        50217$:
                                            ;BEGIN REPEAT               ;REPEAT
                                        ;
                                        50221$:
                                                JSR     PC,BORERS           ;BACKSPACE/ERASE ONE RECORD
                                                CLRB    WRTYER              ;CLEAR WRITE RETRY ERROR
                                                JSR     PC,REWRT            ;REWRITE RECORD ON SAME SPOT
                                                INCB    RPTCNT              ;COUNT REPEATS
                                                CMPB    RPTCNT,#4           ;LIMIT: 4 REPEATS OR RECOVERED
                                                BEQ     50222$
                                                TSTB    WRTYER
                                                BEQ     50221$
                                        50222$:
                                            ;END REPEAT
                                        ;
                                        50220$:
                                                INC     RETRYC              ;COUNT RETRIES
                                                TSTB    WRTYER
                                                BNE     50223$
                                                BR      50216$              ;EXIT RETRY LOOP IF RECOVERED
                                        ;
                                        50223$:
                                                TSTB    ERCVER          ;IFB ERCVER NE #0 THEN
                                                BEQ     50225$
                                                PRINTB  #BTMSG1,RETRYC,<B,RPTCNT>       ;PRINT SUSPECTED BAD SPOT
                                                                                            CLR     (SP)
                                                                                            BISB    RPTCNT,(SP)
                                                                                            MOV     RETRYC, (SP)
                                                                                            MOV     #BTMSG1, (SP)
                                                                                            MOV     #3, (SP)
                                                                                            MOV     SP,R0
                                                                                            TRAP    C$PNTB
                                                                                            ADD     #10,SP
                                        50225$:
                                                CMP     RETRYC,#1               ;ON FIRST RETRY, LOGG BAD SPOT
                                                BNE     50226$
                                                MOV     BTADDR(R5),BTPT         ;BTPT IS BOTH THE BAD SPOT COUNTER
                                                MOV     @BTPT,R4                ;AND THE LOGGING INDEX
                                                ADD     #2,R4
                                                MOV     R4,@BTPT
                                                CMP     R4,#40.             ;IF R4 LOS #40. THEN
                                                BHI     50227$
                                                MOV     BTPT,R3             ;STORE FIRST 20 BAD SPOTS
                                                ADD     R3,R4               ;LET R4 := R4 + R3              ;
                                                MOV     RECCNT(R5),(R4)     ;LET (R4) := RECCNT(R5)         ;
                                        ;
                                        50227$:
                                        ;
                                        50226$:
                                                INCB    ERSFLG          ;ERASE FLAG TO ERASE BAD RECORD
```

```
GLOBAL SUBROUTINES SECTION

 4335 015066  105037  003467                    CLRB    RWERR           ;CANCELL "LOG" ERROR FLAG ON FAILING RET
 4336 015072  105037  003462                    CLRB    RPTCNT          ;CLEAR REPEAT COUNT FOR NEXT RETRY
 4337
 4338 015076                          50224$:
 4339 015076  023727  003460  000004            CMP     RETRYC,#4                       ;LIMIT: 4 RETRIES
 4340 015104  001274                            BNE     50217$
 4341                                           ;END RETRY
 4342 015106                          50216$:
 4343 015106  105737  003464                    TSTB    WRTYER  ;IFB WRTYER NE #0 THEN
 4344 015112  001413                            BEQ     50230$
 4345 015114  105737  002207                    TSTB    ERCVER    ;IFB ERCVER NE #0 THEN
 4346 015120  001410                            BEQ     50231$
 4347 015122                                    PRINTB  #BTMSG3                 ;PRINT RETRY FAILED
      015122  012746  015307                                                            MOV     #BTMSG3, (SP)
      015126  012746  000001                                                            MOV     #1, (SP)
      015132  010600                                                                    MOV     SP,R0
      015134  104414                                                                    TRAP    C$PNTB
      015136  062706  000004                                                            ADD     #4,SP
 4348
 4349 015142                          50231$:
 4350
 4351 015142                          50230$:
 4352 015142  000207                            RTS     PC
 4353
 4354 015144  000000                  WTYCMD: .WORD   0               ;STORAGE FOR WRITE CMD WHILE RETRYING
 4355 015146  000000                  WTYWRD: .WORD   0               ;STORAGE FOR WRITE CMD WORD WHILE RETRYING
 4356 015150  000000                  WTYBRF: .WORD   0               ;STORAGE FOR WRITE BPCR WHILE RETRYING
 4357
 4358 015152      045     101     123  BTMSG1: .ASCIZ  /%ASUSPECT BAD SPOT AFTER %D1%A RETRY, %D1%A REPEAT%N/
      015155      125     123     120
      015160      105     103     124
      015163      040     102     101
      015166      104     040     123
      015171      120     117     124
      015174      040     101     106
      015177      124     105     122
      015202      040     045     104
      015205      061     045     101
      015210      040     122     105
      015213      124     122     131
      015216      054     040     045
      015221      104     061     045
      015224      101     040     122
      015227      105     120     105
      015232      101     124     045
      015235      116     000
 4359 015237      045     116     045  BTMSG2: .ASCIZ  /%N%ABAD TAPE OVERFLOW: CHANGE TAPE!%N%N/
      015242      101     102     101
      015245      104     040     124
      015250      101     120     105
      015253      040     117     126
      015256      105     122     106
      015261      114     117     127
      015264      072     040     103
      015267      110     101     116
      015272      107     105     040
      015275      124     101     120
```

GLOBAL SUBROUTINES SECTION

```
        015300  105  041  045
        015303  116  045  116
        015306  000
  4360  015307  045  101  122  BTMSG3: .ASCIZ  /%ARETRY FAILED ON BAD SPOT...ERASED!%N/
        015312  105  124  122
        015315  131  040  106
        015320  101  111  114
        015323  105  104  040
        015326  117  116  040
        015331  102  101  104
        015334  040  123  120
        015337  117  124  056
        015342  056  056  105
        015345  122  101  123
        015350  105  104  041
        015353  045  116  000
  4361                              .EVEN
  4362
  4363                        ;     SUBR TO BACSPACE ONE RECORD
  4364                        ;     IF THE ERASE FLAG IS SET, THEN ERASE THAT RECORD
  4365                        ;     INPUTS:        ERSFLG  1 = DO ERASE
  4366                        ;     OUTPUTS:
  4367                        ;     REGISTERS:
  4368                        ;     CALLS:         EXCUTE, GOWAIT, CKHAE
  4369
  4370  015356  013737  003420  003424  BORERS::MOV   CMDWRD,PCMDWD   ;SET COMMAND  TO SPACE REV
  4371  015364  012737  104410  003420        MOV   #SRR,CMDWRD     ;LET CMDWRD := #SRR     ;
  4372  015372  013737  003420  002330        MOV   CMDWRD,CMDPKT   ;LET CMDPKT := CMDWRD CLR.BY #BRF.C     ;
  4373  015400  042737  004000  002330        BIC   #BRF.C,CMDPKT
  4374  015406  013737  002330  003422        MOV   CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT   ;
  4375  015414  012737  000001  002332        MOV   #1,CMDPKT+CP.ADL          ;LET CMDPKT+CP.ADL := #1        ;
  4376  015422  005037  003426                CLR   CMDLG   ;LET CMDLG := #0                  ;
  4377  015426  004737  011124                JSR   PC,CMDAC                  ;
  4378  015432  004737  012114                JSR   PC,EXCUTE                 ;
  4379  015436  004737  012424                JSR   PC,GOWAIT                 ;
  4380  015442  004737  017540                JSR   PC,CKHAE                  ;
  4381  015446  105737  003525                TSTB  ERSFLG            ;WHEN ERASE FLAG IS SET, DO ERASE
  4382  015452  001426                        BEQ   50232$
  4383  015454  013737  003420  003424        MOV   CMDWRD,PCMDWD     ;LET PCMDWD := CMDWRD ;
  4384  015462  012737  100411  003420        MOV   #ERS,CMDWRD       ;LET CMDWRD := #ERS   ;
  4385  015470  013737  003420  002330        MOV   CMDWRD,CMDPKT     ;LET CMDPKT := CMDWRD ;
  4386  015476  013737  002330  003422        MOV   CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT ;
  4387  015504  004737  011124                JSR   PC,CMDAC                  ;
  4388  015510  004737  012114                JSR   PC,EXCUTE
  4389  015514  004737  012424                JSR   PC,GOWAIT
  4390  015520  004737  017540                JSR   PC,CKHAE
  4391  015524  105037  003525                CLRB  ERSFLG              ;LET ERSFLG :B= #0
  4392
  4393  015530                        50232$:
  4394  015530  000207                        RTS   PC
  4395
  4396                        ;     SUBR TO REWRITE A BADLY WRITTEN RECORD
  4397
  4398  015532  013737  003420  003424  REWRT:: MOV   CMDWRD,PCMDWD   ;RESTORE WRITE COMMAND PACKET
  4399  015540  013737  015146  003420        MOV   WTYWRD,CMDWRD     ;LET CMDWRD := WTYWRD   ;
  4400  015546  013737  015144  002330        MOV   WTYCMD,CMDPKT     ;LET CMDPKT := WTYCMD   ;
  4401  015554  013737  002330  003422        MOV   CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT   ;
```

GLOBAL SUBROUTINES SECTION

```
4402 015562  013737  003406  002332          MOV     DATAWT,CMDPKT+CP.ADL    ;LET CMDPKT+CP.ADL := DATAWT    ;
4403 015570  013737  015150  002336          MOV     WTYBRF,CMDPKT+CP.CNT    ;LET CMDPKT+CP.CNT := WTYBRF    ;
4404 015576  012737  000002  003426          MOV     #2,CMDLG        ;LET CMDLG := #2                        ;
4405 015604  004737  011124                  JSR     PC,CMDAC
4406 015610  004737  012114                  JSR     PC,EXCUTE                       ;RE-WRITE RECORD
4407 015614  004737  012424                  JSR     PC,GOWAIT                       ;
4408 015620  004737  017540                  JSR     PC,CKHAE                        ;
4409 015624  000207                          RTS     PC
4410
4411                                 ;       SUBROUTINE TO LOG BYTES READ/WRITTEN.
4412                                 ;       ALSO UPDATES READ/WRITE ERROR COUNTERS.
4413                                 ;       INPUTS:
4414                                 ;       OUTPUTS:
4415                                 ;       REGISTERS:      R2, R3, R4.
4416                                 ;       CALLS:
4417
4418 015626  105737  003466          LOG::   TSTB    ERLOG           ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED THEN:
4419 015632  001126                          BNE     50233$
4420 015634  105237  003466                  INCB    ERLOG           ;SET LOG DONE FLAG.
4421 015640  013704  003426                  MOV     CMDLG,R4        ;GET CURRENT CMD LOGGING CODE.
4422 015644  005704                          TST     R4              ;IF THERE IS A CODE THEN:
4423 015646  001520                          BEQ     50234$
4424 015650  162704  000002                  SUB     #2,R4           ;ADJUST THE CODE FOR TABLE INDEX.
4425 015654  010502                          MOV     R5,R2           ;R2 = ADR OF BYTE COUNT LSW.
4426 015656  066402  016112                  ADD     BINC(R4),R2
4427 015662  062702  002626                  ADD     #CNTBGN,R2
4428 015666  063712  003416                  ADD     BRFCNT,(R2)             ;ADD BRF TO LSW.
4429 015672  023737  002360  003416          CMP     MSGPKT+MS.RFC,BRFCNT    ;IF THE RFC IS LOWER OR THE SAME AS BRF THEN
4430 015700  101002                          BHI     50235$
4431 015702  163712  002360                  SUB     MSGPKT+MS.RFC,(R2)      ;SUBTRACT RFC FROM EXPECTED BRF.
4432
4433 015706                          50235$:
4434 015706  010203                          MOV     R2,R3                   ;R3 = ADR OF 2ND WORD.
4435 015710  062703  000010                  ADD     #10,R3
4436
4437 015714                          50236$:    ;WHILE (R2) GT #999. DO
4438 015714  021227  001747                  CMP     (R2),#999.
4439 015720  003404                          BLE     50237$
4440 015722  162712  001750                  SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
4441 015726  005213                          INC     (R3)        ;LET (R3) := (R3) + #1      ;2ND WORD.
4442
4443 015730  000771                          BR      50236$
4444 015732                          50237$:
4445 015732  010302                          MOV     R3,R2     ;LET R2 := R3 + #10           ;R2 = ADR OF 3RD WORD.
4446 015734  062702  000010                  ADD     #10,R2
4447 015740                          50240$:    ;WHILE (R3) GT #999. DO
4448 015740  021327  001747                  CMP     (R3),#999.
4449 015744  003404                          BLE     50241$
4450 015746  162713  001750                  SUB     #1000.,(R3)     ;UPDATE BYTE COUNT
4451 015752  005212                          INC     (R2)        ;LET (R2) := (R2) + #1      ;3RD WORD.
4452
4453 015754  000771                          BR      5 240$
4454 015756                          50241$:
4455 015756  010203                          MOV     R2,R3     ;LET R3 := R2 + #10           ;R3 = ADR OF 4TH WORD.
4456 015760  062703  000010                  ADD     #10,R3
4457 015764                          50242$:    ;WHILE (R2) GT #999. DO
4458 015764  021227  001747                  CMP     (R2),#999.
```

```
GLOBAL SUBROUTINES SECTION

4459 015770  003404                    BLE     50243$
4460 015772  162712  001750            SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
4461 015776  005213                    INC     (R3)          ;LET (R3) := (R3) + #1      ;4TH WORD.
4462
4463 016000  000771                    BR      50242$
4464 016002                      50243$:
4465 016002  105737  003467            TSTB    RWERR                   ;IF R/W ERROR, UPDATE ERROR COUNT.
4466 016006  001440                    BEQ     50244$
4467 016010  010502                    MOV     R5,R2                     ;R2 = ADR OF COUNTER.
4468 016012  066402  016120            ADD     EINC(R4),R2
4469 016016  062702  002766            ADD     #WRREC,R2
4470 016022  105737  003470            TSTB    UNREC           ;IS THE ERROR UNRECOVERABLE?
4471 016026  001404                    BEQ     50245$
4472 016030  062702  000010            ADD     #10,R2          ;YES, POINT TO NEXT COUNTER.
4473 016034  005212                    INC     (R2)            ;UPDATE THE ERROR COUNTER
4474                                                           ;ELSE - IF ERROR IS RECOVERABLE:
4475 016036  000424                    BR      50246$
4476 016040                      50245$:
4477 016040  005212                    INC     (R2)            ;UPDATE THE ERROR COUNTER
4478 016042  105737  002213            TSTB    IREC            ;IF ERROR RECOVERY IS ENABLED:
4479 016046  001020                    BNE     50247$
4480 016050  105737  003522            TSTB    DROPED          ;IF UNIT HAS NOT BEEN DROPPED:
4481 016054  001015                    BNE     50250$
4482 016056  105737  002207            TSTB    ERCVER
4483 016062  001412                    BEQ     50250$
4484 016064                            PRINTB  #NURTY1,RETRYC     ;PRINT # OF RETRIES TO RECOVER
     016064  013746  003460                                                    MOV     RETRYC,-(SP)
     016070  012746  005422                                                    MOV     #NURTY1,-(SP)
     016074  012746  000002                                                    MOV     #2,-(SP)
     016100  010600                                                            MOV     SP,R0
     016102  104414                                                            TRAP    C$PNTB
     016104  062706  000006                                                    ADD     #6,SP
4485                                                                  ;PROVIDED PRINT HAS BEEN ENABLED
4486 016110                      50250$:
4487
4488 016110                      50247$:
4489
4490
4491 016110                      50246$:
4492
4493 016110                      50244$:
4494
4495 016110                      50234$:
4496
4497 016110                      50233$:
4498 016110  000207                    RTS     PC
4499
4500                             ;       INDEXES TO BYTE COUNTERS.
4501 016112  000000              BINC:  0                                ;WRITE.
4502 016114  000040                     40                               ;READ REV.
4503 016116  000100                     100                              ;READ FWD.
4504                             ;       INDEXES TO READ/WRITE ERROR COUNTERS.
4505 016120  000000              EINC:  0                                ;WRITE.
4506 016122  000020                     20                               ;READ REV.
4507 016124  000040                     40                               ;READ FWD.
4508
4509                             ;       IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
```

GLOBAL SUBROUTINES SECTION

```
4510                                    ;       TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
4511                                    ;       READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
4512                                    ;       INPUTS:
4513                                    ;       OUTPUTS:
4514                                    ;       REGISTERS:
4515                                    ;       CALLS:          VFEXC.
4516
4517 016126  105737  003516            VFYDAT::TSTB    VFYFLG          ;IF DATA IS TO BE VERIFIED:
4518 016132  001426                            BEQ     50251$
4519 016134  013737  003420  003424            MOV     CMDWRD,PCMDWD     ;SAVE THE PREVIOUS COMMAND WORD.
4520 016142  012737  104401  003420            MOV     #RDR,CMDWRD       ;COMMAND IS READ REV.
4521 016150  012737  000004  003426            MOV     #4,CMDLG          ;SET UP CMD LOGGING INDEX.
4522 016156  004737  016212                    JSR     PC,VFEXC          ;GO READ ALL THE RECORDS REV.
4523 016162  013737  003420  003424            MOV     CMDWRD,PCMDWD     ;SAVE THE PREVIOUS COMMAND WORD.
4524 016170  012737  104001  003420            MOV     #RDF,CMDWRD       ;COMMAND IS READ FWD.
4525 016176  012737  000006  003426            MOV     #6,CMDLG          ;SET UP CMD LOGGING INDEX.
4526 016204  004737  016212                    JSR     PC,VFEXC                ;GO READ ALL RECORDS FWD.
4527
4528 016210                            50251$:
4529 016210  000207                            RTS     PC      ;RETURN.
4530
4531
4532
4533
4534                                    ;       SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
4535                                    ;       INPUTS:
4536                                    ;       OUTPUTS:
4537                                    ;       REGISTERS:      R2
4538                                    ;       CALLS:          CMDAC, FIRSTU, VFISU, NEXTU, CKHAE.
4539
4540 016212  013737  003420  002330    VFEXC:: MOV     CMDWRD,CMDPKT   ;COMMAND PACKET = READ REV OR FWD.
4541 016220  042737  004000  002330            BIC     #BRF.C,CMDPKT
4542 016226  105737  003520                    TSTB    SWBFLG                  ;IF BYTES ARE TO BE SWAPPED:
4543 016232  001403                            BEQ     50252$
4544 016234  052737  010000  002330            BIS     #SWB.C,CMDPKT     ;SET SWAB BIT IN CMD PACKET.
4545
4546 016242                            50252$:
4547 016242  013737  002330  003422            MOV     CMDPKT,CMDSAV                   ;SAVE COMMAND PACKET 1ST WORD.
4548 016250  013737  003410  002332            MOV     DATARD,CMDPKT+CP.ADL    ;SAVE BUFFER START ADDRESS.
4549 016256  005037  003412                    CLR     NCNT                            ;CLEAR NUMBER OF OPERATIONS.
4550
4551 016262                            50253$: ;WHILE NCNT LT NCNT1 DO         ;WHILE THERE ARE RECORDS REMAINING:
4552 016262  023737  003412  003414            CMP     NCNT,NCNT1
4553 016270  002062                            BGE     50254$
4554 016272  004737  011124                    JSR     PC,CMDAC                        ;STORE CMD ASCII IN ERROR MSG.
4555 016276  004737  017142                    JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
4556 016302                            50255$:   ;WHILE  DEVTBL(R5) NE #END DO ;WHILE THERE ARE DEVICES REMAINING:
4557 016302  026527  002604  177777            CMP     DEVTBL(R5),#END
4558 016310  001442                            BEQ     50256$
4559 016312  032737  000400  003420            BIT     #MOD.CO,CMDWRD            ;IF CMD IS REVERSE THEN:
4560 016320  001421                            BEQ     50257$
4561 016322  032765  000002  003502            BIT     #X0.BOT,EOTFLG(R5)          ;IF NOT AT BOT
4562 016330  001014                            BNE     50260$
4563 016332  032765  000001  003502            BIT     #X0.EOT,EOTFLG(R5)          ;BUT IF AT EOT
4564 016340  001406                            BEQ     50261$
4565 016342  105737  003524                    TSTB    ALLEOT                    ;AND ALL OTHERS AT EOT
4566 016346  001402                            BEQ     50262$
```

GLOBAL SUBROUTINES SECTION

```
4567 016350  004737  016440                JSR     PC,VFISU                ;THEN READ VERIFY
4568                                                                       ;IF NOT ALL AT EOT, FREEZE UNIT(S)
4569 016354                        50262$:
4570                                                                               ;IF NOT AT BOT AND
4571 016354  000402                BR      50263$
4572 016356                        50261$:
4573 016356  004737  016440                JSR     PC,VFISU                ;NOT AT EOT, READ VFY
4574
4575 016362                        50263$:
4576
4577 016362                        50260$:
4578 016362  000412                BR      50264$                          ;ELSE IF CMD IS NOT REVERSE:
4579 016364                        50257$:
4580 016364  032765  000001  003502        BIT     #X0.EOT,EOTFLG(R5)
4581 016372  001404                BEQ     50265$
4582 016374  032737  000001  003420        BIT     #CMD.CO,CMDWRD
4583 016402  001002                BNE     50266$
4584 016404                        50265$:
4585                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
4586 016404  004737  016440                JSR     PC,VFISU                ;ISSUE CMD, CHECK STATUS AND DATA.
4587
4588 016410                        50266$:
4589
4590 016410                        50264$:
4591 016410  004737  017210                JSR     PC,NEXTU                ;GO FIND THE NEXT UNIT.
4592
4593 016414  000732                BR      50255$
4594 016416                        50256$:
4595 016416  004737  017540                JSR     PC,CKHAE                ;CHECK FOR HALT AFTER EACH CMD.
4596 016422  005237  003412                INC     NCNT                    ;UPDATE THE RECORD COUNT.
4597 016426  013737  003420  003424        MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
4598
4599 016434  000712                BR      50253$
4600 016436                        50254$:
4601 016436  000207                RTS     PC                              ;RETURN.
4602
4603                               ;       SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
4604                               ;       CHECK STATUS, CHECK DATA.
4605                               ;       INPUTS:
4606                               ;       OUTPUTS:
4607                               ;       REGISTERS:      R2
4608                               ;       CALLS:          EXCUTE, GOWAIT, CKDATA.
4609
4610 016440  013702  003410        VFISU:: MOV     DATARD,R2               ;INIT READ BUFFER POINTER.
4611 016444  062702  000010                ADD     #8.,R2
4612 016450                        50267$:     ;WHILE R2 NE DATARD DO      ;UNTIL 8 BYTES HAVE BEEN SET.
4613 016450  020237  003410                CMP     R2,DATARD
4614 016454  001403                BEQ     50270$
4615 016456  012742  177777                MOV     #-1,-(R2)               ;INIT READ BUFFER.
4616
4617 016462  000772                BR      50267$
4618 016464                        50270$:
4619 016464  004737  012114                JSR     PC,EXCUTE                       ;GO EXECUTE THE COMMAND.
4620 016470  105737  003522                TSTB    DROPED                  ;IF UNIT HAS NOT BEEN DROPPED THEN:
4621 016474  001002                BNE     50271$
4622 016476  004737  012424                JSR     PC,GOWAIT               ;GO WAIT FOR DONE BIT.
4623
```

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GLOBAL SUBROUTINES SECTION

 4624 016502                            50271$:
 4625 016502  105737  003522                    TSTB    DROPED          ;IF UNIT HAS NOT BEEN DROPPED THEN:
 4626 016506  001006                            BNE     50272$
 4627 016510  032765  000002  003502            BIT     #X0.BOT,EOTFLG(R5)      ;WHEN NOT REVERSED INTO BOT, THEN
 4628 016516  001002                            BNE     50273$
 4629 016520  004737  016526                    JSR     PC,CKDATA       ;GO VERIFY DATA.
 4630
 4631 016524                            50273$:
 4632
 4633 016524                            50272$:
 4634 016524  000207                            RTS     PC
 4635
 4636
 4637                                   ;       SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
 4638                                   ;       AND PRINT ERROR MESSAGE ON MISCOMPARE.
 4639                                   ;       INPUTS:
 4640                                   ;       OUTPUTS:
 4641                                   ;       REGISTERS:      R2, R3, R4.
 4642                                   ;       CALLS:          GCMDA
 4643
 4644 016526  013703  003416            CKDATA::MOV     BRFCNT,R3               ;COMPUTE REC LENGTH READ
 4645 016532  163703  002360                    SUB     MSGPKT+MS.RFC,R3
 4646 016536  005703                            TST     R3                      ;WHEN NO DATA RECEIVED
 4647 016540  001015                            BNE     50274$
 4648 016542                                    ERRHRD  17,WTVERM,DTAERM                ;PRINT ERROR AND EXIT
      016542  104456                                                                    TRAP    C$ERHRD
      016544  000021                                                                    .WORD   17
      016546  004430                                                                    .WORD   WTVERM
      016550  005752                                                                    .WORD   DTAERM
 4649 016552                                    PRINTB  #DTAER4         ;COMPARE ROUTINE
      016552  012746  005337                                                          MOV     #DTAER4,-(SP)
      016556  012746  000001                                                          MOV     #1, (SP)
      016562  010600                                                                  MOV     SP,R0
      016564  104414                                                                  TRAP    C$PNTB
      016566  062706  000004                                                          ADD     #4,SP
 4650 016572  000560                            BR      50275$
 4651 016574                            50274$:
 4652 016574  020337  003416                    CMP     R3,BRFCNT               ;WHEN REC READ IS LONGER
 4653 016600  101417                            BLOS    50276$
 4654 016602                                        ERRHRD 17,WTVERM,DTAERM             ;THAN EXPECTED, PRINT
      016602  104456                                                                    TRAP    C$ERHRD
      016604  000021                                                                    .WORD   17
      016606  004430                                                                    .WORD   WTVERM
      016610  005752                                                                    .WORD   DTAERM
 4655 016612                                        PRINTB #DTAER5,CMDPKT+CP.CNT        ;AN ERROR MESSAGE
      016612  013746  002336                                                          MOV     CMDPKT+CP.CNT, (SP)
      016616  012746  005360                                                          MOV     #DTAER5, (SP)
      016622  012746  000002                                                          MOV     #2, (SP)
      016626  010600                                                                  MOV     SP,R0
      016630  104414                                                                  TRAP    C$PNTB
      016632  062706  000006                                                          ADD     #6,SP
 4656                                                                   ;AND EXIT ROUTINE
 4657 016636  000536                            BR      50277$
 4658 016640                            50276$:
 4659 016640  010337  017136                    MOV     R3,CKDCNT               ;SAVE VERIFICATION LENGTH   1.
 4660 016644  005337  017136                    DEC     CKDCNT
 4661 016650  005037  017140                    CLR     CKDFF                   ;CLEAR # OF BYTES IN ERROR COUNTER.
```

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GLOBAL SUBROUTINES SECTION

 4662 016654 005002                         CLR     R2                      ;INIT BYTE COUNTER
 4663 016656 013703 003406                  MOV     DATAWT,R3               ;GET WRITE BUFFER ADDRESS.
 4664 016662 013704 003410                  MOV     DATARD,R4               ;GET READ BUFFER ADDRESS.
 4665 016666 105737 003523                  TSTB    T1SWB                   ;WHEN RUNNING TEST1 SUB 12.
 4666 016672 001401                         BEQ     50300$
 4667 016674 000313                         SWAB    (R3)                    ;SWAP FIRST WORD OF WRT BFR
 4668                                                                ;WHICH CONTAINS THE RECORD COUNT
 4669 016676                        50300$:
 4670                                   ;REPEAT                             ;REPEAT UNTIL ALL DATA IS COMPARED:
 4671 016676                        50301$:
 4672 016676 020237 017136                  CMP     R2,CKDCNT               ;IF THIS IS THE LAST BYTE THEN:
 4673 016702 001011                         BNE     50302$
 4674 016704 105737 003520                  TSTB    SWBFLG                  ;IF BYTE SWAPPING IS ENABLED THEN.
 4675 016710 001406                         BEQ     50303$
 4676 016712 032737 000001 017136           BIT     #BIT00,CKDCNT           ;IF RECORD LENGTH IS ODD THEN:
 4677 016720 001002                         BNE     50304$
 4678 016722 105723                         TSTB    (R3)+           ;LAST BYTE WILL BE IN
 4679 016724 105724                         TSTB    (R4)+           ;THE UPPER BYTE.
 4680
 4681 016726                        50304$:
 4682
 4683 016726                        50303$:
 4684
 4685 016726                        50302$:
 4686 016726 121314                         CMPB    (R3),(R4)               ;ARE THEY EQUAL.
 4687 016730 001452                         BEQ     3$                      ;BR IF SO.
 4688 016732 005737 017140                  TST     CKDFF                   ;1 ST TIME THRU?
 4689 016736 001010                         BNE     2$                      ;BR IF NOT.
 4690 016740 005265 003346                  INC     VFYCNT(R5)              ;INC THE VERIFY ERROR COUNTER.
 4691 016744 005265 003356                  INC     HRDCNT(R5)              ;INC THE HARD ERROR COUNT.
 4692 016750                                ERRHRD  17,WTVERM,DTAERM        ;REPORT WRITE/VERIFY ERROR.
      016750 104456                                                                      TRAP    C$ERHRD
      016752 000021                                                                      .WORD   17
      016754 004430                                                                      .WORD   WTVERM
      016756 005752                                                                      .WORD   DTAERM
 4693 016760 005237 017140          2$:     INC     CKDFF;LET CKDFF := CKDFF + #1   ;INCREMENT # OF BYTES IN ERROR.
 4694 016764 111437 003436                  MOVB    (R4),TIME1              ;SAVE WAS DATA FOR TYPOUT.
 4695 016770 042737 177400 003436           BIC     #177400,TIME1           ;CLEAR GARBAGE.
 4696 016776 111337 003440                  MOVB    (R3),TIME2              ;SAVE SHOULD BE DATA FOR TYPOUT.
 4697 017002 042737 177400 003440           BIC     #177400,TIME2           ;CLEAR GARBAGE.
 4698 017010 023727 01714C 000013           CMP     CKDFF,#11.              ;IF ERROR BYTE COUNT IS LESS THAN 11:
 4699 017016 002017                         BGE     50305$
 4700 017020                                PRINTX  #DTAER2,R2,<B,TIME1>,<B,TIME2>;PRINT ACTUAL & EXPECTED DATA
      017020 005046                                                                      CLR     -(SP)
      017022 153716 003440                                                               BISB    TIME2,(SP)
      017026 005046                                                                      CLR     -(SP)
      017030 153716 003436                                                               BISB    TIME1,(SP)
      017034 010246                                                                      MOV     R2,-(SP)
      017036 012746 005226                                                               MOV     #DTAER2,-(SP)
      017042 012746 000004                                                               MOV     #4,-(SP)
      017046 010600                                                                      MOV     SP,R0
      017050 104415                                                                      TRAP    C$PNTX
      017052 062706 000012                                                               ADD     #12,SP
 4701 017056                        50305$:
 4702
 4703 017056 105723                 3$:     TSTB    (R3)+                   ;UPDATE WRITE BUFFER ADDRESS.
 4704 017060 105724                         TSTB    (R4)+                   ;UPDATE READ BUFFER ADDRESS.
```

```
GLOBAL SUBROUTINES SECTION

 4705 017062  105722                          TSTB    (R2)+                   ;UPDATE BYTE COUNTER.
 4706 017064  020237  017136                  CMP     R2,CKDCNT               ;END OF DATA COMPARE REPEAT LOOP.
 4707 017070  003702                          BLE     50301$
 4708 017072  005237  017136                  INC     CKDCNT                  ;CKDCNT EQUALS RECORD LENGTH.
 4709 017076  005737  017140                  TST     CKDFF                   ;IF COMPARE ERROR HAS OCCURED THEN:
 4710 017102  001414                          BEQ     50306$
 4711 017104                                  PRINTB  #DTAER3,CKDFF,CKDCNT      ;PRINT # OF BYTES IN ERROR.
      017104  013746  017136                                                          MOV     CKDCNT,-(SP)
      017110  013746  017140                                                          MOV     CKDFF,(SP)
      017114  012746  005275                                                          MOV     #DTAER3,-(SP)
      017120  012746  000003                                                          MOV     #3,-(SP)
      017124  010600                                                                  MOV     SP,R0
      017126  104414                                                                  TRAP    C$PNTB
      017130  062706  000010                                                          ADD     #10,SP
 4712
 4713 017134                          50306$:
 4714
 4715 017134                          50277$:
 4716
 4717 017134                          50275$:
 4718 017134  000207                          RTS     PC                      ;OTHERWISE, RETURN.
 4719
 4720 017136  000000                  CKDCNT: .WORD   0                       ;# OF BYTES TO BE VERIFIED  1.
 4721 017140  000000                  CKDFF:  .WORD   0                       ;# OF BYTES IN ERROR COUNTER.
 4722
 4723                                  ;       SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
 4724                                  ;       INPUTS:
 4725                                  ;       OUTPUTS:
 4726                                  ;       REGISTERS:
 4727                                  ;       CALLS:
 4728
 4729 017142  105037  003522          FIRSTU:: CLRB   DROPED                  ;CLR UNIT DROPPED FLAG
 4730 017146  005005                          CLR     R5                              ;CLR DEVICE POINTER.
 4731 017150  026527  002604  177774  50307$: CMP     DEVTBL(R5),#NINUSE      ;WHILE DEVICES ARE NOT IN USE:
 4732 017156  001003                          BNE     50310$
 4733 017160  062705  000002                  ADD     #2,R5     ;LET R5 := R5 + #2            ;POINT TO NEXT DEVICE.
 4734 017164  000771                          BR      50307$
 4735 017166                          50310$:
 4736 017166  026527  002604  177777          CMP     DEVTBL(R5),#END         ;IF ALL UNITS HAVE BEEN DROPPED THEN:
 4737 017174  001001                          BNE     50311$
 4738 017176                                  DOCLN                             ;DO CLEAN CODE AND TERMINATE PASS.
      017176  104444                                                                  TRAP    C$DCLN
 4739
 4740 017200                          50311$:
 4741 017200  016537  002604  002074          MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN "HEADER" FOR ERROR REPORT
 4742 017206  000207                          RTS     PC                      ;RETURN WITH 1ST DEVICE IN R5.
 4743
 4744
 4745                                  ;       SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
 4746                                  ;       INPUTS:
 4747                                  ;       OUTPUTS:
 4748                                  ;       REGISTERS:
 4749                                  ;       CALLS:
 4750
 4751 017210  105037  003522          NEXTU:: CLRB    DROPED                  ;CLR UNIT DROPPED FLAG
 4752                                          ;REPEAT                         ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
 4753 017214                          50312$:
```

GLOBAL SUBROUTINES SECTION

```
4754 017214  062705  000002            ADD     #2,R5                   ;UPDATE DEVICE TABLE POINTER.
4755 017220  026527  002604  177774    CMP     DEVTBL(R5),#NINUSE      ;UNTIL DEVTBL(R5) NE #NINUSE
4756 017226  001772                    BEQ     50312$
4757 017230  016537  002604  002074    MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN "HEADER" FOR ERROR REPORT
4758 017236  000207                    RTS     PC                      ;RETURN.
4759
4760
4761                             ;      SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
4762                             ;      INPUTS:
4763                             ;      OUTPUTS:
4764                             ;      REGISTERS:
4765                             ;      CALLS:          MOVMSG, PRXST, LOG
4766
4767 017240  005265  003366        DROPU:: INC     FTLCNT(R5)          ;INCREMENT THE FATAL ERROR COUNT.
4768 017244  013704  002370                MOV     MSGPKT+MS.XS3,R4    ;GET UDIAG ERROR CODE FROM XSTAT3.
4769 017250  042704  000377                BIC     #377,R4
4770 017254  016503  002544                MOV     MSGPKA(R5),R3   ;ADR OF THIS UNIT'S MSG PACKET.
4771 017260  005002                        CLR     R2      ;LET R2 := #0                   ;CLR COUNTER.
4772 017262                        50313$: ;WHILE R2 NE #MSGCNT DO         ;WHILE THERE ARE MORE LOCATIONS:
4773 017262  020227  000020                CMP     R2,#MSGCNT
4774 017266  001405                        BEQ     50314$
4775 017270  012723  177777                MOV     # 1,(R3)+               ;INIT THE MSG PACKET WITH ALL 1'S
4776 017274  062702  000002                ADD     #2,R2     ;LET R2 := R2 + #2            ;UPDATE COUNTER.
4777
4778 017300  000770                        BR      50313$
4779 017302                        50314$:
4780 017302  012775  002340  002514        MOV     #GSCPK,@TSDB(R5)        ;INITIATE A GET STATUS COMMAND.
4781 017310  004737  012740                JSR     PC,WSSR                 ;WAIT A WHILE FOR SSR=1
4782 017314  004737  012774                JSR     PC,MOVMSG               ;MOVE MSG PACKET TO COMMON AREA.
4783 017320  020427  157400                CMP     R4,#X3.RNY              ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
4784 017324  001005                        BNE     50315$
4785 017326                                ERRDF   16,RNYM,STAERM          ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
     017326  104455                                                                TRAP    C$ERDF
     017330  000020                                                                .WORD   16
     017332  004753                                                                .WORD   RNYM
     017334  006120                                                                .WORD   STAERM
4786                                                                    ;ELSE IF NOT A RUNNAWAY:
4787 017336  000402                        BR      50316$
4788 017340                        50315$:
4789 017340  004737  017452                JSR     PC,PRXST                ;PRINT EXTENDED STATUS REGISTERS.
4790
4791 017344                        50316$:
4792 017344  105737  003465                TSTB    RECLOG                  ;IF THE RECORD HAS BEEN LOGGED THEN:
4793 017350  001404                        BEQ     50317$
4794 017352  105237  003522                INCB    DROPED                  ;SET UNIT DROPPED FLAG.
4795 017356  004737  015626                JSR     PC,LOG                  ;LOG DATA BYTES + RD/WR ERRORS.
4796
4797 017362                        50317$:
4798 017362                                DORPT                           ;PRINT PERFORMANCE REPORT
     017362  104424                                                                TRAP    C$DRPT
4799 017364  005765  003326        DROPUA: TST     PASCNT(R5)              ;IF PASCNT(R5) NE #0 THEN
4800 017370  001402                        BEQ     50320$
4801 017372  005365  003326                DEC     PASCNT(R5)      ;LET PASCNT(R5) := PASCNT(R5)   #1
4802
4803 017376                        50320$:
4804 017376  013737  003534  017450        MOV     TSNP,DROPN              ;SAVE # OF UNIT TO BE DROPPED.
4805 017404  013700  003534                MOV     TSNP,R0                 ;R0=LOGICAL DEVICE NUMBER
```

```
GLOBAL SUBROUTINES SECTION

 4806 017410                                    DODU    R0                      ;DROP THE UNIT
      017410  104451                                                                    TRAP    C$DODU
 4807                                                                           ;EXEC BGNDU ENDDU CODE IF UDU = 0
 4808
 4809 017412  026527  002604  177774           CMP     DEVTBL(R5),#NINUSE      ;IF UNIT NOT DROPPED
 4810 017420  001410                            BEQ     50321$
 4811 017422  105737  002213                    TSTB    IREC                      ;IF RECOVERY IS ENABLED THEN:
 4812 017426  001005                            BNE     50322$
 4813 017430  000240                            NOP
 4814 017432  000240                            NOP
 4815 017434  000240                            NOP
 4816 017436  105237  003526                    INCB    STAFLG                  ;SET START FLAG TO ENABLE REWIND.
 4817
 4818 017442                            50322$:
 4819
 4820 017442                            50321$:
 4821 017442  105237  003522            DRORTN: INCB    DROPED                  ;SET UNIT DROPPED FLAG.
 4822 017446  000207                            RTS     PC                      ;RETURN.
 4823
 4824 017450  000000                    DROPN:  .WORD   0                       ;# OF UNIT TO BE DROPPED
 4825
 4826                                    ;       SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
 4827                                    ;       INPUTS:
 4828                                    ;       OUTPUTS:
 4829                                    ;       REGISTERS:
 4830                                    ;       CALLS:
 4831
 4832 017452                            PRXST:: PRINTX #GETSTM
      017452  012746  005507                                                            MOV     #GETSTM, (SP)
      017456  012746  000001                                                            MOV     #1, (SP)
      017462  010600                                                                    MOV     SP,R0
      017464  104415                                                                    TRAP    C$PNTX
      017466  062706  000004                                                            ADD     #4,SP
 4833 017472                                    PRINTX  #STAER5,MSGPKT.MS.XS0,MSGPKT.MS.XS1,MSGPKT.MS.XS2,MSGPKT.MS.XS3,MSGPKT.MS.XS
4
      017472  013746  002372                                                            MOV     MSGPKT.MS.XS4,-(SP)
      017476  013746  002370                                                            MOV     MSGPKT.MS.XS3,-(SP)
      017502  013746  002366                                                            MOV     MSGPKT.MS.XS2,-(SP)
      017506  013746  002364                                                            MOV     MSGPKT.MS.XS1,-(SP)
      017512  013746  002362                                                            MOV     MSGPKT.MS.XS0,-(SP)
      017516  012746  006753                                                            MOV     #STAER5,-(SP)
      017522  012746  000006                                                            MOV     #6, (SP)
      017526  010600                                                                    MOV     SP,R0
      017530  104415                                                                    TRAP    C$PNTX
      017532  062706  000016                                                            ADD     #16,SP
 4834 017536  000207                            RTS PC
 4835
 4836                                    ;       SUBROUTINE TO HALT AFTER EACH COMMAND.
 4837                                    ;       INPUTS:
 4838                                    ;       OUTPUTS:
 4839                                    ;       REGISTERS:      R3, R4
 4840                                    ;       CALLS:
 4841
 4842 017540  105737  002206            CKHAE:: TSTB    HAE;IFB HAE NE #0 THEN          ;IF HALT FLAG IS SET:
 4843 017544  001430                            BEQ     50323$
 4844 017546  105737  003531                    TSTB    MISCFG    ;IFB MISCFG EQ #0 THEN                ;
 4845 017552  001023                            BNE     50324$
 4846 017554                                        MANUAL                      ;IS MANUAL INTERVENTION ALLOWED?
```

```
 017554  104450                                                                TRAP    C$MANI
 017556                              BNCOMPLETE CKHRTN          ;BR IF NOT.
 017556  103023                                                                BCC     CKHRTN
 017560  013704  003420          MOV     CMDWRD,R4          ;LET R4 := CMDWRD        ;COMMAND WORD.
 017564  004737  011176              JSR PC,GCMDA               ;FETCH ADR OF CMD ASCII.
 017570  112337  004306          MOVB    (R3)+,HALTM                ;MOVE CMD ASCII
 017574  112337  004307          MOVB    (R3)+,HALTM+1      ;LET HALTM+1 :B= (R3)+
 017600  111337  004310          MOVB    (R3),HALTM+2               ;INTO MESSAGE.
 017604                              GMANIL HALTM,TIME1,1,YES   ;HALT   WAIT FOR AN OEPRATOR INPUT.
 017604  104443                                                                TRAP    C$GMAN
 017606  000404                                                                BR      10000$
 017610  003436                                                                .WORD   TIME1
 017612  000130                                                                .WORD   T$CODE
 017614  004306                                                                .WORD   HALTM
 017616  000001                                                                .WORD   1
 017620                   10000$:
 017620                   10000$:

 017620  000402                  BR      50325$
 017622                   50324$:
 017622  105037  003531          CLRB    MISCFG       ;LET MISCFG :B= #0          ;

 017626                   50325$:

 017626                   50323$:
 017626  000207           CKHRTN: RTS     PC                         ;RETURN
                                 .EVEN

 017630                          ENDMOD



                          .TITLE MISCELLANEOUS SECTIONS
                          .SBTTL  REPORT CODING SECTION



                          ;++
                          ; THE REPORT CODING SECTION CONTAINS THE
                          ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                          ;

 017630                          BGNRPT
 017630                   L$RPT::
 017630  010537  003452          MOV     R5,R5SAVE                  ;SAVE CURRENT DEVICE POINTER.
 017634  004737  017142          JSR     PC,FIRSTU                  ;FIND THE FIRST UNIT.
 017640                   50326$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
 017640  026527  002604  177777  CMP     DEVTBL(R5),#END
 017646  001562                  BEQ     50327$
 017650                            PRINTS        #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
 017650  016546  003376                                                        MOV     RECCNT(R5),-(SP)
 017654  016546  003326                                                        MOV     PASCNT(R5),-(SP)
 017660  016546  002604                                                        MOV     DEVTBL(R5),-(SP)
 017664  012746  020472                                                        MOV     #RPT1A,-(SP)
 017670  012746  000004                                                        MOV     #4,-(SP)
 017674  010600                                                                MOV     SP,R0
 017676  104416                                                                TRAP    C$PNTS
 017700  062706  000012                                                        ADD     #12,SP
 017704                            PRINTS        #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
```

REPORT CODING SECTION

```
        017704  016546  002626                                                  MOV     WRBC(R5),(SP)
        017710  016546  002636                                                  MOV     WRBC+10(R5),(SP)
        017714  016546  002646                                                  MOV     WRBC+20(R5),-(SP)
        017720  016546  002656                                                  MOV     WRBC+30(R5),(SP)
        017724  012746  020547                                                  MOV     #RPT1B,(SP)
        017730  012746  000005                                                  MOV     #5,(SP)
        017734  010600                                                          MOV     SP,R0
        017736  104416                                                          TRAP    C$PNTS
        017740  062706  000014                                                  ADD     #14,SP
  4886  017744                          PRINTS  #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
        017744  016546  002666                                                  MOV     RRBC(R5),(SP)
        017750  016546  002676                                                  MOV     RRBC+10(R5),(SP)
        017754  016546  002706                                                  MOV     RRBC+20(R5),(SP)
        017760  016546  002716                                                  MOV     RRBC+30(R5),(SP)
        017764  012746  020620                                                  MOV     #RPT1C,-(SP)
        017770  012746  000005                                                  MOV     #5,-(SP)
        017774  010600                                                          MOV     SP,R0
        017776  104416                                                          TRAP    C$PNTS
        020000  062706  000014                                                  ADD     #14,SP
  4887  020004                          PRINTS  #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
        020004  016546  002726                                                  MOV     RFBC(R5),(SP)
        020010  016546  002736                                                  MOV     RFBC+10(R5),-(SP)
        020014  016546  002746                                                  MOV     RFBC+20(R5),-(SP)
        020020  016546  002756                                                  MOV     RFBC+30(R5),-(SP)
        020024  012746  020671                                                  MOV     #RPT1D,-(SP)
        020030  012746  000005                                                  MOV     #5,-(SP)
        020034  010600                                                          MOV     SP,R0
        020036  104416                                                          TRAP    C$PNTS
        020040  062706  000014                                                  ADD     #14,SP
  4888  020044                          PRINTS  #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
        020044  016546  003026                                                  MOV     RFREC(R5),-(SP)
        020050  016546  003006                                                  MOV     RRREC(R5),-(SP)
        020054  016546  002766                                                  MOV     WRREC(R5),-(SP)
        020060  012746  020775                                                  MOV     #RPT1F,-(SP)
        020064  012746  000004                                                  MOV     #4,-(SP)
        020070  010600                                                          MOV     SP,R0
        020072  104416                                                          TRAP    C$PNTS
        020074  062706  000012                                                  ADD     #12,SP
  4889  020100                          PRINTS  #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
        020100  016546  003036                                                  MOV     RFUNR(R5),-(SP)
        020104  016546  003016                                                  MOV     RRUNR(R5),-(SP)
        020110  016546  002776                                                  MOV     WRUNR(R5),-(SP)
        020114  012746  021046                                                  MOV     #RPT1G,(SP)
        020120  012746  000004                                                  MOV     #4,(SP)
        020124  010600                                                          MOV     SP,R0
        020126  104416                                                          TRAP    C$PNTS
        020130  062706  000012                                                  ADD     #12,SP
  4890  020134  105737  002210          TSTB    BADTSW  ;IFB BADTSW NE #0 THEN                  ;
  4891  020140  001402                  BEQ     50330$
  4892  020142  004737  020224              JSR PC,BTRPT        ;GO PRINT BAD TAPE SPOTS WHEN  ENABLED
  4893
  4894  020146                  50330$:
  4895  020146                          PRINTS  #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)
        020146  016546  003346                                                  MOV     VFYCNT(R5),-(SP)
        020152  016546  003366                                                  MOV     FTLCNT(R5),-(SP)
        020156  016546  003356                                                  MOV     HRDCNT(R5),(SP)
        020162  016546  003336                                                  MOV     SCCNT(R5),(SP)
```

REPORT CODING SECTION

```
        020166  012746  021243                                                          MOV     @RPT1I,(SP)
        020172  012746  000005                                                          MOV     @5.(SP)
        020176  010600                                                                   MOV     SP,R0
        020200  104416                                                                   TRAP    C$PNTS
        020202  062706  000014                                                          ADD     @14,SP
4896    020206  004737  017210                  JSR     PC,NEXTU                ;FIND THE NEXT UNIT.
4897
4898    020212  000612                  BR      50326$
4899    020214                  50327$:
4900    020214  013705  003452                  MOV     R5SAVE,R5               ;RESTORE CURRENT DEVICE POINTER.
4901    020220                          EXIT    RPT
        020220  000167                                                                   .WORD   J$JMP
        020222  001130                                                                   .WORD   L10010-.
4902
4903                            ;       SUBR TO PRINT BAD TAPES SPOTS DURING THE REPORT PRINTS
4904                            ;       WRITE RETRIES: CUMULATIVE COUNT
4905                            ;       BAD TAPE SPOTS: COUNT PER TAPE PASS ONLY, NOT CUMULATIVE.
4906                            ;       COUNT OF RECOVERABLE WRITE ERRORS EXCLUDES BAD TAPE SPOTS.
4907
4908    020224                  BTRPT:: PRINTS  @RPT1E,WRTYCT(R5)               ;PRINT GLOBAL WRITE RETRY COUNT
        020224  016546  003316                                                          MOV     WRTYCT(R5),-(SP)
        020230  012746  021117                                                          MOV     @RPT1E,-(SP)
        020234  012746  000002                                                          MOV     @2,-(SP)
        020240  010600                                                                   MOV     SP,R0
        020242  104416                                                                   TRAP    C$PNTS
        020244  062706  000006                                                          ADD     @6,SP
4909    020250  016537  002616  003512          MOV     BTADDR(R5),BTPT         ;BTPT IS BOTH THE BAD TAPE SPOT COUNTER
4910    020256  017703  163230                  MOV     @BTPT,R3                ;AND THE LOGGING INDEX
4911    020262  006203                          ASR     R3
4912    020264                                  PRINTS  @RPT1J,R3       ;PRINT # OF BAD TAPE SPOTS
        020264  010346                                                                   MOV     R3,-(SP)
        020266  012746  021147                                                          MOV     @RPT1J,(SP)
        020272  012746  000002                                                          MOV     @2,(SP)
        020276  010600                                                                   MOV     SP,R0
        020300  104416                                                                   TRAP    C$PNTS
        020302  062706  000006                                                          ADD     @6,SP
4913    020306  005703                          TST     R3                      ;PRINT RECORD # IF BAD SPOTS DETECTED
4914    020310  001457                          BEQ     50331$
4915    020312  020327  000024                  CMP     R3,@20.         ;IF R3 HI @20. THEN     ;
4916    020316  101402                          BLOS    50332$
4917    020320  012703  000024                  MOV     @20.,R3                 ;20 BAD SPOTS IS THE LIMIT
4918
4919    020324                  50332$:
4920    020324                    PRINTS        @CRLFSP                 ;
        020324  012746  005744                                                          MOV     @CRLFSP,-(SP)
        020330  012746  000001                                                          MOV     @1,(SP)
        020334  010600                                                                   MOV     SP,R0
        020336  104416                                                                   TRAP    C$PNTS
        020340  062706  000004                                                          ADD     @4,SP
4921    020344  013704  003512          MOV     BTPT,R4   ;LET R4 := BTPT + @2  ;FETCH A BAD SPOT ID
4922    020350  062704  000002          ADD     @2,R4
4923    020354  005002                  CLR     R2                              ;R2 = PRINT COUNT PER LINE: 10 MAX
4924    020356                  50333$:   ;REPEAT                               ;
4925    020356                              PRINTS      @RPT1K,(R4)     ;PRINT A BAD SPOT ID
        020356  011446                                                                   MOV     (R4),-(SP)
        020360  012746  021234                                                          MOV     @RPT1K,(SP)
        020364  012746  000002                                                          MOV     @2,-(SP)
```

M8


```
REPORT CODING SECTION

        020370  010600                                                                  MOV     SP,R0
        020372  104416                                                                  TRAP    C$PNTS
        020374  062706  000006                                                          ADD     #6,SP
  4926  020400  005202                  INC     R2          ;LET R2 := R2 + #1  ;COUNT PRINTS
  4927  020402  062704  000002          ADD     #2,R4       ;LET R4 := R4 + #2  ;NEXT
  4928  020406  020227  000012          CMP     R2,#10.     ;IF R2 EQ #10. THEN ;
  4929  020412  001014                  BNE     50334$
  4930  020414                        PRINTS #CRLFSP                ;GO TO NEXT PRINT LINE PAST 10 PRINTS
        020414  012746  005744                                                          MOV     #CRLFSP,-(SP)
        020420  012746  000001                                                          MOV     #1,-(SP)
        020424  010600                                                                  MOV     SP,R0
        020426  104416                                                                  TRAP    C$PNTS
        020430  062706  000004                                                          ADD     #4,SP
  4931  020434  162703  000012          SUB     #10.,R3     ;LET R3 := R3 - #10.    ;ADJUST BAD SPOT COUNT
  4932  020440  162702  000012          SUB     #10.,R2     ;LET R2 := R2 - #10.    ;ADJUST PRINT COUNT
  4933                                                      ;
  4934  020444                  50334$:
  4935  020444  020203                  CMP     R2,R3   ;UNTIL R2 EQ R3             ;LIMIT: # OF BAD SPOTS
  4936  020446  001343                  BNE     50333$
  4937                                                      ;
  4938  020450                  50331$:
  4939  020450                  PRINTS  #CRLF               ;
        020450  012746  005741                                                          MOV     #CRLF,-(SP)
        020454  012746  000001                                                          MOV     #1,-(SP)
        020460  010600                                                                  MOV     SP,R0
        020462  104416                                                                  TRAP    C$PNTS
        020464  062706  000004                                                          ADD     #4,SP
  4940  020470  000207                  RTS PC
  4941
  4942                                  .NLIST  BEX
  4943  020472      045     116     045 RPT1A:  .ASCIZ  /<N><N><AUNIT <D1><S3><APASS:<D5><S3><ARECORD:<D5><N>/
  4944  020547      045     101     102 RPT1B:  .ASCIZ  /<ABYTES WRITTEN  <D3><A,<Z3><A,<Z3><A,<Z3><N>/
  4945  020620      045     101     102 RPT1C:  .ASCIZ  /<ABYTES READ REV <D3><A,<Z3><A,<Z3><A,<Z3><N>/
  4946  020671      045     101     102 RPT1D:  .ASCII  /<ABYTES READ FWD <D3><A,<Z3><A,<Z3><A,<Z3><N>/
  4947  020741      045     123     062         .ASCIZ  /<S23><AWRT<S4><ARDR<S4><ARDF<N>/
  4948  020775      045     101     122 RPT1F:  .ASCIZ  /<ARECOVERABLE ERRORS   <D5><S2><D5><S2><D5><N>/
  4949  021046      045     101     125 RPT1G:  .ASCIZ  /<AUNRECOVERABLE ERRORS <D5><S2><D5><S2><D5><N>/
  4950  021117      045     101     127 RPT1E:  .ASCIZ  /<AWRITE RETRIES<S8><D5><N>/
  4951  021147      045     116     045 RPT1J:  .ASCIZ  /<N><D2><A BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:/
  4952  021234      045     104     065 RPT1K:  .ASCIZ  /<D5><S1/
  4953  021243      045     101     123 RPT1I:  .ASCII  "<ASPEC COND<S3><AHARD<S3><AFATAL<S3><ACOMPARE<N"
  4954  021317      045     123     063         .ASCIZ  /<S3><D5><S3><D5><S3><D5><S3><D5><N><N>/
  4955                                  .LIST   BEX
  4956                                  .EVEN
  4957
  4958  021354                        ENDRPT
        021354                  L10010:
        021354  104425                                                                  TRAP    C$RPT
  4959
  4960                          .SBTTL  LOAD DEVICE PROTECTION TABLE
  4961
  4962                          ;++
  4963                          ;TABLE FOR SUPERVISOR TO IDENTIFY THE P-TBL FOR THE LOAD DEV
  4964                          ;THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD DEV
  4965                          ;--
  4966
  4967  021356                        BGNPROT
```

```
LOAD DEVICE PROTECTION TABLE

        021356                          L$PROT::
   4968
   4969 021356  000000                            .WORD 0                 ;P TBL OFFSET OF TSDB
   4970 021360  177777                            .WORD -1                ;P TBL OFFSET OF MASS BUS UNIT #:  1 = NOT A MASS BUS DE
   4971 021362  177777                            .WORD -1                ;P TBL OFFSET OF DRIVE #:  1 = NONE, THREE DRIVES PER CONTRO
LLER
   4972 021364                                  ENDPROT
   4973
   4974                                 .SBTTL  INITIALIZE SECTION
   4975
   4976                                 ;++
   4977                                 ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
   4978                                 ; AT THE BEGINNING OF EACH PASS.
   4979                                 ;--
   4980
   4981 021364                                  BGNINIT
        021364                          L$INIT::
   4982
   4983 021364  032727  000003  002330  INIT10: BIT     #BIT0!BIT1,#CMDPKT    ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDRY:
   4984 021372  001421                          BEQ     50335$
   4985 021374                                    ERRSF 1,CMDPKM                ;PRINT ERROR MSG,
        021374  104454                                                                TRAP    C$ERSF
        021376  000001                                                                .WORD   1
        021400  004346                                                                .WORD   CMDPKM
        021402  000000                                                                .WORD   0
   4986 021404                                    DELAY 200.                    ;GO TO SUPERVISOR, WAIT 2 SECONDS.
        021404  012727  000310                                                        MOV     #200.,(PC)+
        021410  000000                                                                .WORD   0
        021412  013727  002116                                                        MOV     L$DLY,(PC)+
        021416  000000                                                                .WORD   0
        021420  005367  177772                                                        DEC     -6(PC)
        021424  001375                                                                BNE     .-4
        021426  005367  177756                                                        DEC     -22(PC)
        021432  001367                                                                BNE     .-20
   4987 021434  000753                            BR      INIT10                ;
   4988
   4989 021436                          50335$:
   4990
   4991 021436  105737  002204                    TSTB    CLRFLG                ;IF CLR COUNTERS FLAG SET:
   4992 021442  001413                            BEQ     50336$
   4993 021444  105037  002204                      CLRB  CLRFLG                ;INIT CLR FLAG.
   4994 021450  005002                            CLR     R2          ;LET R2 := #0
   4995 021452                          50337$:     ;WHILE R2 NE #CNTLEN DO
   4996 021452  020227  000550                    CMP     R2,#CNTLEN
   4997 021456  001405                            BEQ     50340$
   4998 021460  005062  002626                    CLR     WRBC(R2)              ;CLR ALL STATISTICAL COUNTERS.
   4999 021464  062702  000002                    ADD     #2,R2         ;LET R2 := R2 + #2
   5000
   5001 021470  000770                            BR      50337$
   5002 021472                          50340$:
   5003
   5004 021472                          50336$:
   5005
   5006 021472  105737  002205                    TSTB    RRANV           ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
   5007 021476  001406                            BEQ     50341$
   5008 021500  012737  153624  003432              MOV     #RANBC,RANB               ;RESET RANDOM BASE #.
   5009
   5010 021506  012737  032561  003434              MOV     #RANSC,RANS               ;RESET RANDOM SAVE LOCATION.
```

```
5011
5012 021514                                    50341$:
5013 021514                                            READEF  ØEF.START                ;READ START COMMAND EVENT FLAG.
     021514  012700  000040                                                                    MOV     ØEF.START,R0
     021520  104447                                                                           TRAP    C$REFG
5014 021522                                            BNCOMPLETE      INIT15           ;BRANCH IF NOT STARTING.
     021522  103057                                                                           BCC     INIT15
5015 021524  105237  003526                           INCB    STAFLG                   ;SET START COMMAND FLAG.
5016 021530  012705  000006                           MOV     Ø6,R5   ;LET R5 := Ø6
5017 021534                                    50342$: ;REPEAT                          ;INITIATE UNIT NUMBER TABLE
5018 021534  012765  177774  002604                  MOV     ØNINUSE,DEVTBL(R5)       ;BY STORING NOT IN USE IN EACH LOCATION.
5019 021542  162705  000002                           SUB     Ø2,R5     ;LET R5 := R5 - Ø2
5020 021546  005705                                   TST     R5      ;UNTIL R5 EQ Ø0
5021 021550  001371                                   BNE     50342$
5022 021552  022737  000001  002012                  CMP     Ø1,L$UNIT                ;ONLY ONE UNIT ALLOWED
5023 021560  001425                                   BEQ     5034$                    ;OK
5024 021562                                            PRINTF  ØAUDRUN                  ;TELL THE MAN
     021562  012746  005146                                                                    MOV     ØAUDRUN, (SP)
     021566  012746  000001                                                                    MOV     Ø1, (SP)
     021572  010600                                                                           MOV     SP,R0
     021574  104417                                                                           TRAP    C$PNTF
     021576  062706  000004                                                                    ADD     Ø4,SP
5025 021602                                            DELAY   25                       ;WAIT
     021602  012727  000025                                                                    MOV     Ø25,(PC)+
     021606  000000                                                                           .WORD   0
     021610  013727  002116                                                                    MOV     L$DLY,(PC)+
     021614  000000                                                                           .WORD   0
     021616  005367  177772                                                                    DEC     -6(PC)
     021622  001375                                                                           BNE     .-4
     021624  005367  177756                                                                    DEC     -22(PC)
     021630  001367                                                                           BNE     .-20
5026 021632                                            DOCLN                            ;ABORT
     021632  104444                                                                           TRAP    C$DCLN
5027 021634  013705  002012                    5034$:  MOV     L$UNIT,R5        ;LET R5 := L$UNIT SHIFT 1
5028 021640  006305                                   ASL     R5
5029 021642                                    50343$: ;REPEAT                          ;STORE ALL UNIT
5030 021642  162705  000002                           SUB     Ø2,R5     ;LET R5 := R5 - Ø2             ;NUMBERS IN DEVTBL.
5031 021646  010565  002604                           MOV     R5,DEVTBL(R5)     ;LET DEVTBL(R5) := R5 SHIFT  1
5032 021652  006265  002604                           ASR     DEVTBL(R5)
5033 021656  005705                                   TST     R5      ;UNTIL R5 EQ Ø0
5034 021660  001370                                   BNE     50343$
5035
5036 021662                                    INIT15: READEF ØEF.PWR                   ;HAS THERE BE A POWER FAILURE?
     021662  012700  000034                                                                    MOV     ØEF.PWR,R0
     021666  104447                                                                           TRAP    C$REFG
5037 021670                                            BNCOMPLETE INIT16                ;BRANCH IF NOT.
     021670  103004                                                                           BCC     INIT16
5038 021672  105237  003526                           INCB    STAFLG                   ;IF SO - SET THE START FLAG.
5039 021676  105237  003527                           INCB    PWRFLG                   ;IF SO   SET THE POWER FAIL FLAG.
5040
5041 021702                                    INIT16: RFLAGS  OPFLAG                   ;READ AND STORE FLAGS SET BY OPERATOR
     021702  104421                                                                           TRAP    C$RFLA
     021704  010037  003536                                                                    MOV     R0,OPFLAG
5042 021710  005003                                   CLR     R3      ;LET R3 := Ø0                   ;CLEAR EVENT FLAG
5043 021712  105737  003527                           TSTB    PWRFLG           ;IF POWER FAIL HAS NOT OCCURRED THEN:
5044 021716  001020                                   BNE     50344$
5045 021720                                                  READEF ØEF.NEW             ;UPDATE PASS COUNT WHEN
```

INITIALIZE SECTION

```
                021720  012700  000035                                                          MOV     #EF.NEW,R0
                021724  104447                                                                  TRAP    C$REFG
 5046           021726  103014                  BCC     50345$                  ;SUPERVISOR IS IN NEW PASS
 5047           021730  105737  003526          TSTB    STAFLG                  ;AND DIAG WAS NEITHER STARTED
 5048           021734  001010                  BNE     50346$
 5049           021736                            READEF #EF.RES                ;NOR
                021736  012700  000037                                                          MOV     #EF.RES,R0
                021742  104447                                                                  TRAP    C$REFG
 5050           021744  103402                  BCS     50347$          ;IFCOND CC THEN         ;RESTARTED
 5051           021746  005103                  COM     R3                ;LET R3 := COMP R3    ;DO IT
 5052
 5053           021750  000401                  BR      50350$
 5054           021752                  50347$:
 5055           021752  005203                  INC     R3                      ;SET 1ST PASS IF NEW PASS AND
 5056                                                                           ;RESTARTING
 5057           021754                  50350$:
 5058
 5059           021754  000401                  BR      50351$
 5060           021756                  50346$:
 5061           021756  005203                  INC     R3                      ;SET 1ST PASS IF NEW PASS AND
 5062                                                                           ;STARTING
 5063           021760                  50351$:                         ;DO NOT UPDATE IT ON CONTINUE
 5064
 5065           021760                  50345$:                         ;OR ON POWER FAIL
 5066
 5067           021760                  50344$:
 5068           021760  004737  017142          JSR     PC,FIRSTU               ;INIT DEVICE POINTER.
 5069           021764  005002                  CLR     R2      ;LET R2 := #0                   ;INIT DEVICE COUNTER.
 5070           021766                  50352$: ;WHILE DEVTBL(R5) NE #END DO
 5071           021766  026527  002604  177777  CMP     DEVTBL(R5),#END
 5072           021774  001456                  BEQ     50353$
 5073           021776  005202                  INC     R2              ;LET R2 := R2 + #1
 5074           022000  010500                  MOV     R5,R0           ;LET R0 := R5 SHIFT  1
 5075           022002  006200                  ASR     R0
 5076           022004                  GPHARD  R0,R0                           ;GET HARDWARE P TABLE FROM SUPER.
                022004  104442                                                                  TRAP    C$GPHRD
 5077           022006  103044                  BCC     50354$    ;IFCOND CS THEN
 5078           022010  011065  002514          MOV     (R0),TSDB(R5)           ;SAVE TSDB ADDRESS.
 5079           022014  012065  002524          MOV     (R0)+,TSSR(R5)          ;SAVE TSSR ADDRESS.
 5080           022020  062765  000002  002524  ADD     #2,TSSR(R5)
 5081           022026  012065  002534          MOV     (R0)+,TSVCT(R5)         ;SAVE INTERRUPT VECTOR ADDRESS.
 5082           022032  011065  003532          MOV     (R0),TSUNT(R5)          ;SAVE NUMBER OF DRIVE
 5083           022036  011037  003534          MOV     (R0),TSNP               ;SAVE FOR PRINT OUT'S
 5084           022042                  SETVEC  TSVCT(R5),TSSINT(R5),#INTPRI
                022042  012746  000340                                                          MOV     #INTPRI,-(SP)
                022046  016546  002554                                                          MOV     TSSINT(R5),-(SP)
                022052  016546  002534                                                          MOV     TSVCT(R5),-(SP)
                022056  012746  000003                                                          MOV     #3,-(SP)
                022062  104437                                                                  TRAP    C$SVEC
                022064  062706  000010                                                          ADD     #10,SP
 5085                                                                      ;SET UP INTERUPT PROCESSING CONDITIONS.
 5086           022070  005065  003472          CLR     INTFLG(R5)              ;CLEAR INTERRUPT FLAGS.
 5087           022074  005703                  TST     R3                      ;ACTUAL PASSCOUNT UPDATE PER R3
 5088           022076  001410                  BEQ     50355$
 5089           022100  005703                  TST     R3              ;IF R3 LT #0 THEN
 5090           022102  002003                  BGE     50356$
 5091           022104  005265  003326          INC     PASCNT(R5)              ;LET PASCNT(R5) := PASCNT(R5) + #1
```

INITIALIZE SECTION

```
5092
5093 022110  000403                        BR      50357$
5094 022112                          50356$:
5095 022112  012765  000001  003326        MOV     #1,PASCNT(R5)           ;LET PASCNT(R5) := #1
5096
5097 022120                          50357$:
5098
5099 022120                          50355$:
5100
5101 022120                          50354$:
5102 022120  005065  003376                CLR     RECCNT(R5)              ;CLEAR RECORD COUNT
5103 022124  004737  017210                  JSR   PC,NEXTU                ;DO IT FOR ALL DEVICES.
5104
5105 022130  000716                        BR      50352$
5106 022132                          50353$:
5107
5108 022132  005702                        TST     R2                      ;IF THERE ARE NO UNITS:
5109 022134  001026                        BNE     50360$
5110 022136                                  PRINTF #AUDRPM                ;PRINT ALL UNITS DROPPED.
     022136  012746  005114                                                        MOV     #AUDRPM,(SP)
     022142  012746  000001                                                        MOV     #1,(SP)
     022146  010600                                                              MOV     SP,R0
     022150  104417                                                              TRAP    C$PNTF
     022152  062706  000004                                                        ADD     #4,SP
5111 022156                                    DELAY 200.                    ;GO TO SUPERVISOR, WAIT 2 SECONDS.
     022156  012727  000310                                                        MOV     #200.,(PC)+
     022162  000000                                                              .WORD   0
     022164  013727  002116                                                        MOV     L$DLY,(PC)+
     022170  000000                                                              .WORD   0
     022172  005367  177772                                                        DEC     -6(PC)
     022176  001375                                                              BNE     .-4
     022200  005367  177756                                                        DEC     -22(PC)
     022204  001367                                                              BNE     .-20
5112 022206                                      BREAK                       ;GO TO SUPERVISOR, CHECK TTY.
     022206  104422                                                              TRAP    C$BRK
5113 022210                                  DOCLN                           ;DO CLEAN CODE + ABORT PASS.
     022210  104444                                                              TRAP    C$DCLN
5114
5115 022212                          50360$:
5116
5117
5118 022212                                  SETPRI #PRI00                   ;LOWER CPU PRIORITY TO 0
     022212  012700  000000                                                        MOV     #PRI00,R0
     022216  104441                                                              TRAP    C$SPRI
5119 022220  105737  002213                TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED
5120 022224  001033                        BNE     1$
5121 022226  032737  000020  003536        BIT     #ADR,OPFLAG
5122 022234  001027                        BNE     1$
5123 022236  004737  017142                JSR     PC,FIRSTU               ;AND AUTO-DROP NOT CALLED, THEN SET UP FOR FIRST
5124 022242                          50362$:                                ;WHILE THERE ARE MORE DEVICES:
5125 022242  026527  002604  177777        CMP     DEVTBL(R5),#END
5126 022250  001421                        BEQ     1$
5127 022252  105037  003530                CLRB    TRAPD4                  ;CLEAR TRAP FLAG
5128 022256                                SETVEC  #4,#TRAP4,#INTPRI       ;SET VECTOR 4,PRIORTY @6
     022256  012746  000340                                                        MOV     #INTPRI,-(SP)
     022262  012746  023770                                                        MOV     #TRAP4,(SP)
     022266  012746  000004                                                        MOV     #4,-(SP)
```

```
INITIALIZE SECTION

        022272  012746  000003                                                          MOV     #3, (SP)
        022276  104437                                                                  TRAP    C$SVEC
        022300  062706  000010                                                          ADD     #10,SP
  5129                                                          ;START 3.5 MINUTE COUNTER
  5130  022304  012737  000001  003436          MOV     #1,TIME1        ;INCR TIME1 FROM #1 TO #25 BY #1
  5131  022312  000404                          BR      50365$
  5132  022314  000137  023142          1$:     JMP     50363$
  5133
  5134  02232U                          50366$:
  5135  022320  005237  003436                  INC     TIME1
  5136  022324                          50365$:
  5137  022324  023727  003436  000025          CMP     TIME1,#25
  5138  022332  003134                          BGT     4$
  5139  022334  012775  002340  002514          MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
  5140  022342                          DELAY   25                              ;WAIT
        022342  012727  000025                                                          MOV     #25,(PC)+
        022346  000000                                                                 .WORD   0
        022350  013727  002116                                                          MOV     L$DLY,(PC)+
        022354  000000                                                                 .WORD   0
        022356  005367  177772                                                          DEC     -6(PC)
        022362  001375                                                                 BNE     .-4
        022364  005367  177756                                                          DEC     -22(PC)
        022370  001367                                                                 BNE     .-20
  5141  022372                          CLRVEC  #4                              ;CLEAR VECTOR AT 4
        022372  012700  000004                                                          MOV     #4,R0
        022376  104436                                                                  TRAP    C$CVEC
  5142  022400  105737  003530                  TSTB    TRAPD4                  ;IFB TRAPD4 NE #0 THEN
  5143  022404  001423                          BEQ     2$
  5144  022406  005265  003366                  INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
  5145  022412                          PRINTF  #NODEV,TSSR(R5)                 ;PRINT ERROR
        022412  016546  002524                                                          MOV     TSSR(R5),-(SP)
        022416  012746  005543                                                          MOV     #NODEV,-(SP)
        022422  012746  000002                                                          MOV     #2,-(SP)
        022426  010600                                                                  MOV     SP,R0
        022430  104417                                                                  TRAP    C$PNTF
        022432  062706  000006                                                          ADD     #6,SP
  5146  022436  016537  002604  017450          MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
  5147  022444  010500                          MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
  5148  022446  006200                          ASR     R0
  5149  022450                          DODU    R0                              ;DROP THE UNIT
        022450  104451                                                                  TRAP    C$DODU
  5150                                                          ; EXEC BGNDU-ENDDU CODE IF IDU = 0
  5151  022452                          DOCLN                                   ;DO CLEAN &ABORT
        022452  104444                                                                  TRAP    C$DCLN
  5152
  5153  022454  105037  003530          2$:     CLRB    TRAPD4                  ;CLEAR TRAP FLAG
  5154  022460                          SETVEC  #4,#TRAP4,#INTPRI               ;SET VECTOR 4,PRIORTY #6
        022460  012746  000340                                                          MOV     #INTPRI, (SP)
        022464  012746  023770                                                          MOV     #TRAP4, (SP)
        022470  012746  000004                                                          MOV     #4,-(SP)
        022474  012746  000003                                                          MOV     #3, (SP)
        022500  104437                                                                  TRAP    C$SVEC
        022502  062706  000010                                                          ADD     #10,SP
  5155  022506  005775  002524                  TST     @TSSR(R5)               ;CHECK FOR ADDRESS
  5156  022512                          DELAY   25                              ;WAIT
        022512  012727  000025                                                          MOV     #25,(PC)+
        022516  000000                                                                 .WORD   0
```

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INITIALIZE SECTION

```
        022520  013727  002116                                                  MOV     L$DLY,(PC)+
        022524  000000                                                          .WORD   0
        022526  005367  177772                                                  DEC     -6(PC)
        022532  001375                                                          BNE     .-4
        022534  005367  177756                                                  DEC     -22(PC)
        022540  001367                                                          BNE     .-20
  5157  022542                          CLRVEC  #4              ;CLEAR VECTOR AT 4
        022542  012700  000004                                                  MOV     #4,R0
        022546  104436                                                          TRAP    C$CVEC
  5158  022550  105737  003530          TSTB    TRAPD4          ;IFB TRAPD4 NE #0 THEN
  5159  022554  001424                  BEQ     3$
  5160  022556  005265  003366          INC     FTLCNT(R5)      ;LET FTLCNT(R5) := FTLCNT(R5) + #1
  5161  022562                          PRINTF  #NODEV,TSSR(R5) ;PRINT ERROR
        022562  016546  002524                                                  MOV     TSSR(R5),-(SP)
        022566  012746  005543                                                  MOV     #NODEV,-(SP)
        022572  012746  000002                                                  MOV     #2,-(SP)
        022576  010600                                                          MOV     SP,R0
        022600  104417                                                          TRAP    C$PNTF
        022602  062706  000006                                                  ADD     #6,SP
  5162  022606  016537  002604  017450  MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
  5163  022614  010500                  MOV     R5,R0           ;R0=LOGICAL DEVICE NUMBER
  5164  022616  006200                  ASR     R0
  5165  022620                          DODU    R0              ;DROP THE UNIT
        022620  104451                                                          TRAP    C$DODU
  5166
  5167  022622                          DOCLN                   ;DO CLEAN &ABORT
        022622  104444                                                          TRAP    C$DCLN
  5168
  5169  022624  003127          4$:     BGT     50367$
  5170
  5171  022626  004737  010026  3$:     JSR     PC,SETDEF       ;SET UNIT NUMBER
  5172  022632  010475  002514          MOV     R4,@TSDB(R5)
  5173  022636                          DELAY   25
        022636  012727  000025                                                  MOV     #25,(PC)+
        022642  000000                                                          .WORD   0
        022644  013727  002116                                                  MOV     L$DLY,(PC)+
        022650  000000                                                          .WORD   0
        022652  005367  177772                                                  DEC     -6(PC)
        022656  001375                                                          BNE     .-4
        022660  005367  177756                                                  DEC     -22(PC)
        022664  001367                                                          BNE     .-20
  5174  022666  012775  002340  002514  MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
  5175  022674                          DELAY   25              ;WAIT
        022674  012727  000025                                                  MOV     #25,(PC)+
        022700  000000                                                          .WORD   0
        022702  013727  002116                                                  MOV     L$DLY,(PC)+
        022706  000000                                                          .WORD   0
        022710  005367  177772                                                  DEC     -6(PC)
        022714  001375                                                          BNE     .-4
        022716  005367  177756                                                  DEC     -22(PC)
        022722  001367                                                          BNE     .-20
  5176  022724  032775  000200  002524  BIT     #TS.SSR,@TSSR(R5)       ;IF #TS.SSR SETIN @TSSR(R5) THEN
  5177  022732  001420                  BEQ     50370$
  5178  022734  032775  000100  002524  BIT     #TS.OFL,@TSSR(R5)       ;IF #TS.OFL NOTSETIN @TSSR(R5) THEN
  5179  022742  001001                  BNE     50371$
  5180  022744  000457                  BR      50364$                  ;EXIT COUNTER WHEN UNIT ON LINE
  5181
```

INITIALIZE SECTION

```
5182 022746                            50371$:
5183 022746                                    PRINTF #OFLINM,TSNP              ;PRINT UNIT OFF LINE EVERY 10 SEC
     022746  013746  003534                                                     MOV     TSNP, (SP)
     022752  012746  005456                                                     MOV     #OFLINM, (SP)
     022756  012746  000002                                                     MOV     #2, (SP)
     022762  010600                                                             MOV     SP,R0
     022764  104417                                                             TRAP    C$PNTF
     022766  062706  000006                                                     ADD     #6,SP
5184
5185 022772                            50372$:
5186
5187 022772  000412                              BR      50373$
5188 022774                            50370$:
5189 022774                                      PRINTF #NRDYM,DEVTBL(R5)
     022774  016546  002604                                                     MOV     DEVTBL(R5), (SP)
     023000  012746  023740                                                     MOV     #NRDYM, (SP)
     023004  012746  000002                                                     MOV     #2, (SP)
     023010  010600                                                             MOV     SP,R0
     023012  104417                                                             TRAP    C$PNTF
     023014  062706  000006                                                     ADD     #6,SP
5190
5191 023020                            50373$:
5192 023020  012737  000001  003440              MOV     #1,TIME2                ;INCR TIME2 FROM #1 TO #13 BY #1
5193 023026  000402                              BR      50374$
5194 023030                            50375$:
5195 023030  005237  003440                      INC     TIME2
5196 023034                            50374$:
5197 023034  023727  003440  000013              CMP     TIME2,#13
5198 023042  003016                              BGT     50376$
5199 023044                                      DELAY   100.            ;WAIT FOR UNIT TO BE SET ON-LINE
     023044  012727  000144                                                     MOV     #100.,(PC)+
     023050  000000                                                             .WORD   0
     023052  013727  002116                                                     MOV     L$DLY,(PC)+
     023056  000000                                                             .WORD   0
     023060  005367  177772                                                     DEC     -6(PC)
     023064  001375                                                             BNE     .-4
     023066  005367  177756                                                     DEC     -22(PC)
     023072  001367                                                             BNE     .-20
5200 023074                                      BREAK                   ;ALLOW TERMINAL INTERRUPT
     023074  104422                                                             TRAP    C$BRK
5201 023076  000754                              BR      50375$
5202 023100                            50376$:
5203 023100  000137  022320                      JMP     50366$
5204 023104                            50367$:
5205 023104                            50364$:
5206 023104                                      CLRVEC  #4                      ;CLEAR VECTOR AT 4
     023104  012700  000004                                                     MOV     #4,R0
     023110  104436                                                             TRAP    C$CVEC
5207 023112  023727  003436  000025              CMP     TIME1,#25               ;IF OFF LINE FOR 3.5 MINUTES
5208 023120  003404                              BLE     50377$
5209 023122  004737  012774                            JSR PC,MOVMSG           ;GET MESSAGE PACKET
5210 023126  004737  013512                            JSR PC,TCC1             ;PRINT ERROR AND DROP OFF LINE UNIT
5211
5212 023132                            50377$:
5213                                                                            ;REPEAT UNTIL ON LINE OR TIMED OUT.
5214 023132  004737  017210                        JSR PC,NEXTU                ;SET UP FOR NEXT UNIT.
5215
```

```
023136  000137  022242                  JMP     50362$
023142                          50363$:
023142                          50361$:
023142  105737  003527                  TSTB    PWRFLG  ;IFB PWRFLG EQ #0 THEN
023146  001026                          BNE     50400$
023150                                    MEMORY DATAWT         ;REQUEST MEMORY FROM SUPER FOR RD/WR BUFFERS.
023150  104431                                                                          TRAP    C$MEM
023152  010037  003406                                                                  MOV     R0,DATAWT
023156  013737  003406  003410          MOV     DATAWT,DATARD   ;SET RD BFR ADDRESS
023164  062737  004000  003410          ADD     #DATCNT,DATARD
023172  027727  160210  004000          CMP     @DATAWT,#DATCNT   ;WHEN NOT ENOUGH FREE MEMO AVAILABLE
023200  002011                          BGE     50401$
023202                                      PRINTF #MEMOM             ;WARN OPERATOR
023202  012746  023250                                                                  MOV     #MEMOM,-(SP)
023206  012746  000001                                                                  MOV     #1,-(SP)
023212  010600                                                                          MOV     SP,R0
023214  104417                                                                          TRAP    C$PNTF
023216  062706  000004                                                                  ADD     #4,SP
023222                                      DOCLN                     ;AND ABORT PASS
023222  104444                                                                          TRAP    C$DCLN
                                                        ;DIAG MUST BE RE LOADED IN A CPU WITH LARGER MEMO
023224                          50401$:
023224                          50400$:
023224  105037  002214                  CLRB    CHGFLG                  ;CLR CHANGE CMD SEQ TBL FLAG.
023230  012703  003526                  MOV     #ENDFLG,R3      ;LET R3 := #ENDFLG
023234  004737  012724                  JSR     PC,CLRERR               ;CLEAR ALL FLAGS.
023240  105037  003527                  CLRB    PWRFLG                  ;CLEAR THE POWER FAIL FLAG.
023244                                  EXIT    INIT
023244  104432                                                                          TRAP    C$EXIT
023246  000104                                                                          .WORD   L10012 .
023250     045     101     106  MEMOM:  .ASCII  /%AFREE MEMO TOO SMALL FOR RD WR BFRS%N/
023253     122     105     105
023256     040     115     105
023261     115     117     040
023264     124     117     117
023267     040     123     115
023272     101     114     114
023275     040     106     117
023300     122     040     122
023303     104     055     127
023306     122     040     102
023311     106     122     123
023314     045     116
023316     045     101     122          .ASCIZ  /%ARE-LOAD IN LARGER MEMO%N/
023321     105     055     114
023324     117     101     104
023327     040     111     116
023332     040     114     101
023335     122     107     105
023340     122     040     115
023343     105     115     117
023346     045     116     000
                                        .EVEN
```

INITIALIZE SECTION

```
                                        ENDINIT
                                L10012:
023352  104411                                                          TRAP    C$INIT

                                .SBTTL  AUTO DROP SECTION

                                ;++
                                ;SECTION EXECUTED AFTER THE INIT CODE WHEN "ADR" FLAG IS SET BY OPERATOR
                                ;SECTION CHEKS FOR A VALID INTERFACE LOCATION.  DROPS UNIT IF NO RESPONSE
                                ;FROM INTERFACE
                                ;-

                                        BGNAUTO
                                I$AUTO::

023354  004737  017142                  JSR PC,FIRSTU                   ;FIND FIRST UNIT
                        50402$: ;WHILE DEVTBL(R5) NE ØEND DO    ;
023360  026527  002604  177777          CMP     DEVTBL(R5),ØEND
023366  001525                          BEQ     50403$
023370  105037  003530                  CLRB    TRAPD4  ;LET TRAPD4 :B= Ø0      ;
                                  SETVEC Ø4,ØTRAP4,ØINTPRI      ;SET VECTOR 4
023374  012746  000340                                                  MOV     ØINTPRI, (SP)
023400  012746  023770                                                  MOV     ØTRAP4, (SP)
023404  012746  000004                                                  MOV     Ø4, (SP)
023410  012746  000003                                                  MOV     Ø3, (SP)
023414  104437                                                          TRAP    C$SVEC
023416  062706  000010                                                  ADD     Ø10,SP
023422  017502  002514                  MOV     @TSDB(R5),R2            ;ADDRESS TSO5 INTERFACE
                                  CLRVEC Ø4                     ;CLEAR VECTOR AT 4
023426  012700  000004                                                  MOV     Ø4,R0
023432  104436                                                          TRAP    C$CVEC
023434  105737  003530                  TSTB    TRAPD4  ;IFB TRAPD4 NE Ø0 THEN
023440  001423                          BEQ     50404$
023442  005265  003366                  INC     FTLCNT(R5)          ;LET FTLCNT(R5) := FTLCNT(R5) + Ø1
                                  PRINTF ØAUTODM,TSDB(R5)       ;PRINT ERROR
023446  016546  002514                                                  MOV     TSDB(R5), (SP)
023452  012746  023644                                                  MOV     ØAUTODM, (SP)
023456  012746  000002                                                  MOV     Ø2, (SP)
023462  010600                                                          MOV     SP,R0
023464  104417                                                          TRAP    C$PNTF
023466  062706  000006                                                  ADD     Ø6,SP
023472  016537  002604  017450          MOV     DEVTBL(R5),DROPN                ;SAVE Ø OF UNIT TO BE DROPPED.
023500  010500                          MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
023502  006200                          ASR     R0
023504                                  DODU    R0      ;DROP THE UNIT: EXEC BGNDU ENDDU CODE IF IDU = 0
023504  104451                                                          TRAP    C$DODU

023506  000452                          BR      50405$
023510                          50404$:
023510  012775  002340  002514          MOV     ØGSCPK,@TSDB(R5)        ;SEND GET STATUS COMMAND
023516  004737  012740                  JSR PC,WSSR                     ;WAIT
023522  032775  000200  002524          BIT     ØTS.SSR,@TSSR(R5)       ;IF ØTS.SSR SETIN @TSSR(R5) THEN
023530  001423                          BEQ     50406$
023532  032775  000100  002524          BIT     ØTS.OFL,@TSSR(R5)       ;IF ØTS.OFL SETIN @TSSR(R5) THEN
023540  001416                          BEQ     50407$
023542  005265  003366                  INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + Ø1
```

J9

AUTO DROP SECTION

```
5282 023546                                    PRINTF #OFLINM,TSNP
     023546  013746  003534                                          MOV     TSNP, (SP)
     023552  012746  005456                                          MOV     #OFLINM, (SP)
     023556  012746  000002                                          MOV     #2, (SP)
     023562  010600                                                  MOV     SP,R0
     023564  104417                                                  TRAP    C$PNTF
     023566  062706  000006                                          ADD     #6,SP
5283 023572  004737  017364                    JSR PC,DROPUA
5284
5285 023576                          50407$:
5286
5287 023576  000416                      BR      50410$
5288 023600                          50406$:
5289 023600  005265  003366                INC     FTLCNT(R5)          ;LET FTLCNT(R5) := FTLCNT(R5) + #1
5290 023604                               PRINTF #NRDYM,DEVTBL(R5)
     023604  016546  002604                                          MOV     DEVTBL(R5), (SP)
     023610  012746  023740                                          MOV     #NRDYM,-(SP)
     023614  012746  000002                                          MOV     #2, (SP)
     023620  010600                                                  MOV     SP,R0
     023622  104417                                                  TRAP    C$PNTF
     023624  062706  000006                                          ADD     #6,SP
5291 023630  004737  017364                    JSR PC,DROPUA
5292
5293 023634                          50410$:
5294
5295 023634                          50405$:
5296 023634  004737  017210                  JSR PC,NEXTU
5297
5298 023640  000647                      BR      50402$
5299 023642                          50403$:
5300
5301 023642                               ENDAUTO
     023642                          L10013:
     023642  104461                                                  TRAP    C$AUTO
5302
5303 023644     045     101     102  AUTODM: .ASCII  /#ABUS TRAP AT #O6#N/
     023647     125     123     040
     023652     124     122     101
     023655     120     040     101
     023660     124     040     045
     023663     117     066     045
     023666     116
5304 023667     045     101     111          .ASCIZ  /#AINTERFACE BAD OR NOT SET TO ABOVE AD#N/
     023672     116     124     105
     023675     122     106     101
     023700     103     105     040
     023703     102     101     104
     023706     040     117     122
     023711     040     116     117
     023714     124     040     123
     023717     105     124     040
     023722     124     117     040
     023725     101     102     117
     023730     126     105     040
     023733     101     104     045
     023736     116     000
5305 023740     045     101     125  NRDYM:  .ASCIZ  /#AUNIT #D1#A NOT RDY#N/
```

AUTO DROP SECTION

```
        023743      116      111      124
        023746      040      045      104
        023751      061      045      101
        023754      040      116      117
        023757      124      040      122
        023762      104      131      045
        023765      116      000
 5306                                           .EVEN
 5307
 5308                                   ;       DEVICE BUS TRAP HANDLER
 5309                                   ;       OUTPUT: TRAPD4 BYTE  1: TRAPED AT 4
 5310                                   ;                            0: NO TRAP
 5311
 5312 023770  105237  003530            TRAP4:: INCB    TRAPD4;LET TRAPD4 :B= TRAPD4 + #1
 5313 023774  000002                            RTI
 5314
 5315
 5316                                   .SBTTL  CLEANUP CODING SECTION
 5317
 5318                                   ;++
 5319                                   ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
 5320                                   ; AT THE END OF EACH PASS.
 5321                                   ;
 5322
 5323 023776                            BGNCLN
        023776                          L$CLEAN::
 5324
 5325 023776  004737  017142                    JSR     PC,FIRSTU               ;FIND FIRST UNIT.
 5326 024002                            50411$: ;WHILE DEVTBL(R5) NE #END DO
 5327 024002  026527  002604  177777            CMP     DEVTBL(R5),#END
 5328 024010  001410                            BEQ     50412$
 5329 024012  004737  012740                      JSR PC,WSSR                   ;WAIT FOR UNIT READY OR TIMEOUT,
 5330 024016                                      CLRVEC          TSVCT(R5)     ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
        024016  016500  002534                                                          MOV     TSVCT(R5),R0
        024022  104436                                                                  TRAP    C$CVEC
 5331 024024  004737  017210                       JSR   PC,NEXTU               ;FIND NEXT UNIT.
 5332
 5333 024030  000764                    BR      50411$
 5334 024032                            50412$:
 5335
 5336 024032                            EXIT    CLN
        024032  104432                                                          TRAP    C$EXIT
        024034  000002                                                          .WORD   L10014-.
 5337                                   .EVEN
 5338
 5339 024036                            ENDCLN
        024036                          L10014:
        024036  104412                                                          TRAP    C$CLEAN
 5340
 5341                                   .SBTTL  DROP UNIT SECTION
 5342
 5343                                   ;++
 5344                                   ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
 5345                                   ; TO NO LONGER BE TESTED.  THAT CODE SHALL BE EXECUTED WHEN DODU
 5346                                   ;MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
 5347                                   ;
 5348
```

DROP UNIT SECTION

```
5349 024040                            BGNDU
     024040                      L$DU::
5350
5351 024040  010005                    MOV     R0,R5                   ;R5 = LOGICAL DEVICE NUMBER X 2.
5352 024042  006305                    ASL     R5
5353 024044  012765  177774  002604    MOV     #NINUSE,DEVTBL(R5)      ;SET NOT IN USE FLAG FOR THE DEVICE.
5354 024052                            CLRVEC TSVCT(R5)                ;RELEASE THE INTERRUPT VECTOR.
     024052  016500  002534                                                    MOV     TSVCT(R5),R0
     024056  104436                                                            TRAP    C$CVEC
5355 024060                            PRINTF  #DROPDM,DROPN           ;PRINT DROP DEVICE MESSAGE
     024060  013746  017150                                                    MOV     DROPN, (SP)
     024064  012746  005605                                                    MOV     #DROPDM, (SP)
     024070  012746  000002                                                    MOV     #2, (SP)
     024074  010600                                                            MOV     SP,R0
     024076  104417                                                            TRAP    C$PNTF
     024100  062706  000006                                                    ADD     #6,SP
5356 024104                            EXIT    DU
     024104  000167                                                            .WORD   J$JMP
     024106  000000                                                            .WORD   L10015-2 .
5357                                   .EVEN
5358
5359 024110                            ENDDU
     024110                      L10015:
     024110  104453                                                            TRAP    C$DU
5360
5361                                   .SBTTL  ADD UNIT SECTION
5362
5363                                   ;**
5364                                   ; THE ADD UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
5365                                   ;  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
5366                                   ;  "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
5367                                   ; -
5368
5369 024112                            BGNAU
     024112                      L$AU::
5370 024112  010005                    MOV     R0,R5                   ;R5 = LOGICAL DEVICE NUMBER X 2.
5371 024114  006305                    ASL     R5
5372 024116  010065  002604            MOV     R0,DEVTBL(R5)           ;STORE UNIT # IN DEVICE TABLE.
5373 024122                            GPHARD  R0,R0                   ;GET HARDWARE P TABLE FROM SUPER.
     024122  104442                                                            TRAP    C$GPHRD
5374 024124  011065  002514            MOV     (R0),TSDB(R5)           ;SAVE TSDB ADDRESS.
5375 024130  012065  002524            MOV     (R0)+,TSSR(R5)          ;SAVE TSSR ADDRESS.
5376 024134  062765  000002  002524    ADD     #2,TSSR(R5)
5377 024142  011065  002534            MOV     (R0),TSVCT(R5)          ;SAVE INTERRUPT VECTOR ADDRESS.
5378 024146  011065  003532            MOV     (R0),TSUNT(R5)          ;SAVE NUMBER OF DRIVE
5379 024152  011037  003534            MOV     (R0),TSNP               ;SAVE FOR PRINT OUT'S
5380 024156                            SETVEC TSVCT(R5),TSSINT(R5),#INTPRI
     024156  012746  000340                                                    MOV     #INTPRI,-(SP)
     024162  016546  002554                                                    MOV     TSSINT(R5),-(SP)
     024166  016546  002534                                                    MOV     TSVCT(R5),-(SP)
     024172  012746  000003                                                    MOV     #3,-(SP)
     024176  104437                                                            TRAP    C$SVEC
     024200  062706  000010                                                    ADD     #10,SP
5381                                                                    ;SET UP INTERUPT PROCESSING CONDITIONS.
5382 024204  005065  003472            CLR     INTFLG(R5)              ;CLEAR INTERRUPT FLAGS.
5383
5384 024210                            EXIT    AU
```

M9

ADD UNIT SECTION

```
        024210  000167                                                          .WORD   J$JMP
        024212  000000                                                          .WORD   L10016 2 .
   5385
   5386                                         .EVEN
   5387
   5388 024214                                  ENDAU
        024214                          L10016:
        024214  104452                                                          TRAP    C$AU
   5389
   5390
   5391
   5392                                 .TITLE HARDWARE TESTS
   5393
   5394                                 .SBTTL  TEST 1:  BASIC FUNCTIONS.
   5395
   5396                                 ;++
   5397                                 ; TEST TO EXECUTE ALL TS05 FUNCTIONS.
   5398                                 ; -
   5399
   5400 024216                                  BGNMOD
   5401
   5402 024216                                  BGNTST
        024216                          T1::
   5403
   5404 024216  105037  003515                  CLRB    RANDOM                  ;CLR THE RANDOM OPERATIONS FLAG.
   5405 024222  105037  003514                  CLRB    EXPBOT                  ;CLR EXPECT BOT FLAG.
   5406
   5407 024226                                  BGNSUB                  ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
        024226                          T1.1:
        024226  104402                                                          TRAP    C$BSUB
   5408
   5409 024230  004737  017142                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
   5410 024234  004737  007072                  JSR     PC,SOFINIT              ;INIT DEVICE
   5411 024240  103404                          BCS     11$
   5412 024242                                  ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
        024242  104455                                                          TRAP    C$ERDF
        024244  000002                                                          .WORD   2
        024246  004536                                                          .WORD   NSSRM
        024250  006120                                                          .WORD   STAERM
   5413
   5414 024252  004737  007526          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
   5415 024256  012702  025134                  MOV     #BFSEQO,R2              ;ADR OF CMD SEQ.
   5416 024262  004737  025110                  JSR     PC,BFSEQ                ;SET UP CMD SEQ.
   5417 024266  004737  010266                  JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
   5418 024272  004737  017142                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
   5419 024276                          50413$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
   5420 024276  026527  002604  177777          CMP     DEVTBL(R5),#END
   5421 024304  001451                          BEQ     50414$
   5422 024306  016502  002544                  MOV     MSGPKA(R5),R2           ;GET MSG PACKET ADR,
   5423 024312  062702  000012                  ADD     #12,R2    ;LET R2 := R2 + #12           ;GET XSTAT2 ADR,
   5424 024316  011265  002564                  MOV     (R2),TS5CL(R5)            ;STORE CODE LEVEL FROM DTR BYTE,
   5425 024322  042765  177700  002564          BIC     #177700,TS5CL(R5)
   5426 024330  011265  002574                  MOV     (R2),TS5SW(R5)                  ;STORE  SWITCH SETTINGS
   5427 024334  042765  177477  002574          BIC     #177477,TS5SW(R5)
   5428 024342                                  PRINTF  #CODELM,DEVTBL(R5),TS5CL(R5)
        024342  016546  002564                                                  MOV     TS5CL(R5),-(SP)
        024346  016546  002604                                                  MOV     DEVTBL(R5),-(SP)
```

TEST 1: BASIC FUNCTIONS.

```
        024352  012746  004162                                                  MOV     #CODELM,-(SP)
        024356  012746  000003                                                  MOV     #3,(SP)
        024362  010600                                                          MOV     SP,R0
        024364  104417                                                          TRAP    C$PNTF
        024366  062706  000010                                                  ADD     #10,SP
  5429                                          ;PRINT THE TS05 MICROCODE LEVEL.
  5430  024372                        PRINTF  #SWSET,DEVTBL(R5),TS5SW(R5)
        024372  016546  002574                                                  MOV     TS5SW(R5),-(SP)
        024376  016546  002604                                                  MOV     DEVTBL(R5),-(SP)
        024402  012746  004231                                                  MOV     #SWSET,-(SP)
        024406  012746  000003                                                  MOV     #3,-(SP)
        024412  010600                                                          MOV     SP,R0
        024414  104417                                                          TRAP    C$PNTF
        024416  062706  000010                                                  ADD     #10,SP
  5431                                          ;PRINT THE TS05 SWITCH SETTINGS.
  5432  024422                  50415$:
  5433  024422  004737  017210           JSR     PC,NEXTU        ;FIND NEXT UNIT.
  5434
  5435  024426  000723                   BR      50413$
  5436  024430                  50414$:
  5437
  5438  024430                          ENDSUB
        024430                  L10020:
        024430  104403                  .                                       TRAP    C$ESUB
  5439                                  .
  5440  024432                          BGNSUB                  ;SUBTEST 2 - REWIND.
        024432                  T1.2:
        024432  104402                                                          TRAP    C$BSUB
  5441
  5442  024434  012702  025206           MOV     #BFSEQ1,R2      ;ADR OF CMD SEQ.
  5443  024440  004737  025110           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  5444  024444  004737  010266           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  5445  024450  105037  003526           CLRB    STAFLG          ;CLEAR START FLAG
  5446  024454                          ENDSUB
        024454                  L10021:
        024454  104403                                                          TRAP    C$ESUB
  5447
  5448  024456                          BGNSUB                  ;SUBTEST 3 - WRITE/VERIFY.
        024456                  T1.3:
        024456  104402                                                          TRAP    C$BSUB
  5449
  5450  024460  012702  025220           MOV     #BFSEQ2,R2      ;ADR OF CMD SEQ.
  5451  024464  004737  025110           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  5452  024470  004737  010266           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  5453  024474                          ENDSUB
        024474                  L10022:
        024474  104403                                                          TRAP    C$ESUB
  5454
  5455  024476                          BGNSUB                  ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
        024476                  T1.4:
        024476  104402                                                          TRAP    C$BSUB
  5456
  5457  024500  012702  025312           MOV     #BFSEQ3,R2      ;ADR OF CMD SEQ.
  5458  024504  004737  025110           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  5459  024510  004737  010266           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  5460  024514                          ENDSUB
        024514                  L10023:
```

TEST 1: BASIC FUNCTIONS.

```
      024514  104403                                                          TRAP    C$ESUB
 5461
 5462 024516                          BGNSUB                                 ;SUBTEST 5   SPACE FILES.
      024516                  T1.5:
      024516  104402                                                          TRAP    C$BSUB
 5463
 5464 024520  012702  025364          MOV     #BFSEQ4,R2                     ;ADR OF CMD SEQ.
 5465 024524  004737  025110          JSR     PC,BFSEQ                       ;SET UP CMD SEQ.
 5466 024530  004737  010266          JSR     PC,EXALL                       ;EXECUTE CMD SEQ ON ALL DEVICES.
 5467 024534                          ENDSUB
      024534                  L10024:
      024534  104403                                                          TRAP    C$ESUB
 5468
 5469 024536                          BGNSUB                                 ;SUBTEST 6 - SPACE RECORDS.
      024536                  T1.6:
      024536  104402                                                          TRAP    C$BSUB
 5470
 5471 024540  012702  025426          MOV     #BFSEQ5,R2                     ;ADR OF CMD SEQ.
 5472 024544  004737  025110          JSR     PC,BFSEQ                       ;SET UP CMD SEQ.
 5473 024550  004737  010266          JSR     PC,EXALL                       ;EXECUTE CMD SEQ ON ALL DEVICES.
 5474 024554                          ENDSUB
      024554                  L10025:
      024554  104403                                                          TRAP    C$ESUB
 5475
 5476 024556                          BGNSUB                                 ;SUBTEST 7 - WRITE RETRY.
      024556                  T1.7:
      024556  104402                                                          TRAP    C$BSUB
 5477
 5478 024560  012702  025500          MOV     #BFSEQ6,R2                     ;ADR OF CMD SEQ.
 5479 024564  004737  025110          JSR     PC,BFSEQ                       ;SET UP CMD SEQ.
 5480 024570  004737  010266          JSR     PC,EXALL                       ;EXECUTE CMD SEQ ON ALL DEVICES.
 5481 024574                          ENDSUB
      024574                  L10026:
      024574  104403                                                          TRAP    C$ESUB
 5482
 5483 024576                          BGNSUB                                 ;SUBTEST 8 - READ REV RETRY.
      024576                  T1.8:
      024576  104402                                                          TRAP    C$BSUB
 5484
 5485 024600  012702  025552          MOV     #BFSEQ7,R2                     ;ADR OF CMD SEQ.
 5486 024604  004737  025110          JSR     PC,BFSEQ                       ;SET UP CMD SEQ.
 5487 024610  004737  010266          JSR     PC,EXALL                       ;EXECUTE CMD SEQ ON ALL DEVICES.
 5488 024614                          ENDSUB
      024614                  L10027:
      024614  104403                                                          TRAP    C$ESUB
 5489
 5490 024616                          BGNSUB                                 ;SUBTEST 9 - READ FWD RETRY.
      024616                  T1.9:
      024616  104402                                                          TRAP    C$BSUB
 5491
 5492 024620  012702  025604          MOV     #BFSEQ8,R2                     ;ADR OF CMD SEQ.
 5493 024624  004737  025110          JSR     PC,BFSEQ                       ;SET UP CMD SEQ.
 5494 024630  004737  010266          JSR     PC,EXALL                       ;EXECUTE CMD SEQ ON ALL DEVICES.
 5495 024634                          ENDSUB
      024634                  L10030:
      024634  104403                                                          TRAP    C$ESUB
 5496
```

TEST 1: BASIC FUNCTIONS.

```
                                        BGNSUB                          ;SUBTEST 10- CLEAN.
                                T1.10:
                                                                                TRAP    C$BSUB
                                        MOV     #8FSEQ9,R2              ;ADR OF CMD SEQ.
                                        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
                                        JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
                                        ENDSUB
                                L10031:
                                                                                TRAP    C$ESUB

                                        BGNSUB                          ;SUBTEST 11 - WTV SWAPPED DATA BYTES.
                                T1.11:
                                                                                TRAP    C$BSUB
                                        MOV     #8FSE10,R2              ;ADR OF CMD SEQ.
                                        JSR     PC,BFSEQ                ;SET UP CMD SEQ.
                                        JSR     PC,EXALL                ;WRITE/VERIFY RECORDS 1 AND 2.
                                        MOVB    #1,SWBFLG               ;ENABLE BYTE SWAPPING.
                                        JSR     PC,EXALL                ;WRITE/VERIFY RECORDS 3 AND 4.
                                        CLRB    SWBFLG                  ;DISABLE BYTE SWAPPING.
                                        ENDSUB
                                L10032:
                                                                                TRAP    C$ESUB
                                        MOV     DATAWT,R2               ;INIT WRITE BUFFER POINTER.
                                        ADD     #10.,R2
                                50416$: ;WHILE R2 NE DATAWT DO  ;UNTIL 10 BYTES HAVE BEEN SWAPPED.
                                        CMP     R2,DATAWT
                                        BEQ     50417$
                                          SWAB -(R2)                    ;SWAP DATA BYTES IN WRITE BUFFER.

                                        BR      50416$
                                50417$:
                                        INCB    T1SWB           ;SET T1 SWAP BYTES FLAG FOR "CKDATA" SUBR

                                        BGNSUB                          ;SUBTEST 12 - READ SWAPPED DATA BYTES.
                                T1.12:
                                                                                TRAP    C$BSUB
                                        MOV     #RDR,CMDWRD             ;CMD IS READ REV.
                                        JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 4).
                                        MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
                                        JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 3).
                                        MOVB    #1,SWBFLG               ;ENABLE BYTE SWAPPING.
                                        MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
                                        JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 2).
                                        MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
                                        JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 1).
                                        MOV     #RDF,CMDWRD             ;CMD IS READ FWD.
                                        JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 1).
                                        MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
                                        JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 2).
                                        CLRB    SWBFLG                  ;DISABLE BYTE SWAPPING.
                                        MOV     #12,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 10.
                                        JSR     PC,VFEXC                ;VERIFY EVEN LENGTH SWAP (RECORD 3).
                                        MOV     #11,CMDPKT+CP.CNT       ;CHANGE BYTE COUNT TO 9.
                                        JSR     PC,VFEXC                ;VERIFY ODD LENGTH SWAP (RECORD 4).

                                        ENDSUB
```

SEQ 0120

TEST 1: BASIC FUNCTIONS.

```
                025076                          L10033:
                025076  104403                                                  TRAP    C$ESUB
5544
5545            025100  105037  003523                  CLRB    T1SWB           ;CLEAR T1 SWAP BYTES FLAG
5546
5547            025104                          EXIT    TST
                025104  104432                                                  TRAP    C$EXIT
                025106  000574                                                  .WORD   L10017 .
5548
5549                                    ;       SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
5550                                    ;       INPUTS:         R2 = FWA OF COMMAND SEQUENCE.
5551                                    ;       OUTPUTS:
5552                                    ;       REGISTERS:
5553                                    ;       CALLS:
5554
5555            025110  012701  003540        BFSEQ:: MOV     #CMDSEQ,R1      ;INIT SEQ TABLE ADDRESS.
5556            025114                  50420$: ;WHILE (R2) NE #END DO          ;WHILE THERE ARE MORE COMMANDS:
5557            025114  021227  177777                  CMP     (R2),#END
5558            025120  001402                          BEQ     50421$
5559            025122  012221                          M^V     (R2)+,(R1)+     ;MOVE COMMANDS TO SEQ TABLE.
5560
5561            025124  000773                          BR      50420$
5562            025126                  50421$:
5563            025126  012711  177777                  MOV     #END,(R1)       ;STORE END OF SEQUENCE CODE.
5564            025132  000207                          RTS     PC              ;RETURN.
5565
5566
5567                                    ;       BASIC FUNCTION COMMAND SEQUENCE
5568
5569            025134  140004          BFSEQ0: .WORD   SCH                     ;SET CHAR. 200.         (1)
5570            025136  000200                          200
5571            025140  000001                          1
5572            025142  000000                          0
5573            025144  100013                          DRI                     ;DRIVE INIT.            (2)
5574            025146  000001                          1
5575            025150  000001                          1
5576            025152  000000                          0
5577            025154  140004                          SCH                     ;SET CHAR. 20           (3)
5578            025156  000020                          20
5579            025160  000001                          1
5580            025162  000000                          0
5581            025164  100017                          GES                     ;GET STATUS.            (4)
5582            025166  000001                          1
5583            025170  000001                          1
5584            025172  000000                          0
5585            025174  140004                          SCH                     ;SET CHAR. 40.          (5)
5586            025176  000040                          40
5587            025200  000001                          1
5588            025202  000000                          0
5589            025204  177777                  .WORD   END
5590
5591            025206  102010          BFSEQ1:         RWD                     ;REWIND TWICE.          (6)
5592            025210  000001                          1
5593            025212  000002                          2
5594            025214  000000                          0
5595            025216  177777                  .WORD   END
5596
```

E10

SEQ 0121

TEST 1: BASIC FUNCTIONS.

```
5597 025220  104105                BFSEQ2:         WTV             ;WRITE/VERIFY PAT 1.    (7)
5598 025222  004000                                DATCNT
5599 025224  000001                                1
5600 025226  000001                                1
5601 025230  104105                                WTV             ;WTV PAT 2.             (8)
5602 025232  004000                                DATCNT
5603 025234  000001                                1
5604 025236  000002                                2
5605 025240  104105                                WTV             ;WTV PAT 3.             (9)
5606 025242  004000                                DATCNT
5607 025244  000001                                1
5608 025246  000003                                3
5609 025250  104105                                WTV             ;WTV PAT 4.             (10)
5610 025252  004000                                DATCNT
5611 025254  000001                                1
5612 025256  000004                                4
5613 025260  104105                                WTV             ;WTV PAT 5.             (11)
5614 025262  004000                                DATCNT
5615 025264  000001                                1
5616 025266  000005                                5
5617 025270  104105                                WTV             ;WTV PAT 6.             (12)
5618 025272  004000                                DATCNT
5619 025274  000001                                1
5620 025276  000006                                6
5621 025300  104105                                WTV             ;WTV PAT 0.             (13)
5622 025302  004000                                DATCNT
5623 025304  000001                                1
5624 025306  000000                                0
5625 025310  177777                      .WORD     END
5626
5627 025312  100011                BFSEQ3:         WTM             ;WRITE TAPE MARK.       (14)
5628 025314  000001                                1
5629 025316  000001                                1
5630 025320  000000                                0
5631 025322  104005                                WRT             ;WRITE 10 RECORDS.      (15)
5632 025324  004000                                DATCNT
5633 025326  000010                                10
5634 025330  000001                                1
5635 025332  100411                                ERS             ;ERASE 10 TIMES.        (16)
5636 025334  000001                                1
5637 025336  000010                                10
5638 025340  000000                                0
5639 025342  100011                                WTM             ;WRITE TAPE MARK.       (17)
5640 025344  000001                                1
5641 025346  000001                                1
5642 025350  000000                                0
5643 025352  101011                                WTR             ;WTM RETRY              (18)
5644 025354  000001                                1
5645 025356  000001                                1
5646 025360  000000                                0
5647 025362  177777                      .WORD     END
5648
5649 025364  105410                BFSEQ4:         SFR             ;SPACE 2 FILES REV.     (19)
5650 025366  000002                                2
5651 025370  000001                                1
5652 025372  000000                                0
5653 025374  105010                                SFF             ;SPACE 2 FILES FWD.     (20)
```

F10

TEST 1: BASIC FUNCTIONS.

```
5654 025376  000002                                2
5655 025400  000001                                1
5656 025402  000000                                0
5657 025404  105410                                SFR             ;SPACE 2 FILES REV.     (21)
5658 025406  000001                                1
5659 025410  000002                                2
5660 025412  000000                                0
5661 025414  105010                                SFF             ;SPACE 2 FILES FWD.     (22)
5662 025416  000001                                1
5663 025420  000002                                2
5664 025422  000000                                0
5665 025424  177777                      .WORD     END
5666
5667 025426  102010           BFSEQ5:              RWD             ;REWIND.                (23)
5668 025430  000001                                1
5669 025432  000001                                1
5670 025434  000000                                0
5671 025436  104010                                SRF             ;SPACE 7 RECORDS FWD.   (24)
5672 025440  000007                                7
5673 025442  000001                                1
5674 025444  000000                                0
5675 025446  104410                                SRR             ;SPACE 7 RECORDS REV.   (25)
5676 025450  000007                                7
5677 025452  000001                                1
5678 025454  000000                                0
5679 025456  104010                                SRF             ;SPACE 7 RECORDS FWD.   (26)
5680 025460  000001                                1
5681 025462  000007                                7
5682 025464  000000                                0
5683 025466  104410                                SRR             ;SPACE 7 RECORDS REV.   (27)
5684 025470  000001                                1
5685 025472  000007                                7
5686 025474  000000                                0
5687 025476  177777                      .WORD     END
5688
5689 025500  102010           BFSEQ6:              RWD             ;REWIND.                (28)
5690 025502  000001                                1
5691 025504  000001                                1
5692 025506  000000                                0
5693 025510  104005                                WRT             ;WRITE.                 (29)
5694 025512  004000                                DATCNT
5695 025514  000001                                1
5696 025516  000001                                1
5697 025520  105005                                WRR             ;WRITE RETRY.           (30)
5698 025522  004000                                DATCNT
5699 025524  000001                                1
5700 025526  000001                                1
5701 025530  100011                                WTM             ;WRITE TAPE MARK.
5702 025532  000001                                1
5703 025534  000001                                1
5704 025536  000000                                0
5705 025540  105410                                SFR             ;SPACE 1 FILE REV.
5706 025542  000001                                1
5707 025544  000001                                1
5708 025546  000000                                0
5709 025550  177777                      .WORD     END
5710
```

TEST 1: BASIC FUNCTIONS.

```
5711 025552  104401          BFSEQ7:         RDR             ;READ REV.              (31)
5712 025554  004000                          DATCNT
5713 025556  000001                          1
5714 025560  000001                          1
5715 025562  105401                          RNR             ;READ NEXT REV.         (32)
5716 025564  004000                          DATCNT
5717 025566  000001                          1
5718 025570  000001                          1
5719 025572  125401                          RNF             ;READ NEXT FWD.         (33)
5720 025574  004000                          DATCNT
5721 025576  000001                          1
5722 025600  000001                          1
5723 025602  177777                  .WORD   END
5724
5725 025604  104001          BFSEQ8:         RDF             ;READ FWD.              (34)
5726 025606  004000                          DATCNT
5727 025610  000001                          1
5728 025612  000001                          1
5729 025614  105001                          RPF             ;READ PREVIOUS FWD.     (35)
5730 025616  004000                          DATCNT
5731 025620  000001                          1
5732 025622  000001                          1
5733 025624  125001                          RPR             ;READ PREVIOUS REV.     (36)
5734 025626  004000                          DATCNT
5735 025630  000001                          1
5736 025632  000001                          1
5737 025634  177777                  .WORD   END
5738
5739 025636  101012          BFSEQ9: .WORD   CLN             ;CLEAN.                 (37)
5740 025640  000001                          1
5741 025642  000001                          1
5742 025644  000000                          0
5743 025646  102010                          RWD             ;REWIND                 (38)
5744 025650  000001                          1
5745 025652  000001                          1
5746 025654  000000                          0
5747 025656  177777                  .WORD   END             ;END OF SEQUENCE.
5748
5749 025660  104105          BFSE10:         WTV             ;WRITE/VERIFY EVEN LENGTH.  (39)
5750 025662  000012                          12
5751 025664  000001                          1
5752 025666  000000                          0
5753 025670  104105                          WTV             ;WRITE/VERIFY ODD LENGTH.   (40)
5754 025672  000011                          11
5755 025674  000001                          1
5756 025676  000000                          0
5757 025700  177777                  .WORD   END
5758                                 .EVEN
5759
5760 025702                          ENDTST
     025702                  L10017:
     025702  104401                                                  TRAP    C$ETST
5761
5762                         .SBTTL  TEST 2: DATA RELIABILITY.
5763
5764                         ;**
5765                         ; TEST TO CHECK THE DATA RELIABILITY OF THE TSO5.
```

TEST 2: DATA RELIABILITY.

```
5766                                    ;
5767 025704                             BGNTST
     025704                             T2::
5768
5769 025704  112737  000001  003515     MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
5770 025712  105037  003514             CLRB    EXPBOT                  ;CLEAR EXPECT BOT FLAG.
5771 025716  005037  003456             CLR     WTMFLG                  ;CLEAR WRITE TAPE MARK FLAG
5772 025722  004737  017142             JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
5773 025726  004737  007072             JSR     PC,SOFINIT              ;INIT DEVICE
5774 025732  103404                     BCS     11$
5775 025734                             ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     025734  104455                                                             TRAP    C$ERDF
     025736  000002                                                             .WORD   2
     025740  004536                                                             .WORD   NSSRM
     025742  006120                                                             .WORD   STAERM
5776
5777 025744  004737  007526     11$:    JSR     PC,MDSET                ;GO DO SETUP'S
5778 025750  012702  004000             MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK.
5779 025754  005302                     DEC     R2
5780 025756  010237  003430             MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
5781 025762  005137  003430             COM     LENMSK
5782 025766  004737  010222             JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
5783 025772  105737  003526             TSTB    STAFLG  ;IFB STAFLG NE #0 THEN          ;IF STARTING THEN:
5784 025776  001417                     BEQ     50424$
5785 026000  004737  010246               JSR   PC,SETRW                ;CMD2=REWIND
5786 026004  105037  003526             CLRB    STAFLG    ;LET STAFLG :B= #0            ;CLR START FLAG.
5787
5788 026010                             50422$:
5789 026010  012721  104105             MOV     #WTV,(R1)+
5790 026014  012721  004000             MOV     #DATCNT,(R1)+
5791 026020  012702  177740             MOV     #RNOPSC,R2
5792 026024  005102                     COM     R2
5793 026026  010221                     MOV     R2,(R1)+
5794 026030  012721  000007             MOV     #RANP,(R1)+
5795
5796 026034                             50423$: BREAK                           ; DO A SUPVSR BREAK FIRST.
     026034  104422                                                             TRAP    C$BRK
5797
5798 026036                             50424$:                         ;FILL SEQ TBL WITH RANDOM CMDS.
5799 026036  020127  003740             CMP     R1,#SEQEND
5800 026042  002012                     BGE     50425$
5801 026044  063737  003432  003434     ADD     RANB,RANS       ;LET RANS := RANS + RANB
5802 026052  013702  003434             MOV     RANS,R2
5803 026056  042702  177741             BIC     #177741,R2
5804 026062  004772  026220             JSR     PC,@RANCMD(R2)          ;SET UP A RANDOM CMD + BRF.
5805
5806 026066  000763                     BR      50424$
5807 026070                             50425$:
5808 026070  012711  177777             MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
5809 026074  004737  010266               JSR   PC,EXALL                ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE
5810
5811 026100  012701  003540             MOV     #CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER.
5812 026104  005702                     TST     R2                              ;REPEAT UNTIL EOT IS REACHED
5813 026106  001752                     BEQ     50423$
5814 026110  105237  003524             INCB    ALLEOT                  ;FLAG ALL UNITS @ EOT
5815 026114  000240                     NOP
5816 026116  000240                     NOP
```

```
TEST 2: DATA RELIABILITY.

 5817 026120  000240                          NOP
 5818 026122  004737  027674                 JSR     PC,T5WEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
 5819                                                                 ;SO THAT SHORTER READ STOP DISTANCE
 5820                                                                 ;SHALL POSITION HEAD IN CLEAN IRG GAP
 5821                                                                ;READ REV THAT EXTRA REC TO RE-POSITION THE TAPE
 5822 026126  004737  026260                 JSR     PC,RANRD        ;SET UP READ REV/FWD CMDS.
 5823 026132  012737  177740  003544          MOV     #RNOPSC,CMDSEQ+4        ;# OF RECORDS FOR READ REV.
 5824 026140  005137  003544                 COM     CMDSEQ+4
 5825 026144  013737  003544  003554          MOV     CMDSEQ+4,CMDSEQ+14      ;# OF RECORDS FOR READ FORWARD.
 5826 026152  012711  177777                 MOV     #END,(R1)       ;STORE END OF SEQUENSE CODE IN SEQ TABLE.
 5827 026156  004737  010266                 JSR     PC,EXALL        ;GO EXECUTE READ REV/FWD OF LAST N RECORDS.
 5828 026162  105037  003524                 CLRB    ALLEOT          ;CLEAR ALL UNITS @ EOT FLAG
 5829 026166  112737  000001  003517          MOVB    #1,RPTFLG       ;REQUEST PERFORMANCE REPORT DURING REWIND.
 5830 026174  012701  003540                 MOV     #CMDSEQ,R1      ;INIT SEQ TBL POINTER.
 5831 026200  004737  010246                 JSR PC,SETRW            ;STORE REWIND IN SEQ TBL.
 5832 026204  012711  177777                 MOV     #END,(R1)       ;STORE END IN SEQ TBL.
 5833 026210  004737  010266                 JSR PC,EXALL            ;EXECUTE REWIND CMD ON ALL UNITS
 5834
 5835 026214                                 EXIT    TST
      026214  104432                                                                     TRAP    C$EXIT
      026216  000320                                                                     .WORD   L10034 .
 5836
 5837                                ;       ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
 5838                                ;       THE DATA RELIABILITY TEST.
 5839
 5840 026220  026416                RANCMD: RANWV                   ;WRITE
 5841 026222  026372                        RANWR                   ;WRITE.
 5842 026224  026372                        RANWR                   ;WRITE.
 5843 026226  026372                        RANWR                   ;WRITE.
 5844 026230  026372                        RANWR                   ;WRITE.
 5845 026232  026372                        RANWR                   ;WRITE.
 5846 026234  026372                        RANWR                   ;WRITE.
 5847 026236  026372                        RANWR                   ;WRITE.
 5848 026240  026260                        RANRD                   ;READ.
 5849 026242  026260                        RANRD                   ;READ.
 5850 026244  026260                        RANRD                   ;READ.
 5851 026246  026260                        RANRD                   ;READ.
 5852 026250  026260                        RANRD                   ;READ.
 5853 026252  026260                        RANRD                   ;READ.
 5854 026254  026260                        RANRD                   ;READ.
 5855 026256  026260                        RANRD                   ;READ.
 5856
 5857
 5858                                ;       SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
 5859                                ;       INPUTS:
 5860                                ;       OUTPUTS:
 5861                                ;       REGISTERS:      R2
 5862                                ;       CALLS:
 5863
 5864 026260  005737  003456        RANRD:: TST     WTMFLG                  ;WAS LAST CMD A WRITE?
 5865 026264  001406                        BEQ     1$                      ;NO,GO AHEAD
 5866 026266  004737  026430                JSR     PC,RAWTM                ;YES PUT DOWN TAPE MARK
 5867 026272  004737  026456                JSR     PC,RASFR                ;AND SPACE FILE REV
 5868 026276  005037  003456                CLR     WTMFLG                  ;THEN CLEAR THE FLAG
 5869 026302  020127  003740^       1$:     CMP     R1,#SEQEND
 5870 026306  002030                        BGE     2$
 5871 026310  012721  104401                MOV     #RDR,(R1)+              ;STORE READ REV CMD.
```

```
TEST 2: DATA RELIABILITY.

 5872 026314  012721  004000                 MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
 5873 026320  063737  003434  003432          ADD     RANS,RANB       ;LET RANB := RANB + RANS
 5874 026326  013702  003432                 MOV     RANB,R2         ;LET R2 := RANB CLR.BY #RNOPSC
 5875 026332  042702  177740                 BIC     #RNOPSC,R2
 5876 026336  010221                         MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
 5877 026340  012721  000007                 MOV     #RANP,(R1)+     ;RANDOM PATTERN.
 5878 026344  020127  003740                 CMP     R1,#SEQEND
 5879 026350  002007                         BGE     2$
 5880 026352  012721  104001                 MOV     #RDF,(R1)+      ;STORE READ FWD CMD.
 5881 026356  012721  004000                 MOV     #DATCNT,(R1)+   ;SET BRF TO MAX TO READ RANDOM LENGTHS.
 5882 026362  010221                         MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
 5883 026364  012721  000007                 MOV     #RANP,(R1)+     ;RANDOM PATTERN.
 5884 026370  000207                 2$:     RTS PC
 5885
 5886                                 ;       SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
 5887                                 ;       THEN A WRITE TAPE MARK AND SPACE FILE REVERSE.
 5888                                 ;
 5889                                 ;       INPUTS:
 5890                                 ;       OUTPUTS:
 5891                                 ;       REGISTERS:
 5892                                 ;       CALLS:
 5893
 5894 026372  012721  104005         RANWR:: MOV     #WRT,(R1)+              ;STORE WRITE CMD.
 5895 026376  004737  026504                 JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
 5896 026402  005737  003456                 TST     WTMFLG                  ;LAST CMD A WRT?
 5897 026406  001002                         BNE     1$                      ;YES,RETURN
 5898 026410  005237  003456                 INC     WTMFLG                  ;NO,SET THE FLAG
 5899 026414  000207                 1$:     RTS PC
 5900
 5901
 5902                                 ;       SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
 5903                                 ;       INPUTS:
 5904                                 ;       OUTPUTS:
 5905                                 ;       REGISTERS:
 5906                                 ;       CALLS:
 5907
 5908 026416  012721  104105         RANWV:: MOV     #WTV,(R1)+              ;STORE WRITE/VERIFY CMD.
 5909 026422  004737  026504                 JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
 5910 026426  000207                         RTS     PC
 5911
 5912
 5913                                 ;       SUBROUTINE TO SET UP A WRITE TAPE MARK IN THE SEQUENCE TABLE.
 5914                                 ;       INPUTS:
 5915                                 ;       OUTPUTS:
 5916                                 ;       REGISTERS:
 5917                                 ;       CALLS:
 5918
 5919 026430  020127  003740         RAWTM:: CMP     R1,#SEQEND
 5920 026434  002007                         BGE     1$
 5921 026436  012721  100011                 MOV     #WTM,(R1)+               ;STORE WRITE TAPE MARK CMD.
 5922 026442  012721  000001                 MOV     #1,(R1)+                ;BRF
 5923 026446  012721  000001                 MOV     #1,(R1)+                ;# OF OPERATIONS
 5924 026452  005721                         TST     (R1)+                   ;SKIP PATTERNS
 5925 026454  000207                 1$:     RTS PC
 5926
 5927                                 ;       SUBROUTINE TO SET UP A SPACE FILE REVERSE IN THE SEQUENCE TABLE.
 5928                                 ;       INPUTS:
```

K10

TEST 2: DATA RELIABILITY.

```
5929                                    ;       OUTPUTS:
5930                                    ;       REGISTERS:
5931                                    ;       CALLS:
5932
5933 026456  020127  003740            RASFR:: CMP     R1,#SEQEND
5934 026462  002007                            BGE     1$
5935 026464  012721  105410                    MOV     #SFR,(R1)+              ;STORE SPACE FILE REVERSE
5936 026470  012721  000001                    MOV     #1,(R1)+                ;BRF
5937 026474  012721  000001                    MOV     #1,(R1)+                ;# OF OPERATIONS
5938 026500  005721                            TST     (R1)+                   ;SKIP PATTERNS
5939 026502  000207                    1$:     RTS PC
5940
5941
5942                                    ;       SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
5943                                    ;       SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
5944                                    ;       INPUTS:
5945                                    ;       OUTPUTS:
5946                                    ;       REGISTERS:      R2
5947                                    ;       CALLS:
5948
5949 026504  012721  004000            RANW::  MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR PATTERN GENERATION.
5950                                                                    ;RANDOM BRF WILL BE GENERATED FOR EACH RECORD.
5951 026510  063737  003434  003432            ADD     RANS,RANB               ;LET RANB := RANB + RANS
5952 026516  013702  003432                    MOV     RANB,R2                 ;LET R2 := RANB CLR.BY #RNOPSC
5953 026522  042702  177740                    BIC     #RNOPSC,R2
5954 026526  010221                            MOV     R2,(R1)+                ;SET RANDOM # OF OPERATIONS.
5955 026530  012721  000007                    MOV     #RANP,(R1)+             ;RANDOM PATTERN.
5956 026534  000207                            RTS PC                          ;RETURN.
5957
5958                                            .EVEN
5959
5960 026536                                    ENDTST
     026536                             L10034:
     026536  104401                                                                 TRAP    C$ETST
5961
5962                                    .SBTTL  TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
5963
5964                                    ;++
5965                                    ; TEST TO WRITE RECORDS FROM BOT TO EOT.
5966                                    ;--
5967
5968 026540                                    BGNTST
     026540                             T3::
5969
5970 026540  112737  000001  003515            MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
5971 026546  105037  003514                    CLRB    EXPBOT  ;LET EXPBOT :B= #0              ;CLEAR EXPECT BOT FLAG.
5972
5973 026552  004737  017142                    JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
5974 026556  004737  007072                    JSR     PC,SOFINIT              ;INIT DEVICE
5975 026562  103404                            BCS     11$
5976 026564                                    ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     026564  104455                                                                 TRAP    C$ERDF
     026566  000002                                                                 .WORD   2
     026570  004536                                                                 .WORD   NSSRM
     026572  006120                                                                 .WORD   STAERM
5977
5978 026574  004737  007526            11$:    JSR     PC,MDSET                ;GO DO SETUP'S
```

```
TEST 3: WRITE COMPATABILITY/WRITE UTILITY.

 5979 026600  012702  004000                  MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK.
 5980 026604  005302                          DEC     R2
 5981 026606  010237  003430                  MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
 5982 026612  005137  003430                  COM     LENMSK
 5983 026616  004737  010222                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
 5984 026622  004737  010246                  JSR PC,SETRW                    ;CMD2=REWIND
 5985 026626  105037  003526                  CLRB    STAFLG  ;LET STAFLG :B= #0              ;CLEAR START FLAG
 5986 026632                          50426$: BREAK                   ; DO A SUPVSR BREAK FIRST.
      026632  104422                                                                  TRAP    C$BRK
 5987
 5988 026634                          50427$:                         ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
 5989 026634  020127  003740                  CMP     R1,#SEQEND
 5990 026640  002003                          BGE     50430$
 5991 026642  004737  026372                  JSR     PC,RANWR                ;STORE A WRITE CMD IN SEQUENCE TABLE.
 5992 026646  000772                          BR      50427$
 5993 026650                          50430$:
 5994 026650  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
 5995 026654  004737  010266                    JSR   PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
 5996 026660  012701  003540                  MOV     #CMDSEQ,R1                      ;INIT SEQ TBL POINTER,
 5997 026664  005702                          TST     R2                              ;REPEAT UNTIL EOT IS REACHED
 5998 026666  001761                          BEQ     50426$
 5999 026670  105237  003524                  INCB    ALLEOT                  ;SET ALL UNITS @ EOT FLAG
 6000 026674  000240                          NOP
 6001 026676  000240                          NOP
 6002 026700  000240                          NOP
 6003 026702  004737  027674                  JSR     PC,TSWEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
 6004                                                                 ;SO THAT SHORTER READ STOP DISTANCE
 6005                                                                 ;SHALL POSITION HEAD IN CLEAN IRG GAP
 6006                                                                 ;READ REV THAT EXTRA REC TO RE-POSITION TAPE
 6007 026706  105037  003524                  CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
 6008 026712  004737  010246                  JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL.
 6009 026716  012711  177777                  MOV     #END,(R1)               ;STORE END IN SEQ TBL.
 6010 026722  004737  010266                  JSR PC,EXALL                    ;EXECUTE REWIND CMD ON ALL UNITS
 6011
 6012
 6013 026726                          EXIT    TST
      026726  104432                                                                  TRAP    C$EXIT
      026730  000002                                                                  .WORD   L10035-.
 6014
 6015                                         .EVEN
 6016
 6017 026732                                  ENDTST
      026732                          L10035:
      026732  104401                                                                  TRAP    C$ETST
 6018
 6019
 6020                                 .SBTTL  TEST 4:  READ COMPATABILITY/READ UTILITY.
 6021
 6022                                 ;**
 6023                                 ; TEST TO READ ENTIRE TAPE FORWARD AND REVERSE.
 6024                                 ;--
 6025
 6026 026734                                  BGNTST
      026734                          T4::
 6027
 6028 026734  112737  000001  003515          MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
 6029 026742  112737  000001  003514          MOVB    #1,EXPBOT               ;SET EXPECT BOT FLAG.
```

TEST 4: READ COMPATABILITY/READ UTILITY.

```
6030
6031 026750  004737  017142                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
6032 026754  004737  007072                  JSR     PC,SOFINIT              ;INIT DEVICE
6033 026760  103404                          BCS     11$
6034 026762                                  ERRDF   2,NSSRM,STAERM          ;REPORT TSO5 NOT READY
     026762  104455                                                          TRAP    C$ERDF
     026764  000002                                                          .WORD   2
     026766  004536                                                          .WORD   NSSRM
     026770  006120                                                          .WORD   STAERM
6035
6036 026772  004737  007526          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
6037 026776  004737  010252                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
6038 027002  004737  010246                  JSR PC,SETRW                    ;CMD2=REWIND.
6039 027006  105037  003526                  CLRB    STAFLG  ;LET STAFLG :B= @0              ;CLEAR START FLAG
6040 027012  012721  104001                  MOV     @RDF,(R1)+              ;CMD3 = READ FORWARD.
6041 027016  012721  004000                  MOV     @DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
6042 027022  012721  077777                  MOV     @77777,(R1)+            ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
6043 027026  012721  000007                  MOV     @RANP,(R1)+             ;PATTERN = RANDOM.
6044 027032  012711  177777                  MOV     @END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
6045 027036  004737  010266                  JSR     PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNITS.
6046 027042  105237  003524                  INCB    ALLEOT                  ;FLAG TO ALLOW ALL UNITS AT EOT TO READ REV
6047 027046  012701  003540                  MOV     @CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER.
6048 027052  012721  104401                  MOV     @RDR,(R1)+              ;CMD1 = READ REVERSE.
6049 027056  012721  004000                  MOV     @DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
6050 027062  012721  077777                  MOV     @77777,(R1)+            ;RECORD COUNT = MAX FOR WHOLE TAPE.
6051 027066  012721  000007                  MOV     @RANP,(R1)+             ;PATTERN = RANDOM.
6052 027072  012711  177777                  MOV     @END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
6053 027076  004737  010266                  JSR     PC,EXALL                ;GO EXECUTE READ REV. OF ENTIRE TAPE.
6054 027102  105037  003524                  CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
6055
6056 027106                                  EXIT    TST
     027106  104432                                                          TRAP    C$EXIT
     027110  000002                                                          .WORD   L10036 .
6057
6058                                         .EVEN
6059
6060 027112                                  ENDTST
     027112                          L10036:
     027112  104401                                                          TRAP    C$ETST
6061
6062                                 .SBTTL  TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
6063
6064                                 ;++
6065                                 ; TEST TO EXECUTE  OPERATOR SELECTED COMMAND SEQUENCE.
6066                                 ;-
6067
6068 027114                                  BGNTST
     027114                          T5::
6069
6070 027114  105037  003515                  CLRB    RANDOM                  ;CLEAR RAMDOM MODE FLAG.
6071 027120  112737  000001  003514          MOVB    @1,EXPBOT               ;SET EXPECT BOT FLAG.
6072
6073 027126  004737  017142                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
6074 027132  004737  007072                  JSR     PC,SOFINIT              ;INIT DEVICE
6075 027136  103404                          BCS     11$
6076 027140                                  ERRDF   2,NSSRM,STAERM          ;REPORT TSO5 NOT READY
     027140  104455                                                          TRAP    C$ERDF
```

TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

```
        027142  000002                                                                  .WORD   2
        027144  004536                                                                  .WORD   NSSRM
        027146  006120                                                                  .WORD   STAERM
   6077
   6078 027150  004737  007526          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
   6079 027154  113737  002216  003521          MOVB    PIRE,IRE                ;MOVE INHIBIT RFC ERROR REPORT FLAG.
   6080 027162  004737  010222                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
   6081 027166  013737  002220  003542          MOV     CHAR,CMDSEQ+2           ;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
   6082 027174  012702  002222                  MOV     #CMD2,R2                ;R2 POINTS TO CMD2 IN SOFT P TABLE.
   6083 027200  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 2 FROM P TBL TO SEQ TBL.
   6084 027204  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 3 FROM P TBL TO SEQ TBL.
   6085 027210  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 4 FROM P TBL TO SEQ TBL.
   6086 027214  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 5 FROM P TBL TO SEQ TBL.
   6087 027220  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 6 FROM P TBL TO SEQ TBL.
   6088 027224  004737  027652                  JSR     PC,PTCMDS               ;MOVE CMD 7 FROM P TBL TO SEQ TBL.
   6089 027230  004737  027652                  JSR     PC,PTCMDS               ;MOVE END CMD FROM P TBL TO SEQ TBL.
   6090 027234  005037  003442                  CLR     JLOOP                   ;CLEAR JMP CMD LOOP COUNT.
   6091 027240  105037  003526                  CLRB    STAFLG                  ;CLEAR START FLAG
   6092 027244  012701  003540                  MOV     #CMDSEQ,R1              ;INIT SEQUENCE TABLE POINTER.
   6093 027250                          3$:     ;WHILE (R1) NE #END DO          ;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBLE:
   6094 027250                          50431$:
   6095 027250  021127  177777                  CMP     (R1),#END
   6096 027254  001574                          BEQ     50432$
   6097 027256  022711  000040                    CMP   #JMP.C,(R1)             ;IS THIS A JUMP CMD?
   6098 027262  001024                            BNE   6$                      ;BR IF NOT.
   6099 027264  062701  000002                  ADD     #2,R1     ;LET R1 := R1 + #2          ;POINT TO BRF.
   6100 027270  012137  003444                    MOV   (R1)+,JLOC              ;SAVE BRF (LOCATION).
   6101 027274  022137  003442                    CMP (R1)+,JLOOP               ;HAS LOOP COUNT BE SATISFIED?
   6102 027300  001003                            BNE   1$                      ;IF NOT, JMP AGAIN.
   6103 027302  062701  000002                  ADD     #2,R1                   ;IF SO, ADJUST SEQ POUNTER
   6104 027306  000760                            BR    3$                      ;AND GO TO NEXT COMMAND.
   6105 027310  005237  003442          1$:       INC   JLOOP                   ;UPDATE THE LOOP COUNT.
   6106 027314  012701  003540                  MOV     #CMDSEQ,R1              ;INIT CMD SEQ TABLE POINTER.
   6107 027320  005337  003444          2$:       DEC   JLOC                    ;DECR LOCATION COUNTER.
   6108 027324  001751                            BEQ   3$                      ;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
   6109 027326  062701  000010                  ADD     #10,R1                  ;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
   6110 027332  000772                            BR    2$                      ;DO IT AGAIN.
   6111
   6112 027334  022711  000020          6$:       CMP   #DLY.C,(R1)             ;DELAY?
   6113 027340  001026                            BNE   4$                      ;BR IF NOT.
   6114 027342  062701  000004                  ADD     #4,R1                   ;R1 = LOCATION OF N COUNT.
   6115 027346  011137  003440                  MOV     (R1),TIME2              ;SAVE N COUNT.
   6116 027352                          7$:       DELAY 1                       ;GO TO SUPER-WAIT 1 MSEC.
        027352  012727  000001                                                          MOV     #1,(PC)+
        027356  000000                                                                  .WORD   0
        027360  013727  002116                                                          MOV     L$DLY,(PC)+
        027364  000000                                                                  .WORD   0
        027366  005367  177772                                                          DEC     -6(PC)
        027372  001375                                                                  BNE     .-4
        027374  005367  177756                                                          DEC     -22(PC)
        027400  001367                                                                  BNE     .-20
   6117 027402  005337  003440                    DEC   TIME2
   6118 027406  001361                            BNE   7$
   6119 027410  062701  000004                  ADD     #4,R1     ;LET R1 := R1 + #4          ;POINT TO NEXT CMD.
   6120 027414  000715                            BR    3$                      ;GO CHECK NEXT CMD.
   6121 027416  004737  011232          4$:       JSR   PC,SETUP                ;GO SETUP THE COMMAND BLOCK.
   6122 027422                          50433$:   ;WHILE NCNT LT NCNT1 DO       ;WHILE THERE ARE RECORDS REMAINING:
```

TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

```
6123 027422  023737  003412  003414          CMP     NCNT,NCNT1
6124 027430  002103                          BGE     50434$
6125 027432  004737  011124                      JSR PC,CMDAC                ;STORE CMD ASCII IN ERROR MSG.
6126 027436  004737  010564                      JSR PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
6127 027442  023727  003420  100017          CMP     CMDWRD,#GES             ;IF CMD IS GET STATUS THEN:
6128 027450  001002                          BNE     50435$
6129 027452  004737  017452                        JSR PC,PRXST              ;PRINT EXTENDED STATUS REGISTERS.
6130
6131 027456                          50435$:
6132 027456  004737  017540                  JSR PC,CKHAE                    ;CHECK HALT AFTER EACH CMD FLAG.
6133 027462  012702  000001                  MOV     #1,R2                   ;SET ALL UNITS AT BOT/EOT.
6134 027466  004737  017142                  JSR PC,FIRSTU                   ;FIND FIRST UNIT.
6135 027472                          50436$:     ;WHILE DEVTBL(R5) NE #END DO        ;WHILE THERE ARE MORE UNITS:
6136 027472  026527  002604  177777          CMP     DEVTBL(R5),#END
6137 027500  001426                          BEQ     50437$
6138 027502  032737  000400  003420          BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
6139 027510  001406                          BEQ     50440$
6140 027512  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)        ;.F NOT AT BOT THEN:
6141 027520  001001                          BNE     50441$
6142 027522  005002                          CLR     R2                      ;CLEAR EOT/BOT FLAG.
6143
6144 027524                          50441$:
6145 027524  000411                          BR      50442$                          ;ELSE IF CMD IS NOT REVERSE:
6146 027526                          50440$:
6147 027526  032765  000001  003502          BIT     #X0.EOT,EOTFLG(R5)
6148 027534  001404                          BEQ     50443$
6149 027536  032737  000001  003420          BIT     #CMD.CO,CMDWRD
6150 027544  001001                          BNE     50444$
6151 027546                          50443$:
6152                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
6153 027546  005002                          CLR     R2              ;LET R2 := #0           ;CLEAR EOT/BOT FLAG.
6154
6155 027550                          50444$:
6156
6157 027550                          50442$:
6158 027550  004737  017210                        JSR PC,NEXTU              ;FIND NEXT UNIT
6159                                                                    ;
6160 027554  000746                      BR      50436$
6161 027556                          50437$:
6162 027556  020227  000001                  CMP     R2,#1           ;IF ALL UNIT ARE AT EOT/BOT THEN:
6163 027562  001016                          BNE     50445$
6164 027564  013737  003412  003414          MOV     NCNT,NCNT1      ;FORCE TERMINATION OF COMMAND.
6165 027572  005237  003414                  INC     NCNT1
6166 027576  105237  003524                  INCB    ALLEOT           ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VERIFY OF D
6167 027602  023727  003426  000002          CMP     CMDLG,#2        ;WHEN WRITING IS CURRENT COMMAND
6168 027610  001002                          BNE     50446$
6169 027612  004737  027674                  JSR PC,T5WEOT           ;GO WRITE/READ REV ONE RECORD BEYOND EOT
6170
6171 027616                          50446$:
6172
6173 027616  000402                      BR      50447$
6174 027620                          50445$:
6175 027620  105037  003524                  CLRB    ALLEOT          ;WHEN NOT ALL @EOT, CLEAR FLAG
6176
6177 027624                          50447$:
6178 027624  005237  003412                  INC     NCNT            ;UPDATE RECORD COUNT.
6179 027630  013737  003420  003424          MOV     CMDWRD,PCMDWD   ;SAVE PREVIOUS COMMAND WORD.
```

TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

```
                                        BR      50433$
                                50434$:
027640  004737  016126                  JSR     PC,VFYDAT       ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
                                                                ;VERIFY THE LAST N RECORDS OF DATA.

                                        BR      50431$
                                50432$:

027646                                  EXIT    TST
027646  104432                                                                  TRAP    C$EXIT
027650  000140                                                                  .WORD   L10037-.

                                ;       SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
                                ;       THE COMMAND SEQUENCE TABLE.
                                ;       INPUTS:         R2 = POINTER TO SOFT "P" TABLE
                                ;       OUTPUTS:
                                ;       REGISTERS:      R3.
                                ;       CALLS:

027652  012203                  PTCMDS::MOV     (R2)+,R3            ;R3 = COMMAND TABLE INDEX.
027654  005303                          DEC     R3
027656  006303                          ASL     R3
027660  016321  003752                  MOV     CMDTBL(R3),(R1)+        ;MOVE COMMAND WORD.
027664  012221                          MOV     (R2)+,(R1)+             ;MOVE # OF BYTES.
027666  012221                          MOV     (R2)+,(R1)+             ;MOVE # OF OPERATIONS.
027670  012221                          MOV     (R2)+,(R1)+             ;MOVE PATTERN CODE.
027672  000207                          RTS PC

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

027674  000240                  T5WEOT:: NOP
027676  000240                          NOP
027700  004737  010564                  JSR PC,EXSUB            ;WRITE ONE RECORD BEYOND EOT
027704  004737  017540                  JSR PC,CKHAE            ;SO THAT READ SHORTER STOP DISTANCE
                                                                ;SHALL POSITION HEAD IN CLEAN IRG GAP
027710  012700  000002                  MOV     #2,R0           ;SET UP COUNTER FOR EOT
027714  013737  003420  003424  1$:     MOV     CMDWRD,PCMDWD   ;LET PCMDWD := CMDWRD   ;REPOSITION TAPE
027722  012737  104401  003420          MOV     #RDR,CMDWRD     ;LET CMDWRD := #RDR     ;BEFORE EXTRA RECORD
027730  012737  000004  003426          MOV     #4,CMDLG                        ;BY READING REVERSE
027736  013737  003420  002330          MOV     CMDWRD,CMDPKT    ;LET CMDPKT := CMDWRD CLR.BY #BRF.C
027744  042737  004000  002330          BIC     #BRF.C,CMDPKT
027752  013737  002330  003422          MOV     CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT ;THAT RECORD TO ALLOW
027760  013737  003410  002332          MOV     DATARD,CMDPKT+CP.ADL        ;NEXT COMMAND IN THE
027766  004737  011124                  JSR PC,CMDAC            ;TABLE TO BE EXECUTED
027772  004737  010564                  JSR PC,EXSUB
027776  004737  017540                  JSR PC,CKHAE
030002  005300                          DEC     R0              ;FOUND EOT YET?
030004  001343                          BNE     1$              ;NO,KEEP GOING
030006  000207                          RTS PC                  ;YES,RETURN

                                        .EVEN
```

TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

```
6235 030010                             ENDTST
     030010                        L10037:
     030010  104401                                                    TRAP    C$ETST
6236
6237 030012                             ENDMOD
6238
6239                                  .TITLE PARAMETER CODING
6240
6241                                  .SBTTL  HARDWARE PARAMETER CODING SECTION
6242
6243 030012                             BGNMOD
6244
6245                                  ;++
6246                                  ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
6247                                  ; THAT ARE USED BY THE SUPERVISOR TO BUILD P TABLES.  THE
6248                                  ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
6249                                  ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
6250                                  ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
6251                                  ; WITH THE OPERATOR.
6252                                  ;-
6253
6254 030012                             BGNHRD
     030012  000042                                                    .WORD L10040-L$HARD/2
     030014                       L$HARD::
6255
6256 030014                             GPRMA   TS5ADR,0,0,160010,177564,YES
     030014  000031                                                    .WORD   T$CODE
     030016  030052                                                    .WORD   TS5ADR
     030020  160010                                                    .WORD   T$LOLIM
     030022  177564                                                    .WORD   T$HILIM
6257 030024                             GPRMD   TS5VCT,2,0,777,60,776,YES
     030024  001032                                                    .WORD   T$CODE
     030026  030067                                                    .WORD   TS5VCT
     030030  000777                                                    .WORD   777
     030032  000060                                                    .WORD   T$LOLIM
     030034  000776                                                     WORD   T$HILIM
6258 030036                                 GPRMD   TS5UNT,4,0,1,0,1,NO
     030036  002022                                                    .WORD   T$CODE
     030040  030076                                                    .WORD   TS5UNT
     030042  000001                                                    .WORD   1
     030044  000000                                                    .WORD   T$LOLIM
     030046  000001                                                    .WORD   T$HILIM
6259 030050                             EXIT HRD
     030050  024004                                                    .WORD   T$CODE
6260
6261                                        .NLIST  BEX
6262 030052     124     123     104  TS5ADR: .ASCIZ  /TSDB ADDRESS/
6263 030067     126     105     103  TS5VCT: .ASCIZ  /VECTOR/
6264 030076     123     105     114  TS5UNT: .ASCIZ  /SELECT DRIVE 0 1/
6265                                        .LIST   BEX
6266                                        .EVEN
6267
6268 030120                             ENDHRD
                                                                       .EVEN
     030120                        L10040:
6269
6270                                  .SBTTL  SOFTWARE PARAMETER CODING SECTION
```

SOFTWARE PARAMETER CODING SECTION

```
6271
6272
6273                                    ;**
6274                                    ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
6275                                    ; THAT ARE USED BY THE SUPERVISOR TO BUILD P TABLES  THE
6276                                    ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
6277                                    ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
6278                                    ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
6279                                    ; WITH THE OPERATOR.
6280                                    ;
6281 030120                                    BGNSFT
     030120  000302                                                        .WORD L10041 L$SOFT/2
     030122                             L$SOFT::
6282 030122                                    GPRML   CLRM,0,1,YES
     030122  000130                                                        .WORD   T$CODE
     030124  030726                                                        .WORD   CLRM
     030126  000001                                                        .WORD   1
6283 030130                                    GPRML   RRVM,0,400,YES
     030130  000130                                                        .WORD   T$CODE
     030132  030745                                                        .WORD   RRVM
     030134  000400                                                        .WORD   400
6284 030136                                    GPRML   RCVERM,2,400,YES
     030136  001130                                                        .WORD   T$CODE
     030140  031050                                                        .WORD   RCVERM
     030142  000400                                                        .WORD   400
6285 030144                                    GPRML   HAEM,2,1,YES
     030144  001130                                                        .WORD   T$CODE
     030146  030774                                                        .WORD   HAEM
     030150  000001                                                        .WORD   1
6286 030152                                    GPRML   IRECM,6,400,YES
     030152  003130                                                        .WORD   T$CODE
     030154  031124                                                        .WORD   IRECM
     030156  000400                                                        .WORD   400
6287 030160                                    XFERT   NEXTSP
     030160  004024                                                        .WORD   T$CODE
6288 030162                                    GPRML   BADTM,4,1,YES
     030162  002130                                                        .WORD   T$CODE
     030164  031020                                                        .WORD   BADTM
     030166  000001                                                        .WORD   1
6289 030170                            NEXTSP: GPRML   DINTM,6,1,YES
     030170  003130                                                        .WORD   T$CODE
     030172  031101                                                        .WORD   DINTM
     030174  000001                                                        .WORD   1
6290 030176                                    GPRML   IREM,12,1,YES
     030176  005130                                                        .WORD   T$CODE
     030200  031171                                                        .WORD   IREM
     030202  000001                                                        .WORD   1
6291 030204                                    GPRML   CHGM,10,1,YES
     030204  004130                                                        .WORD   T$CODE
     030206  031145                                                        .WORD   CHGM
     030210  000001                                                        .WORD   1
6292 030212                                    XFERF   ENDSP1
     030212  127044                                                        .WORD   T$CODE
6293 030214                                    GPRMD   CHARM,14,0,377,0,777,YES
     030214  006032                                                        .WORD   T$CODE
     030216  031222                                                        .WORD   CHARM
     030220  000377                                                        .WORD   377
```

SOFTWARE PARAMETER CODING SECTION

```
                030222  000000                                          .WORD   T$LOLIM
                030224  000777                                          .WORD   T$HILIM
  6294          030226                  GPRMD   CMD2M,16,D,37,1,33,YES
                030226  007052                                          .WORD   T$CODE
                030230  031247                                          .WORD   CMD2M
                030232  000037                                          .WORD   37
                030234  000001                                          .WORD   T$LOLIM
                030236  000033                                          .WORD   T$HILIM
  6295          030240                  GPRMD   BPCRM,20,D,-1,1,DATCNT,YES
                030240  010052                                          .WORD   T$CODE
                030242  031255                                          .WORD   BPCRM
                030244  177777                                          .WORD   1
                030246  000001                                          .WORD   T$LOLIM
                030250  004000                                          .WORD   T$HILIM
  6296          030252                  GPRMD   NUMBM,22,D,-1,1,77777,YES
                030252  011052                                          .WORD   T$CODE
                030254  031267                                          .WORD   NUMBM
                030256  177777                                          .WORD   1
                030260  000001                                          .WORD   T$LOLIM
                030262  077777                                          .WORD   T$HILIM
  6297          030264                  GPRMD   PATTM,24,D,17,0,10,YES
                030264  012052                                          .WORD   T$CODE
                030266  031307                                          .WORD   PATTM
                030270  000017                                          .WORD   17
                030272  000000                                          .WORD   T$LOLIM
                030274  000010                                          .WORD   T$HILIM
  6298          030276                  GPRMD   CMD3M,26,D,37,1,33,YES
                030276  013052                                          .WORD   T$CODE
                030300  031416                                          .WORD   CMD3M
                030302  000037                                          .WORD   37
                030304  000001                                          .WORD   T$LOLIM
                030306  000033                                          .WORD   T$HILIM
  6299          030310                  GPRMD   BPCRM,30,D, 1,1,DATCNT,YES
                030310  014052                                          .WORD   T$CODE
                030312  031255                                          .WORD   BPCRM
                030314  177777                                          .WORD   1
                030316  000001                                          .WORD   T$LOLIM
                030320  004000                                          .WORD   T$HILIM
  6300          030322                  GPRMD   NUMBM,32,D,-1,1,77777,YES
                030322  015052                                          .WORD   T$CODE
                030324  031267                                          .WORD   NUMBM
                030326  177777                                          .WORD   -1
                030330  000001                                          .WORD   T$LOLIM
                030332  077777                                          .WORD   T$HILIM
  6301          030334                  GPRMD   PATTM,34,D,17,0,10,YES
                030334  016052                                          .WORD   T$CODE
                030336  031307                                          .WORD   PATTM
                030340  000017                                          .WORD   17
                030342  000000                                          .WORD   T$LOLIM
                030344  000010                                          .WORD   T$HILIM
  6302          030346                  GPRMD   CMD4M,36,D,37,1,33,YES
                030346  017052                                          .WORD   T$CODE
                030350  031424                                          .WORD   CMD4M
                030352  000037                                          .WORD   37
                030354  000001                                          .WORD   T$LOLIM
                030356  000033                                          .WORD   T$HILIM
  6303          030360                  GPRMD   BPCRM,40,D, 1,1,DATCNT,YES
```

SOFTWARE PARAMETER CODING SECTION

```
        030360  020052                                                  .WORD   T$CODE
        030362  031255                                                  .WORD   BPCRM
        030364  177777                                                  .WORD    1
        030366  000001                                                  .WORD   T$LOLIM
        030370  004000                                                  .WORD   T$HILIM
  6304  030372                        GPRMD   NUMBM,42,D,-1,1,77777,YES
        030372  021052                                                  .WORD   T$CODE
        030374  031267                                                  .WORD   NUMBM
        030376  177777                                                  .WORD    1
        030400  000001                                                  .WORD   T$LOLIM
        030402  077777                                                  .WORD   T$HILIM
  6305  030404                        GPRMD   PATTM,44,D,17,0,10,YES
        030404  022052                                                  .WORD   T$CODE
        030406  031307                                                  .WORD   PATTM
        030410  000017                                                  .WORD   17
        030412  000000                                                  .WORD   T$LOLIM
        030414  000010                                                  .WORD   T$HILIM
  6306  030416                        GPRMD   CMD5M,46,D,37,1,33,YES
        030416  023052                                                  .WORD   T$CODE
        030420  031432                                                  .WORD   CMD5M
        030422  000037                                                  .WORD   37
        030424  000001                                                  .WORD   T$LOLIM
        030426  000033                                                  .WORD   T$HILIM
  6307  030430                        GPRMD   BPCRM,50,D, 1,1,DATCNT,YES
        030430  024052                                                  .WORD   T$CODE
        030432  031255                                                  .WORD   BPCRM
        030434  177777                                                  .WORD    1
        030436  000001                                                  .WORD   T$LOLIM
        030440  004000                                                  .WORD   T$HILIM
  6308  030442                        GPRMD   NUMBM,52,D,-1,1,77777,YES
        030442  025052                                                  .WORD   T$CODE
        030444  031267                                                  .WORD   NUMBM
        030446  177777                                                  .WORD    1
        030450  000001                                                  .WORD   T$LOLIM
        030452  077777                                                  .WORD   T$HILIM
  6309  030454                        GPRMD   PATTM,54,D,17,0,10,YES
        030454  026052                                                  .WORD   T$CODE
        030456  031307                                                  .WORD   PATTM
        030460  000017                                                  .WORD   17
        030462  000000                                                  .WORD   T$LOLIM
        030464  000010                                                  .WORD   T$HILIM
  6310  030466                        XFER    ENDSP2
        030466  002004                                                  .WORD   T$CODE
  6311  030470                ENDSP1: XFER    ENDSP3
        030470  076004                                                  .WORD   T$CODE
  6312  030472                ENDSP2: GPRMD   CMD6M,56,D,37,1,33,YES
        030472  027052                                                  .WORD   T$CODE
        030474  031440                                                  .WORD   CMD6M
        030476  000037                                                  .WORD   37
        030500  000001                                                  .WORD   T$LOLIM
        030502  000033                                                  .WORD   T$HILIM
  6313  030504                        GPRMD   BPCRM,60,D,-1,1,DATCNT,YES
        030504  030052                                                  .WORD   T$CODE
        030506  031255                                                  .WORD   BPCRM
        030510  177777                                                  .WORD   -1
        030512  000001                                                  .WORD   T$LOLIM
        030514  004000                                                  .WORD   T$HILIM
```

SOFTWARE PARAMETER CODING SECTION

```
6314 030516                    GPRMD   NUM8M,62,D,-1,1,77777,YES
     030516  031052                                    .WORD   T$CODE
     030520  031267                                    .WORD   NUM8M
     030522  177777                                    .WORD   -1
     030524  000001                                    .WORD   T$LOLIM
     030526  077777                                    .WORD   T$HILIM
6315 030530                    GPRMD   PATTM,64,D,17,0,10,YES
     030530  032052                                    .WORD   T$CODE
     030532  031307                                    .WORD   PATTM
     030534  000017                                    .WORD   17
     030536  000000                                    .WORD   T$LOLIM
     030540  000010                                    .WORD   T$HILIM
6316 030542                    GPRMD   CMD7M,66,D,37,1,33,YES
     030542  033052                                    .WORD   T$CODE
     030544  031446                                    .WORD   CMD7M
     030546  000037                                    .WORD   37
     030550  000001                                    .WORD   T$LOLIM
     030552  000033                                    .WORD   T$HILIM
6317 030554                    GPRMD   BPCRM,70,D, 1,1,DATCNT,YES
     030554  034052                                    .WORD   T$CODE
     030556  031255                                    .WORD   BPCRM
     030560  177777                                    .WORD   -1
     030562  000001                                    .WORD   T$LOLIM
     030564  004000                                    .WORD   T$HILIM
6318 030566                    GPRMD   NUM8M,72,D,-1,1,77777,YES
     030566  035052                                    .WORD   T$CODE
     030570  031267                                    .WORD   NUM8M
     030572  177777                                    .WORD    1
     030574  000001                                    .WORD   T$LOLIM
     030576  077777                                    .WORD   T$HILIM
6319 030600                    GPRMD   PATTM,74,D,17,0,10,YES
     030600  036052                                    .WORD   T$CODE
     030602  031307                                    .WORD   PATTM
     030604  000017                                    .WORD   17
     030606  000000                                    .WORD   T$LOLIM
     030610  000010                                    .WORD   T$HILIM
6320 030612                    GPRMD   CMD8M,76,D,37,1,33,YES
     030612  037052                                    .WORD   T$CODE
     030614  031454                                    .WORD   CMD8M
     030616  000037                                    .WORD   37
     030620  000001                                    .WORD   T$LOLIM
     030622  000033                                    .WORD   T$HILIM
6321 030624                    GPRMD   BPCRM,100,D,-1,1,DATCNT,YES
     030624  040052                                    .WORD   T$CODE
     030626  031255                                    .WORD   BPCRM
     030630  177777                                    .WORD   -1
     030632  000001                                    .WORD   T$LOLIM
     030634  004000                                    .WORD   T$HILIM
6322 030636                    GPRMD   NUM8M,102,D, 1,1,77777,YES
     030636  041052                                    .WORD   T$CODE
     030640  031267                                    .WORD   NUM8M
     030642  177777                                    .WORD    1
     030644  000001                                    .WORD   T$LOLIM
     030646  077777                                    .WORD   T$HILIM
6323 030650                    GPRMD   PATTM,104,D,17,0,10,YES
     030650  042052                                    .WORD   T$CODE
     030652  031307                                    .WORD   PATTM
```

SOFTWARE PARAMETER CODING SECTION

```
        030654  000017                                                  .WORD   17
        030656  000000                                                  .WORD   T$LOLIM
        030660  000010                                                  .WORD   T$HILIM
  6324  030662                          XFER    ENDSP
        030662  022004                                                  .WORD   T$CODE
  6325  030664                  ENDSP3: GPRML   TSMD,106,1,YES
        030664  043130                                                  .WORD   T$CODE
        030666  031317                                                  .WORD   TSMD
        030670  000001                                                  .WORD   1
  6326  030672                          XFERT   ENDSP
        030672  016024                                                  .WORD   T$CODE
  6327  030674                          GPRM    FAST,114,1,YES
        030674  046130                                                  .WORD   T$CODE
        030676  031407                                                  .WORD   FAST
        030700  000001                                                  .WORD   1
  6328  030702                          XFERT   ENDSP4
        030702  011024                                                  .WORD   T$CODE
  6329  030704                          GPRML   WTBF,112,1,YES
        030704  045130                                                  .WORD   T$CODE
        030706  031367                                                   WORD   WTBF
        030710  000001                                                  .WORD   1
  6330  030712                          XFERT   ENDSP
        030712  006024                                                  .WORD   T$CODE
  6331  030714                          GPRML   RDBF,110,1,YES
        030714  044130                                                  .WORD   T$CODE
        030716  031350                                                  .WORD   RDBF
        030720  000001                                                  .WORD   1
  6332  030722                  ENDSP5: XFER    ENDSP
        030722  002004                                                  .WORD   T$CODE
  6333  030724                  ENDSP4: XFER    ENDSP
        030724  001004                                                  .WORD   T$CODE
  6334  030726                  ENDSP:
  6335  030726                          ENDSFT
                                                                        .EVEN
        030726                  L10041:
  6336                                  .EVEN
  6337
  6338                                  .NLIST  BEX
  6339  030726    103   114   105   CLRM:   .ASCIZ  /CLEAR COUNTERS/
  6340  030745    122   105   123   RRVM:   .ASCIZ  /RESET RANDOM VARIABLES/
  6341  030774    110   101   114   HAEM:   .ASCIZ  /HALT AFTER EACH CMD/
  6342  031020    102   101   104   BADTM:  .ASCIZ  /BAD TAPE SPOT DETECTION/
  6343  031050    120   122   111   RCVERM: .ASCIZ  /PRINT RECOVERABLE ERRORS/
  6344  031101    104   111   123   DINTM:  .ASCIZ  /DISABLE INTERRUPTS/
  6345  031124    111   116   110   IRECM:  .ASCIZ  /INHIBIT RECOVERY/
  6346  031145    103   110   101   CHGM:   .ASCIZ  /CHANGE CMD SEQUENCE/
  6347  031171    111   116   110   IREM:   .ASCIZ  /INHIBIT RFC ERROR REPORT/
  6348  031222    103   110   101   CHARM:  .ASCIZ  /CHARACTERISTICS CODE/
  6349  031247    103   115   104   CMD2M:  .ASCIZ  "CMD/2"
  6350  031255    102   122   106   BPCRM:  .ASCIZ  /BRF COUNT/
  6351  031267    043   040   117   NUMBM:  .ASCIZ  /# OF OPERATIONS/
  6352  031307    120   101   124   PATTM:  .ASCIZ  /PATTERN/
  6353  031317    104   105   106   TSMD:   .ASCIZ  /DEFAULT SWITCH SETTINGS?/
  6354  031350    122   105   101   RDBF:   .ASCIZ  /READ BUFFERING/
  6355  031367    127   122   111   WTBF:   .ASCIZ  /WRITE BUFFERING/
  6356  031407    061   060   060   FAST:   .ASCIZ  /100ips/
  6357                                  .LIST   BEX
```

SOFTWARE PARAMETER CODING SECTION

```
                                        .EVEN
                                        .NLIST  BEX
031416  103  115  104  CMD3M:  .ASCIZ  "CMD/3"
031424  103  115  104  CMD4M:  .ASCIZ  "CMD/4"
031432  103  115  104  CMD5M:  .ASCIZ  "CMD/5"
031440  103  115  104  CMD6M:  .ASCIZ  "CMD/6"
031446  103  115  104  CMD7M:  .ASCIZ  "CMD/7"
031454  103  115  104  CMD8M:  .ASCIZ  "CMD/8"
                                        .LIST   BEX
                                        .EVEN


                                ;*************************************************************************
                                ;*************************************************************************
                                ;       PATCH AREA
                                ; AND AN ADJUSTMENT TO ACCOUNT FOR THE "LASTAD BIT7" HACK
                                ; DESCRIBED IN "SUPPRG.MEM" (FOR REV C).
                                ;
031462                          PATCH:: .BLKW   64.

        032000                          .=.!377+1

032000                                  LASTAD
                                                                                .EVEN
032000  000000                                                                 .WORD   0
032002  000000                                                                 .WORD   0
032004                          L$LAST::
032004                                  ENDMOD

                                .SBTTL  HARD CODED P TBL

                                ;**
                                ;DIAG IS PRE PARAMETERIZED PER TBL
                                ;

032004                                  BGNSETUP 1
032004                                    BGNPTAB
032004  000000                                                                 .WORD   0
032006  000003                                                                 .WORD   L10044 ./2-1
032010                          L10042:
032010  172522                              172522
032012  000224                              224
032014  000000                                0
032016                                    ENDPTAB
032016                          L10044:
032016                                  ENDSETUP

        000001                  .END
```

Symbol table

```
ACK.C = 100000 G    BTADDR  002616 G    CP.CNT= 000006 G    C$TPRI= 000013      EXPBOT  003514 G
ADR   = 000020 G    BTMSG1  015152      CRLF    005741 G    DATARD  003410 G    EXSUB   010564 G
ALLEOT  003524 G    BTMSG2  015237      CRLFSP  005744 G    DATAWT  003406 G    EXTFEA  002322 G
ASSEMB= 000010      BTMSG3  015307      CTCC    003450 G    DATCNT= 004000 G    E$END = 002100
ATTNM   004603 G    BTPT    003512 G    CVC.C = 040000 G    DATERM  005752 G    E$LOAD= 000035
AUDRPM  005114 G    BTRPT   020224 G    C$AU  = 000052      DEVTBL  002604 G    FAST    031407
AUDRUN  005146 G    BTO     003046 G    C$AUTO= 000061      DFPTBL  002174 G    FATSM   004642 G
AUTODM  023644      BT1     003120 G    C$BRK = 000022      DFTSCH= 000040 G    FIRSTU  017142 G
BADTM   031020      BT2     003172 G    C$BSEG= 000004      DIA   = 100006 G    FMT.CO= 000040 G
BADTSW  002210 G    BT3     003244 G    C$BSUB= 000002      DIABLK= 003406 G    FMT.C1= 000100 G
BENBSW  002326 G    CHAR    002220 G    C$CEFG= 000045      DIACNT= 000020 G    FTLCNT  003366 G
BFSEQ   025110 G    CHARM   031222      C$CLCK= 000062      DIAGMC= 000000      FUNRM   004622 G
BFSEQ0  025134      CHGFLG  002214 G    C$CLEA= 000012      DINT    002212 G    F$AU  = 000015
BFSEQ1  025206      CHGM    031145      C$CLOS= 000035      DINTM   031101      F$AUTO= 000020
BFSEQ2  025220      CHKERR  013250 G    C$CLP1= 000006      DLY   = 000020 G    F$BGN = 000040
BFSEQ3  025312      CH.EAI= 000040 G    C$CVEC= 000036      DLY.C = 000020 G    F$CLEA= 000007
BFSEQ4  025364      CH.ERI= 000020 G    C$DCLN= 000044      DRI   = 100013 G    F$DU  = 000016
BFSEQ5  025426      CH.ESS= 000200 G    C$DODU= 000051      DROPDM  005065 G    F$END = 000041
BFSEQ6  025500      CKDATA  016526 G    C$DRPT= 000024      DROPED  003522 G    F$HARD= 000004
BFSEQ7  025552      CKDCNT  017136      C$DU  = 000053      DROPN   017450      F$HW  = 000013
BFSEQ8  025604      CKDFF   017140      C$EDIT= 000003      DROPU   017240 G    F$INIT= 000006
BFSEQ9  025636      CKHAE   017540 G    C$ERDF= 000055      DROPUA  017364      F$JMP = 000050
BFSE10  025660      CKHRTN  017626      C$ERHR= 000056      DRORTN  017442      F$MOD = 000000
BGNFLG= 003460      CLN   = 101012 G    C$ERRO= 000060      DTAERM  005752 G    F$MSG = 000011
BINC    016112      CLRERR  012724 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    030726      C$ESCA= 000010      DTAER4  005337 G    F$RPT = 000012
BIT01 = 000002 G    CMDAC   011124 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$GMAN= 000043      EF.RES= 000037 G    GCMDA   011176 G
BIT08 = 000400 G    CMDSEQ  003540 G    C$GPHR= 000042      EF.RWB= 000030 G    GENPAT  011616 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    016120      GETSTM  005507 G
BIT10 = 002000 G    CMDWRD  003420 G    C$INIT= 000011      END   = 177777 G    GIT     012110
BIT11 = 004000 G    CMD.C0= 000001 G    C$INLP= 000020      ENDERF= 003472      GOWAIT  012424 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   030726      G$CNTO= 000200
BIT14 = 040000 G    CMD.C3= 000010 G    C$MSG = 000023      ENDSP1  030470      G$DELM= 000372
BIT15 = 100000 G    CMD.C4= 000020 G    C$OPEN= 000034      ENDSP2  030472      G$DISP= 000003
BIT2  = 000004 G    CMD2M   031247      C$PNTB= 000014      ENDSP3  030664      G$EXCP= 000400
BIT3  = 000010 G    CMD3M   031416      C$PNTF= 000017      ENDSP4  030724      G$HILI= 000002
BIT4  = 000020 G    CMD4M   031424      C$PNTS= 000016      ENDSP5  030722      G$LOLI= 000001
BIT5  = 000040 G    CMD5M   031432      C$PNTX= 000015      EOTFLG  003502 G    G$NO  = 000000
BIT6  = 000100 G    CMD6M   031440      C$QIO = 000377      ERCVER  002207 G    G$OFFS= 000400
BIT7  = 000200 G    CMD7M   031446      C$RDBU= 000007      ERLOG   003466 G    G$OFSI= 000376
BIT8  = 000400 G    CMD8M   031454      C$REFG= 000047      ERREC   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$PRML= 000000
BORERS  015356 G    CNTLEN= 000550 G    C$RFLA= 000021      EVL   = 000004 G    G$RADA= 000140
BPCRM   031255      CODELM  004162 G    C$RPT = 000025      EXALL   010266 G    G$RADB= 000000
BRCPK   002344 G    CP.ADH= 000004 G    C$SEFG= 000046      EXARTN  010562      G$RADD= 000040
BRFCNT  003416 G    CP.ADL= 000002 G    C$SPRI= 000041      EXCRTN  012422      G$RADL= 000120
BRF.C = 004000 G    CP.CMD= 000000 G    C$SVEC= 000037      EXCUTE  012114 G    G$RADO= 000020
```

Symbol table

```
G$XFER= 000004        L$CCP   002106 G      L10012  023352        NSSRM   004536 G      RAWTM   026430 G
G$YES = 000010        L$CLEA  023776 G      L10013  023642        NUMBM   031267        RCVERM  031050
HAE     002206 G      L$CO    002032 G      L10014  024036        NURTY1  005422 G      RDBF    031350
HAEM    030774        L$DEPO  002011 G      L10015  024110        OFLINM  005456 G      RDBUF   002314 G
HALTM   004306 G      L$DESC  002136 G      L10016  024214        ONEFIL= 000001        RDF   = 104001 G
HELP  = 000000        L$DESP  002076 G      L10017  025702        OPFLAG  003536 G      RDR   = 104401 G
HOE   = 100000 G      L$DEVP  002060 G      L10020  024430        OPP.C = 020000 G      RECCNT  003376 G
HRDCNT  003356 G      L$DISP  002124 G      L10021  024454        O$APTS= 000000        RECLOG  003465 G
HSSW    002320 G      L$DLY   002116 G      L10022  024474        O$AU  = 000001        RECRED  007066
IBE   = 010000 G      L$DTP   002040 G      L10023  024514        O$BGNR= 0000          RECTAP  010124 G
IDU   = 000040 G      L$DTYP  002034 G      L10024  024534        O$BGNS= 000001        RECUD   013060 G
IER   = 020000 G      L$DU    024040 G      L10025  024554        O$DU  = 000001        RERM    005017 G
IE.C  = 000200 G      L$DUT   002072 G      L10026  024574        O$ERRT= 000000        RETRYC  003460 G
INIT10  021364        L$DVTY  002164 G      L10027  024614        O$GNSW= 000001        REV     002324 G
INIT15  021662        L$EF    002052 G      L10030  024634        O$POIN= 000001        REWRT   015532 G
INIT16  021702        L$ENVI  002044 G      L10031  024654        O$SETU= 000000        RFBC    002726 G
INTFLG  003472 G      L$ETP   002102 G      L10032  024712        PASCNT  003326 G      RFCERM  004521 G
INTPRI= 000340 G      L$EXP1  002046 G      L10033  025076        PATCH   031462 G      RFREC   003026 G
INVRT   007764 G      L$EXP4  002064 G      L10034  026536        PATERN  003446 G      RFUNR   003036 G
IRE     003521 G      L$EXP5  002066 G      L10035  026732        PATR0   011702 G      RLEXM   004556 G
IREC    002213 G      L$HARD  030014 G      L10036  027112        PATR1   011740 G      RNF   = 125401 G
IRECM   031124        L$HIME  002120 G      L10037  030010        PATR2   011760 G      RNOPSC= 177740 G
IREM    031171        L$HPCP  002016 G      L10040  030120        PATR3   011770 G      RNR   = 105401 G
ISR   = 000100 G      L$HPTP  002022 G      L10041  030726        PATR4   012014 G      RNYM    004753 G
IXE   = 004000 G      L$HW    002174 G      L10042  032010        PATR5   012026 G      RPF   = 105001 G
I$AU  = 000041        L$ICP   002104 G      L10044  032016        PATR6   012040 G      RPR   = 125001 G
I$AUTO= 000041        L$INIT  021364 G      MBR   = 100012 G      PATR7   012060 G      RPTCNT  003462 G
I$CLN = 000041        L$LADP  002026 G      MDSET   007526 G      PATR8   012112 G      RPTFLG  003517 G
I$DU  = 000041        L$LAST  032004 G      MEMOM   023250        PATTBL  011660        RPT1A   020472
I$HRD = 000041        L$LOAD  002100 G      MISCFG  003531 G      PATTM   031307        RPT1B   020547
I$INIT= 000041        L$LUN   002074 G      MOD.C0= 000400 G      PCMDWD  003424 G      RPT1C   020620
I$MOD = 000041        L$MREV  002050 G      MOD.C1= 001000 G      PIRE    002216 G      RPT1D   020671
I$MSG = 000041        L$NAME  002000 G      MOD.C2= 002000 G      PNT   = 001000 G      RPT1E   021117
I$PROT= 000040        L$PRIO  002042 G      MOD.C3= 004000 G      PRI   = 002000 G      RPT1F   020775
I$PTAB= 000041        L$PROT  021356 G      MOVMSG  012774 G      PRI00 = 000000 G      RPT1G   021046
I$PWR = 000041        L$PRT   002112 G      MSGCNT= 000020 G      PRI01 = 000040 G      RPT1I   021243
I$RPT = 000041        L$REPP  002062 G      MSGPKA  002544 G      PRI02 = 000100 G      RPT1J   021147
I$SEG = 000041        L$REV   002010 G      MSGPKT  002354 G      PRI03 = 000140 G      RPT1K   021234
I$SETU= 000041        L$RPT   017630 G      MSGPK0  002374 G      PRI04 = 000200 G      RRANV   002205 G
I$SFT = 000041        L$SOFT  030122 G      MSGPK1  002414 G      PRI05 = 000240 G      RRBC    002666 G
I$SRV = 000041        L$SPC   002056 G      MSGPK2  002434 G      PRI06 = 000300 G      RRECL = 000020 G
I$SUB = 000041        L$SPCP  002020 G      MSGPK3  002454 G      PRI07 = 000340 G      RREC    003006 G
I$TST = 000041        L$SPTP  002024 G      MS.RFC= 000004 G      PRXST   017452 G      RRUNR   003016 G
JLOC    003444 G      L$STA   002030 G      MS.XS0= 000006 G      PTCMDS  027652 G      RRVM    030745
JLOOP   003442 G      L$SW    002204 G      MS.XS1= 000010 G      PWRFLG  003527 G      RTLE    014550 G
JMP   = 000040 G      L$TEST  002114 G      MS.XS2= 000012 G      RANB    003432 G      RTLRTN  014674
JMP.C = 000040 G      L$TIML  002014 G      MS.XS3= 000014 G      RANBC = 153624 G      RWCPK   002350 G
J$JMP = 000167        L$UNIT  002012 G      MS.XS4= 000016 G      RANCMD  026220        RWD   = 102010 G
LENMSK  003430 G      L10000  002202        NCMD.C= 177740 G      RANDOM  003515 G      RWERR   003467 G
LOE   = 040000 G      L10001  002330        NCNT    003412 G      RANP  = 000007 G      RSSAVE  003452 G
LOG     015626 G      L10002  006116        NCNT1   003414 G      RANRD   026260 G      SCCNT   003336 G
LOT   = 000010 G      L10003  007070        NEXTSP  030170        RANS    003434 G      SCERM   004475 G
L$ACP   002110 G      L10004  010100        NEXTU   017210 G      RANSC = 032561 G      SCH   = 140004 G
L$APT   002036 G      L10005  010106        NINUSE= 177774 G      RANW    026504 G      SCHBK   002474 G
L$AU    024112 G      L10006  010114        NODEV   005543 G      RANWR   026372 G      SCHCNT= 000012 G
L$AUT   002070 G      L10007  010122        NOINTM  004670 G      RANWV   026416 G      SEQEND  003740 G
L$AUTO  023354 G      L10010  021354        NRDYM   023740        RASFR   026456 G      SETCH   010222 G
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PARAMETER CODING MACRO V05.03 Friday 22 May 87 08:12 Page 26 86 SEQ 0142

Symbol table

```
SETDEF  010026 G    TRAPD4  003530 G    T$HILI= 000010    T1      024216 G    WRTYCT  003316 G
SETRW   010246 G    TRAP4   023770 G    T$LAST= 000001    T1SWB   003523 G    WRTYER  003464 G
SETUP   011232 G    TSAM    004705 G    T$LOLI= 000000    T1.1    024226       WRTYFG  003463 G
SFF   = 105010 G    TSBA  = 002514 G    T$LSYM= 010000    T1.10   024636       WRUNR   002776 G
SFPTBL  002204 G    TSC.FC= 177717 G    T$LTNO= 000005    T1.11   024656       WSM   = 140006 G
SFR   = 105410 G    TSC.TC= 177761 G    T$NEST= 177777    T1.12   024742       WSMBK   002506 G
SOFINI  007072 G    TSDB    002514 G    T$NS0 = 000000    T1.2    024432       WSSR    012740 G
SRF   = 104010 G    TSMD    031317      T$NS1 = 000005    T1.3    024456       WTBF    031367
SRR   = 104410 G    TSNP    003534 G    T$NS2 = 000002    T1.4    024476       WTBUF   002316 G
STAERM  006120 G    TSSR    002524 G    T$PCNT= 000000    T1.5    024516       WTM   = 100011 G
STAER1  006436      TSSREG  003454 G    T$PTAB= 010043    T1.6    024536       WTMFLG  003456 G
STAER2  006616      TSUNT   003532 G    T$PTHV= 000001    T1.7    024556       WTR   = 101011 G
STAER3  006675      TSVCT   002534 G    T$PTNU= 000001    T1.8    024576       WTV   = 104105 G
STAER4  006733      TS.A16= 000400 G    T$SAVL= 177777    T1.9    024616       WTVERM  004430 G
STAER5  006753      TS.A17= 001000 G    T$SEGL= 177777    T2      025704 G     WTYBRF  015150
STAER6  006562      TS.NBA= 002000 G    T$SIZE= 000005    T3      026540 G     WTYCMD  015144
STAER7  006530      TS.NXM= 004000 G    T$SUBN= 000000    T4      026734 G     WTYWRD  015146
STAFLG  003526 G    TS.OFL= 000100 G    T$TAGL= 177777    T5      027114 G     XST2  = ****** GX
SVCGBL= 000000      TS.RMR= 010000 G    T$TAGN= 010045    T5WEOT  027674 G     X$ALWA= 000000
SVCINS= 000001      TS.SC = 100000 G    T$TEMP= 000000    UAM   = 000200 G     X$FALS= 000040
SVCSUB= 000000      TS.SPE= 020000 G    T$TEST= 000005    UNIWLK  005653       X$OFFS= 000400
SVCTAG= 000000      TS.SSR= 000200 G    T$TSTM= 177777    UNL   = 100412 G     X$TRUE= 000020
SVCTST= 000000      TS.UPE= 040000 G    T$TSTS= 000001    UNREC   003470 G     X0.BOT= 000002 G
SWBFLG  003520 G    TS1MD   002312 G    T$$AU = 010016    URERM   005041 G     X0.EOT= 000001 G
SWB.C = 010000 G    TS5ADR  030052      T$$AUT= 010013    VFEXC   016212 G     X0.LET= 020000 G
SWSET   004231 G    TS5CL   002564 G    T$$CLE= 010014    VFISU   016440 G     X0.ONL= 000100 G
S$LSYM= 010000      TS5INT  002554 G    T$$DAT= 010044    VFYCNT  003346 G     X0.RLL= 010000 G
TCCRA   013454      TS5IN0  010074 G    T$$DU = 010015    VFYDAT  016126 G     X0.RLS= 040000 G
TCC0    013474 G    TS5IN1  010102 G    T$$HAR= 010040    VFYFLG  003516 G     X0.TMK= 100000 G
TCC1    013512 G    TS5IN2  010110 G    T$$HW = 010000    VFY.C = 000100 G     X0.WLK= 000004 G
TCC2    013530 G    TS5IN3  010116 G    T$$INI= 010012    WAITF   007204 G     X2.BFE= 000100 G
TCC3    013640 G    TS5SW   002574 G    T$$MSG= 010003    WLKCHK  007416 G     X2.EFE= 000200 G
TCC4    013656 G    TS5UNT  030076      T$$PC = 000001    WLKZRO  011774       X2.EXT= ****** GX
TCC5    014272 G    TS5VCT  030067      T$$PRO= 010011    WRBC    002626 G     X2.OPM= 100000 G
TCC6    014370 G    T$ARGC= 000003      T$$PTA= 010043    WRECL = 000020 G     X3.DCK= 000010 G
TCC7    014532 G    T$CODE= 001004      T$$RPT= 010010    WRR   = 105005 G     X3.RNY= 157400 G
TC2RTN  013636      T$ERRN= 000002      T$$SOF= 010041    WRREC   002766 G     X4.HSS= 100000 G
TIME1   003436 G    T$EXCP= 000000      T$$SRV= 010007    WRT   = 104005 G     X4.RCE= 040000 G
TIME2   003440 G    T$FLAG= 000041      T$$SUB= 010033    WRTCHK  007270 G     ZROPAT  011744
TOERM   004453 G    T$FREE= 032016      T$$SW = 010001    WRTCHR  007476 G     $LSTIN= 000001
TOOMM   004727 G    T$GMAN= 000000      T$$TES= 010037    WRTY    014676 G     $LSTTA= 000001

. ABS.  032016    000   (RW,I,GBL,ABS,OVR)
        000000    001   (RW,I,LCL,REL,CON)
Errors detected:  0

*** Assembler statistics


Work  file  reads: 303
Work  file writes: 295
Size of work file: 28938 Words  ( 114 Pages)
Size of core pool: 19684 Words  ( 75 Pages)
Operating  system: RSX 11M/PLUS (Under VAX/VMS)

Elapsed time: 00:04:16.49
CVTSED,CVTSED/-SP=SVC/ML,CVTSED
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