TSV05 TSV05 DATA REL
CVTSEBO

AH-T179B-MC
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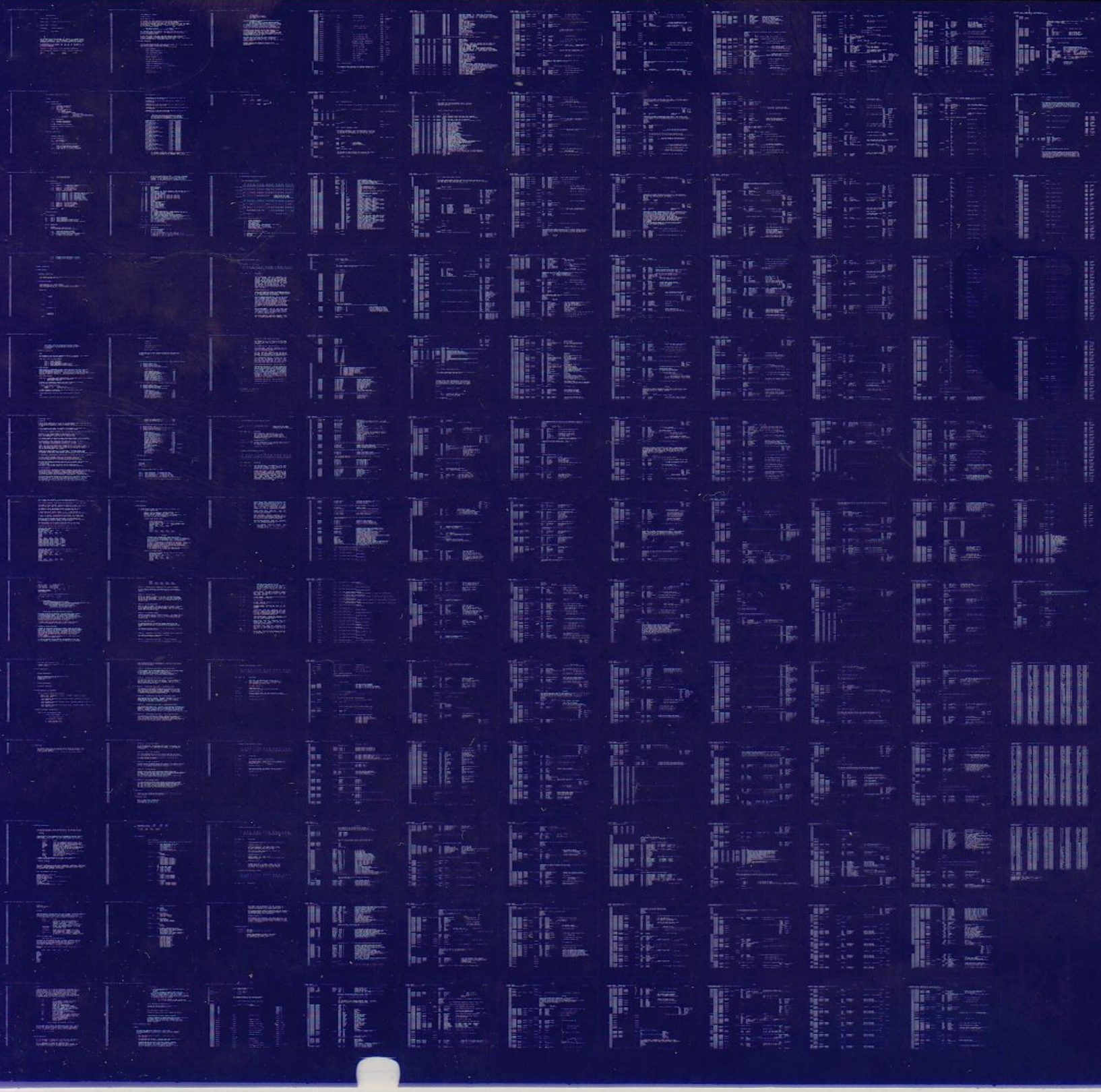
digital
Made In USA



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                                IDENTIFICATION
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                        PRODUCT CODE:   AC-T178B-MC

                        PRODUCT NAME:   CVTSEBO TSV05 DATA RELIABILITY

                        PRODUCT DATE:   25-APR-82

                        MAINTAINER:     CSS/PPG DIAGNOSTICS

                        AUTHOR:         DICK GORDON
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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

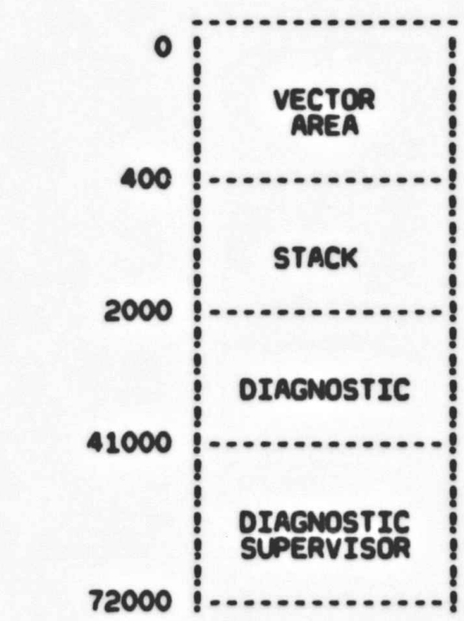
1.1.1 FUNCTIONAL DESCRIPTION

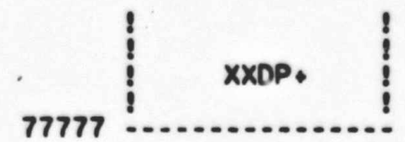
THIS PROGRAM CAN BE USED AS A BASIC FUNCTION TEST, A DATA RELIABILITY TEST, OR A COMPATABILITY TEST.

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 #:
                                        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
```

THAT FIXED DELAY ELEMENT "L$DLY".

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

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

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

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR

1.3 RELATED DOCUMENTS AND STANDARDS

DIGITAL EQUIPMENT CORPORATION DOCUMENTS:

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

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

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

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

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ORDER OF HOST CPU DIAGNOSTIC USAGE:

1) CONTROL LOGIC PROGRAM - ALL TESTS.

   (VTSA,VTSB,VTSC,VTSD)

2) DATA RELIABILITY PROGRAM:

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

504
505
506 1.5 ASSUMPTIONS
507 ----------
508
509 THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK
510 PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC..
511 DO NOT FUNCTION PROPERLY.
512 VTSA,VTSB,VTSC, AND VTSD HAVE ALL SUCESSFULLY RUN WITHOUT ERRORS.
513
514

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

```
CHMDLB0 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 VTSEA0
VTSEA0BINDRS LOADED
DIAG. RUN-TIME SERVICES REV D. APR 79
```

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573                                     CVTSE-A-0
574                                     TSV05 DATA RELIABILITY
575                                     UNIT IS TSV05
576
577
578                                     SWITCHES
579                                     --------
580
581                                     THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION.
582                                     THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS.  ALL OF THE LEGAL
583                                     SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH.
584                                     IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".
585
586                                             SWITCH          EFFECT
587                                             ------          ----------------------------------
588                                             /TESTS:LIST     EXECUTE ONLY THOSE TESTS SPECIFIED IN
589                                                             THE LIST.  LIST IS A STRING OF TEST
590                                                             NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10.
591                                                             THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO
592                                                             BE RUN.  ALL OTHER TESTS WILL NOT BE RUN.
593                                             /PASS:DDDDD     EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
594                                             /FLAGS:FLGS     SET SPECIFIED FLAGS.
595
596                                             /EOP:DDDDD      REPORT END OF PASS MESSAGE AFTER EVERY
597                                                             DDDDD PASSES ONLY.  (DDDDD = 1 TO 64000)
598                                             /UNITS:LIST     TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED
599                                                             IN THE LIST.  LIST EXAMPLE - /UNITS:0:5:10-12
600                                                             USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)
601
602                                     EXAMPLE OF SWITCH USAGE:
603
604                                             START/TESTS:1-5/PASS:1000/EOP:100
605
606                                     THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE
607                                     EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF
608                                     PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY.  A
609                                     SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS.  YOU MAY,
610                                     FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".
611
612                                     BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH
613                                     COMMAND.
614
615                                             TESTS   PASS    FLAGS   EOP     UNITS
616                                             ------------------------------------
617                                     START     X       X       X       X       X
618                                     RESTART   X       X       X       X       X
619                                     CONTINUE          X       X       X
620                                     PROCEED                   X
621                                     DROP                                      X
622                                     ADD                                       X
623                                     PRINT
624                                     DISPLAY                                   X
625                                     FLAGS
626                                     ZFLAGS
627                                     EXIT
628
629
```

```
630                                     FLAGS
631                                     -----
632
633                                     FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS
634                                     LOOPING ON ERROR.  ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN
635                                     CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH.  FLAGS
636                                     ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE
637                                     FLAG SWITCH.  THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR
638                                     ALL FLAGS.  WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS,
639                                     NO COMMANDS AFFECT THE STATE OF THE FLAGS;  THEY REMAIN SET OR
640                                     CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.
641
642                                             FLAG            EFFECT
643                                             ----            ----------
644                                             HOE             HALT ON ERROR - CONTROL IS RETURNED TO
645                                                             RUNTIME SERVICES COMMAND MODE
646                                             LOE             LOOP ON ERROR
647                                             IER*            INHIBIT ALL ERROR REPORTS
648                                             IBR*            INHIBIT ALL ERROR REPORTS EXCEPT
649                                                             FIRST LEVEL  (FIRST LEVEL CONTAINS
650                                                             ERROR TYPE, NUMBER, PC, TEST AND UNIT)
651                                             IXE*            INHIBIT EXTENDED ERROR REPORTS (THOSE
652                                                             CALLED BY PRINTX MACRO'S)
653                                             PRI             DIRECT MESSAGES TO LINE PRINTER
654                                             PNT             PRINT TEST NUMBER AS TEST EXECUTES
655                                             BOE             "BELL" ON ERROR
656                                             UAM             UNATTENDED MODE (NO MANUAL INTERVENTION)
657                                             ISR             INHIBIT STATISTICAL REPORTS (DOES NOT
658                                                             APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT
659                                                             STATISTICAL REPORTING)
660                                             IDR             INHIBIT PROGRAM DROPPING OF UNITS
661                                             ADR             EXECUTE AUTODROP CODE
662                                             LOT             LOOP ON TEST
663
664                                                     *ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1
665
666
667                                     SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS.  YOU MAY
668                                     SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH.  FOR EXAMPLE,
669                                     TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS
670                                     AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:
671
672                                             /FLAGS:LOE:IER:BOE
673
674
675
676
677                             2.1 HARDWARE PARAMETERS
678                                 ------------------
679
680                                     ON A "N" RESPONSE TO "CHANGE HW?", THE DIAG SHALL RUN ASSUMING
681                                     ONE UNIT AT TSDB = 172520 WITH A VECTOR = 224 AND DRIVE=0.
682
683                                     ON A "Y" RESPONSE TO "CHANGE HW?" QUESTION,THEN
684                                     THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE
685                                     VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT
686                                     VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONCE.
```

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

```
744                                     READ BUFFERING (L) N ?
745
746
747                                     ANSWERING NO TO THE DEFAULT SWITCH QUESTION WILL CAUSE THE
748                                     100 IPS QUESTION TO BE ASKED.
749
750                                     ANSWERING YES TO THE 100 IPS QUESTION WILL INHIBIT THE LAST
751                                     TWO QUESTIONS.
752
753                                     ANSWERING NO TO THE 100 IPS QUESTION WILL CAUSE THE WRITE
754                                     BUFFERING QUESTION TO BE ASKED.
755
756                                     ANSWERING YES TO THE WRITE BUFFERING QUESTION WILL INHIBIT THE
757                                     LAST QUESTION.
758
759                                     ANSWERING NO TO THE WRITE BUFFERING QUESTION WILL CAUSE THE
760                                     READ BUFFERING QUESTION TO BE ASKED.
761
762
763                                     NOTE1:   THIS QUESTION SHOULD BE ANSWERED (N) UNLESS AN
764                                            OPERATOR SELECTED SEQUENCE IS TO BE EXECUTED.
765                                            IF THIS QUESTION WAS ANSWERED Y, THE FOLLOWING
766                                            QUESTIONS MUST BE ANSWERED OR DEFAULTED WITH A <CR> ONLY:
767
768                                     CHARACTERISTICS CODE (O) 40 ?   (0,20,40,200) (OCTAL)
769                                     CMD/2 (D) 13 ?                  (1-27)   (DECIMAL)
770                                     BRF COUNT (D) 1 ?               (1-2K)   (DECIMAL)
771                                     # OF OPERATIONS (D) 1 ?         (1-32K)  (DECIMAL)
772                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
773                                     CMD/3 (D) 4 ?                   (1-27)   (DECIMAL)
774                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
775                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
776                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
777                                     CMD/4 (D) 3 ?                   (1-27)   (DECIMAL)
778                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
779                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
780                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
781                                     CMD/5 (D) 2 ?                   (1-27)   (DECIMAL)
782                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
783                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
784                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
785                                     CMD/6 (D) 13. ?                 (1-27)   (DECIMAL)
786                                     BRF COUNT (D) 1 ?               (1-2K)   (DECIMAL)
787                                     # OF OPERATIONS (D) 1 ?         (1-32K)  (DECIMAL)
788                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
789                                     CMD/7 (D) 27. ?                 (1-27)   (DECIMAL)
790                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
791                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
792                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
793                                     CMD/8 (D) 27. ?                 (1-27)   (DECIMAL)
794                                     BRF COUNT (D) 2048 ?            (1-2K)   (DECIMAL)
795                                     # OF OPERATIONS (D) 32000 ?     (1-32K)  (DECIMAL)
796                                     PATTERN (D) 7 ?                 (0-8)    (DECIMAL)
797
798                                     NOTE:    THE PROGRAM AUTOMATICALLY INSERTS A CHARACTERISTIC CODE OF  40
799                                            AS THE FIRST COMMAND IN THE SEQUENCE TABLE.  IF A
800                                            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.

```
858                                     7       RANDOM DATA PATTERN.
859                                     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>
                RESET RANDOM VARIABLES (L) N ?                  N<CR>
                PRINT RECOVERABLE ERRORS  (L) N ?               N<CR>
                HALT AFTER EACH CMD (L) N ?                     N<CR>
                INHIBIT RECOVERY (L) N ?                        N<CR>
                BAD TAPE SPOT DETECTION (L) Y ?                 N<CR>
                DISABLE INTERRUPTS (L) N ?                      N<CR>
```

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


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

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

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


                    2.4 EXECUTION TIMES
                        ---------------


                        2.4.1  SYSTEM CONFIGURATION
                               --------------------

                               PDP11/23
                               MOS MEMORY
                               LA36
                               TQ[illegible]5/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 - TS05 NOT READY:

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

3.1.3 ERROR #3 - NO RESPONSE ERROR:

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

3.1.4 ERROR #4 - NO INTERRUPT ERROR:

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

3.1.5 SPECIAL CONDITION ERRORS:

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

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

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

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

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

THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE

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

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

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

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

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

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

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

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

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

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

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

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

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

```
1146                        3.1.6   ERROR #13 - RFC NON-ZERO ERROR:
1147
1148                                IF, AFTER EXECUTION, THE RESIDUAL FRAME COUNT IS NON-ZERO, THE
1149                                ERROR IS REPORTED AND A HARD ERROR IS LOGGED.  THE PROGRAM THEN
1150                                PROCEEDS NORMALLY.  THE REPORTING AND LOGGING OF THESE ERRORS
1151                                IS OPTIONAL.
1152
1153
1154                        3.1.7   ERROR #14 - RETRY LIMIT EXCEEDED:
1155
1156                                ON A WRITE COMMAND THIS IS A FATAL DEVICE ERROR AND THE DEVICE
1157                                WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1158
1159                                ON A READ COMMAND THIS ERROR IS LOGGED AS A HARD ERROR AND
1160                                THE PROGRAM PROCEEDS NORMALLY.
1161
1162
1163                        3.1.8   ERROR #15 - TOO MANY INTERRUPTS:
1164
1165                                IF MORE THAN ONE INTERRUPT OCCURS PER COMMAND, THIS ERROR IS REPORTED.
1166                                THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
1167                                THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1168
1169
1170                        3.1.9   ERROR #16 - CAPSTAN RUNAWAY:
1171
1172                                CAPSTAN DID NOT STOP WITHIN ACCEPTABLE WINDOW AFTER LAST
1173                                COMMAND.  THE PROGRAM WILL ISSUE A GET STATUS COMMAND BEFORE REPORTING
1174                                THE ERROR SO THAT THE DEAD TRACK FIELD IN EXTENDED STATUS REGISTER 2
1175                                WILL CONTAIN THE TACH COUNT WHEN THE TAPE STOPPED.
1176                                THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
1177                                THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
1178
1179
1180                      3.1.10  ERROR #17 - DATA COMPARE ERROR:
1181
1182                                IF A DATA VALIDATION ERROR OCCURS DURING A WRITE/VERIFY COMMAND.
1183                                THE PROGRAM PRINTS WHAT THE DATA SHOULD HAVE BEEN AND WHAT THE
1184                                DATA WAS, AND PRINTS THE BYTE AND RECORD NUMBER THE ERROR OCCURRED
1185                                ON.  ONLY THE FIRST 10 BYTES IN ERROR PER RECORD ARE PRINTED.
1186                                THE TOTAL # OF BYTES IN ERROR PER RECORD IS ALSO PRINTED.  A
1187                                HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.
1188
1189
1190                      3.2 ERROR HALTS
1191                          -----------
1192
1193                              ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION
1194                              WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.
1195
1196                      4.0 PERFORMANCE REPORT
1197                          ------------------
1198
1199                              UNIT X   PASS:XXXXX  RECORD:XXXXX
1200                              BYTES WRITTEN  XXX,XXX,XXX,XXX
1201                              BYTES READ REV XXX,XXX,XXX,XXX
1202                              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.
```

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

5.2 TEST 2 - DATA RELIABILITY.

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

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

5.3 TEST 3 - WRITE COMPATABILITY/WRITE UTILITY.

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

5.4 TEST 4 - READ COMPATABILITY/READ UTILITY.

REWINDS AND READS ENTIRE TAPE, FORWARD AND REVERSE.

5.5 TEST 5 - RANDOM/OPERATOR SELECTED COMMAND SEQUENCE.

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

6.0 DEVICE INFORMATION TABLES

6.1 GENERAL

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

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

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

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

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 TS05 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):

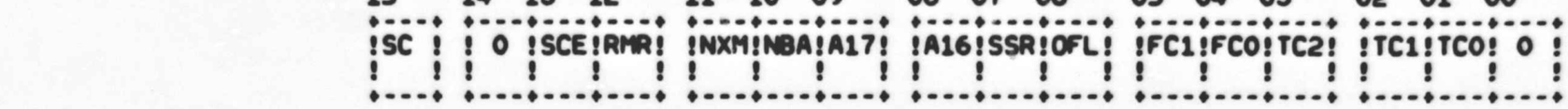
0 = NORMAL TERMINATION
1 = ATTENTION CONDITION
2 = TAPE STATUS ALERT
3 = FUNCTION REJECT
4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD DOWN TAPE FROM START OF FUNCTION
5 = RECOVERABLE ERROR - TAPE NOT MOVED
6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
7 = FATAL CONTROLLER ERROR

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



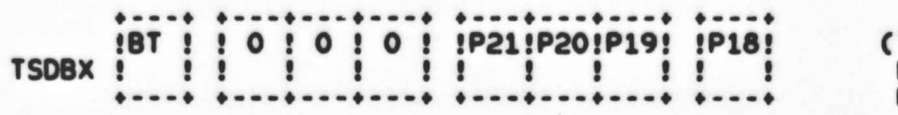
BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE 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

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

Q-BUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

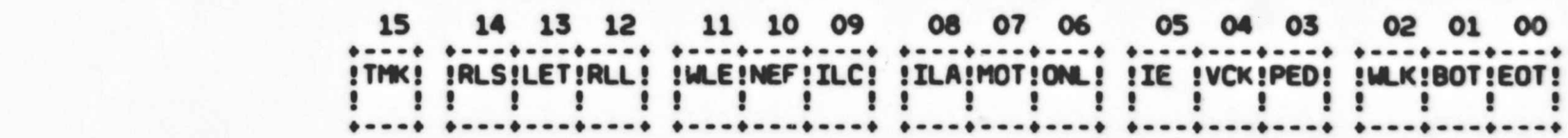
6.3.2.1 TSV05 EXTENDED DATA BUFFER REGISTER (TSDBX)



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

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

6.3.3 EXTENDED STATUS REGISTER 0 (XSTATO)

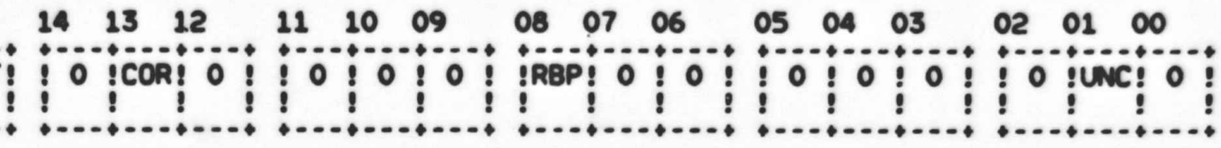


BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN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

1626				
1627	13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE
1628				MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE
1629				MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT
1630				AND THE FIRST RECORD ENCOUNTERED IS A TAPE
1631				MARK. THE SETTING OF THIS BIT WILL NOT OCCUR
1632				UNLESS THIS MODE OF TERMINATION IS ENABLED
1633				THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
1634				
1635	12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT
1636				INDICATES THAT THE RECORD READ WAS LONGER THAN
1637				THE BYTE COUNT SPECIFIED.
1638				
1639	11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A
1640				WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE
1641				DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT
1642				LOCK SWITCH ACTIVATED DURING THE OPERATION.
1643				
1644	10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES
1645				THAT THE COMMAND COULD NOT BE EXECUTED DUE TO
1646				ONE OF THE FOLLOWING CONDITIONS:
1647				
1648				- THE COMMAND SPECIFIED REVERSE TAPE
1649				DIRECTION BUT THE TAPE WAS ALREADY
1650				POSITIONED AT BOT.
1651				- THE ISSUING OF ANY MOTION COMMAND EXCEPT

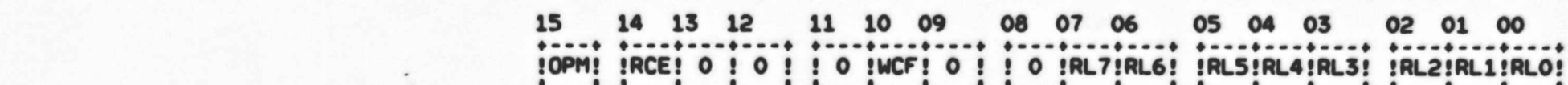
```
1653
1654
1655                                        WHEN THE VOLUME CHECK BIT IS SET.
1656                                    -   ANY COMMAND, EXCEPT GET STATUS OR DRIVE
1657                                        INITIALIZE, WHEN THE TS05 IS OFF-LINE.
1658                                    -   ANY WRITE COMMAND WHEN THE TAPE DOES NOT
1659                                        CONTAIN A WRITE ENABLE RING (WRITE LOCK
1660                                        STATUS - WLS).
1661
1662                        09   ILC   3     ILLEGAL COMMAND.  SET WHEN A COMMAND IS ISSUED
1663                                        AND EITHER ITS COMMAND FIELD OR ITS COMMAND
1664                                        MODE FIELD CONTAINS CODES WHICH ARE NOT
1665                                        SUPPORTED BY THE TS05.
1666
1667                        08   ILA   3     ILLEGAL ADDRESS.  (MORE THAN 18 BITS OR ODD WHEN
1668                                        AN EVEN ADDRESS IS REQUIRED.)
1669
1670                        07   MOT   S     TAPE IS MOVING.
1671
1672                        06   ONL   S     ON LINE.  WHEN SET, INDICATES THAT THE TS05 IS
1673                                        ON-LINE AND OPERABLE.
1674
1675                        05   IE    S     INTERRUPT ENABLE.  REFLECTS THE STATE OF THE
1676                                        INTERRUPT ENABLE BIT SUPPLIED ON THE LAST
1677                                        COMMAND.
1678
1679                        04   VCK   S     VOLUME CHECK.  WHEN SET, INDICATES THAT THE
1680                                        DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED
1681                                        OFF-LINE.  CLEARED BY THE CLEAR VOLUME CHECK
1682                                        (CVC) BIT IN THE COMMAND HEADER WORD.  THIS BIT
1683                                        CAN CAUSE A TERMINATION CLASS OF 3.
1684
1685                        03   PED   S     PHASE ENCODED DRIVE.  ALWAYS SET, INDICATES THAT
1686                                        THE TS05 IS CAPABLE OF READING AND WRITING ONLY
1687                                        1600 BPI PHASE ENCODED DATA.
1688
1689                        02   WLK   S,3   WRITE LOCKED.  WHEN SET, INDICATES THAT THE
1690                                        MOUNTED REEL OF TAPE DOES NOT HAVE A
1691                                        WRITE-ENABLE RING INSTALLED.  THE TAPE IS,
1692                                        THEREFORE, WRITE PROTECTED.
1693
1694                        01   BOT   S,3   BEGINNING OF TAPE.  WHEN SET, INDICATES THAT
1695                                        THE TAPE IS POSITIONED AT THE LOAD POINT AS
1696                                        DENOTED BY THE BOT REFLECTIVE STRIP ON THE
1697                                        TAPE.
1698
1699                        00   EOT   S,2   END OF TAPE.  THIS BIT IS SET WHENEVER THE TAPE
1700                                        IS POSITIONED AT OR BEYOND THE END OF TAPE
1701                                        REFLECTIVE STRIP.
```

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



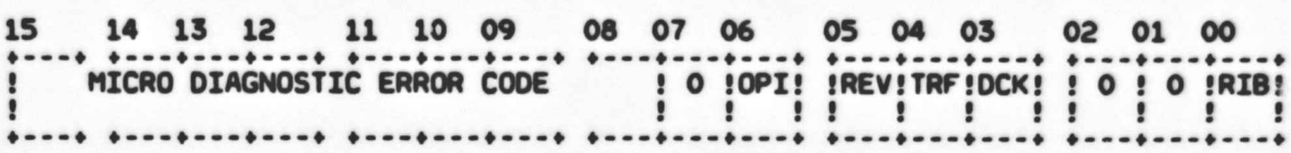
BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE FIFO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE Q-BUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TSO5.
14	-	-	NOT USED. (ALWAYS A 0)
13	COR	S	CORRECTABLE DATA. CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12-09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

6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)



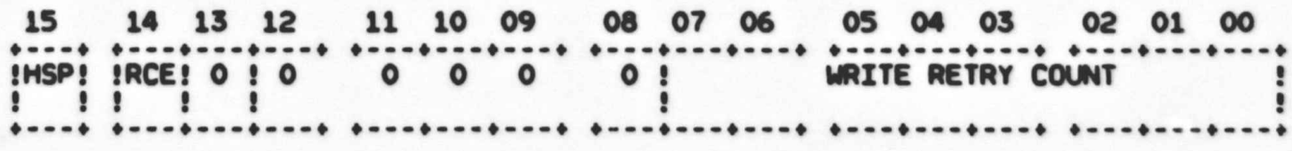
BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	RCE	7,F2	RAM CHECKSUM ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13-11			RESERVED (ALWAYS A 0)
10	WCF	7	WRITE CLOCK FAILURE. SET DURING A WRITE TO INDICATE THAT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

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



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

6.3.7 EXTENDED STATUS REGISTER 4 (XSTAT4)



BIT	NAME	TCC	DEFINITION

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

7.0 DIAGNOSTIC HISTORY

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

REVISION B - APR 1983

- UPDATED THE DIAGNOSTIC TO SUPPLY THE CORRECT RECORD NUMBER DURING EXECUTION OF TEST #2. REF: CHMIELECKI TO MITCHELL "TSV05 DATA RELIABILITY PROBLEM"; 21-JAN-83.

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

000000                                  .ENABL  ABS,AMA
        002000                  .       =       2000
002000                                  BGNMOD

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

002000                                  POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU

002000                                  HEADER  CVTSE,B,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      102                                                         .ASCII  /B/
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  027754                                                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  030062                                                          .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
```

```
PROGRAM HEADER

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$EF::                  ;DIAG. EVENT FLAG
002052  000000                                                          .WORD   0
002054  000000                                                          .WORD   0
002056                  L$SPC::
002056  000000                                                          .WORD   0
002060                  L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  002164                                                          .WORD   L$DVTYP
002062                  L$REPP::                ;PTR. TO REPORT CODE
002062  017570                                                          .WORD   L$RPT
002064                  L$EXP4::
002064  000000                                                          .WORD   0
002066                  L$EXP5::
002066  000000                                                          .WORD   0
002070                  L$AUT::                 ;PTR. TO ADD UNIT CODE
002070  024052                                                          .WORD   L$AU
002072                  L$DUT::                 ;PTR. TO DROP UNIT CODE
002072  024000                                                          .WORD   L$DU
002074                  L$LUN::                 ;LUN FOR EXERCISERS TO FILL
002074  000000                                                          .WORD   0
002076                  L$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  002136                                                          .WORD   L$DESC
002100                  L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
002100  104035                                                          EMT     E$LOAD
002102                  L$ETP::                 ;POINTER TO ERRTBL
002102  000000                                                          .WORD   0
002104                  L$ICP::                 ;PTR. TO INIT CODE
002104  021324                                                          .WORD   L$INIT
002106                  L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  023736                                                          .WORD   L$CLEAN
002110                  L$ACP::                 ;PTR. TO AUTO CODE
002110  023314                                                          .WORD   L$AUTO
002112                  L$PRT::                 ;PTR. TO PROTECT TABLE
002112  021316                                                          .WORD   L$PROT
002114                  L$TEST::                ;TEST NUMBER
002114  000000                                                          .WORD   0
002116                  L$DLY::                 ;DELAY COUNT
002116  000000                                                          .WORD   0
002120                  L$HIME::                ;PTR. TO HIGH MEM
002120  000000                                                          .WORD   0
 66
 72                     .SBTTL  DISPATCH TABLE
 73
 74                     ;++
 75                     ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
 76                     ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
 77                     ;--
 78
 79 002122                      DISPATCH 5
002122  000005                                                          .WORD   5
002124                  L$DISPATCH::
002124  024156                                                          .WORD   T1
```

```
DISPATCH TABLE

        002126  025644                                                          .WORD   T2
        002130  026500                                                          .WORD   T3
        002132  026674                                                          .WORD   T4
        002134  027054                                                          .WORD   T5
     80
     87
     88                                 .SBTTL  DESCRIPTIVE TEXT
     89
     90                                 ;++
     91                                 ;2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVICE UNDER TES
T
     92                                 ;--
     93
     94 002136                                  DESCRIPT        <DATA RELIABILITY TEST>
        002136                          L$DESC::
        002136  104     101     124                                             .ASCIZ  /DATA RELIABILITY TE
ST/
        002141  101     040     122
        002144  105     114     111
        002147  101     102     111
        002152  114     111     124
        002155  131     040     124
        002160  105     123     124
        002163  000
                                                                                .EVEN
     95 002164                                  DEVTYP          <TSV05>
        002164                          L$DVTYP::
        002164  124     123     126                                             .ASCIZ  /TSV05/
        002167  060     065     000
                                                                                .EVEN
     96                                 .SBTTL  DEFAULT HARDWARE P-TABLE
     97
     98                                 ;++
     99                                 ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
    100                                 ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
    101                                 ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
    102                                 ;--
    103
    104 002172                                  BGNHW   DFPTBL
        002172  000003                                                          .WORD   L10000-L$HW/2
        002174                          L$HW::
        002174                          DFPTBL::
    105
    10
    107 002174  172520                  .WORD   172520          ;TSD8 ADDRESS.
    108 002176  000224                  .WORD   224             ;VECTOR ADDRESS.
    109 002200  000000                  .WORD   0               ;DRIVE #0 FOR DEFAULT
    110
    111 002202                                  ENDHW
        002202                          L10000:
    112                                 .SBTTL  SOFTWARE P-TABLE
    113
    114                                 ;++
    115                                 ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
    116                                 ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
    117                                 ;--
    118
    119 002202                                  BGNSW   SFPTBL
        002202  000051                                                          .WORD   L10001-L$SW/2
```

```
                002204                  L$SW::
                002204                  SFPTBL::
    120
    127 002204      001                 CLRFLG:: .BYTE   1          ;CLEAR COUNTERS FLAG.
    128 002205      000                 RRANV::  .BYTE   0          ;RESET RANDOM VARIABLES EACH PASS FLAG.
    129 002206      000                 HAE::    .BYTE   0          ;HALT AFTER EACH COMMAND FLAG.
    130 002207      000                 ERCVER:: .BYTE   0          ;ENABLE RECOVERABLE ERROR PRINTS FLAG.
    131 002210      001                 BADTSW:: .BYTE   1          ;BAD TAPE SWITCH TO REWRITE ON SAME SPOT & DETECT BAD TAPE
    132 002211      000                          .BYTE   0          ;SPARE
    133 002212      000                 DINT::   .BYTE   0          ;DISABLE INTERRUPTS FLAG.
    134 002213      000                 IREC::   .BYTE   0          ;INHIBIT ERROR RECOVERY FLAG.
    135 002214      000                 CHGFLG:: .BYTE   0          ;CHANGE CMD SEQ TABLE FLAG.
    136 002215      000                          .BYTE   0          ;SPARE.
    137 002216      000                 PIRE::   .BYTE   0          ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
    138 002217      000                          .BYTE   0          ;SPARE.
    139 002220  000040                  CHAR::   CH.EAI             ;CHARACTERISTICS CODE (DEFAULT = 40).
    140 002222  000015                  CMDD::   .WORD   13.        ;COMMAND 2 (DEFAULT = REWIND).
    141 002224  000001                           .WORD   1          ;BYTE COUNT
    142 002226  000001                           .WORD   1          ;NUMBER OF OPERATIONS
    143 002230  000007                           .WORD   RANP       ;PATTERN
    144 002232  000004                           .WORD   4          ;COMMAND 3  (DEFAULT = WRITE)
    145 002234  004000                           .WORD   DATCNT     ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
    146 002236  076400                           .WORD   32000.     ;NUMBER OF OPERATIONS (DEFAULT = 32000).
    147 002240  000007                           .WORD   RANP       ;PATTERN (DEFAULT = RANDOM).
    148 002242  000003                           .WORD   3          ;COMMAND 4 (DEFAULT = READ REV).
    149 002244  004000                           .WORD   DATCNT     ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
    150 002246  076400                           .WORD   32000.     ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
    151 002250  000007                           .WORD   RANP       ;PATTERN (DEFAULT = RANDOM).
    152 002252  000002                           .WORD   2          ;COMMAND 5 (DEFAULT = READ FWD).
    153 002254  004000                           .WORD   DATCNT     ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
    154 002256  076400                           .WORD   32000.     ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
    155 002260  000007                           .WORD   RANP       ;PATTERN (DEFAULT = RANDOM).
    156 002262  000015                           .WORD   13.        ;COMMAND 6 (DEFAULT = REWIND).
    157 002264  000001                           .WORD   1          ;BYTE COUNT
    158 002266  000001                           .WORD   1          ;NUMBER OF OPERATIONS
    159 002270  000007                           .WORD   RANP       ;PATTERN
    160 002272  000033                           .WORD   27.        ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
    161 002274  004000                           .WORD   DATCNT     ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
    162 002276  076400                           .WORD   32000.     ;NUMBER OF OPERATIONS (DEFAULT = 32000).
    163 002300  000007                           .WORD   RANP       ;PATTERN (DEFAULT = RANDOM).
    164 002302  000033                           .WORD   27.        ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
    165 002304  004000                           .WORD   DATCNT     ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
    166 002306  076400                           .WORD   32000.     ;NUMBER OF OPERATIONS (DEFAULT = 32000).
    167 002310  000007                           .WORD   RANP       ;PATTERN (DEFAULT = RANDOM).
    168 002312  000001              TS1MD::     .WORD   1          ;DEFAULT SWITCH SETTING
    169 002314  000000              RDBUF::     .WORD   0          ;ENABLE READ BUFFERING
    170 002316  000000              WTBUF::     .WORD   0          ;ENABLE WRITE BUFFERING
    171 002320  000000              HSSW::      .WORD   0          ;RUN AT 100IPS SWITCH
    172 002322  000000              EXTFEA::    .WORD   0          ;EXTENDED FEATURES SOFTWARE SW 0=OFF;1=ON
    173 002324  000000              BENBSW::    .WORD   0          ;BUFFER ENABLE SOFTWARE SW 0=OFF;1=ON
    174
    175 002326                              ENDSW
                002326              L10001:
    176
    177 002326                              ENDMOD
```

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

002326                                  BGNMOD

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

002326                                  EQUALS
                                ;
                                ; BIT DIFINITIONS
                                ;
100000                          BIT15== 100000
040000                          BIT14== 40000
020000                          BIT13== 20000
010000                          BIT12== 10000
004000                          BIT11== 4000
002000                          BIT10== 2000
001000                          BIT09== 1000
000400                          BIT08== 400
000200                          BIT07== 200
000100                          BIT06== 100
000040                          BIT05== 40
000020                          BIT04== 20
000010                          BIT03== 10
000004                          BIT02== 4
000002                          BIT01== 2
000001                          BIT00== 1
                                ;
001000                          BIT9==  BIT09
000400                          BIT8==  BIT08
000200                          BIT7==  BIT07
000100                          BIT6==  BIT06
000040                          BIT5==  BIT05
000020                          BIT4==  BIT04
000010                          BIT3==  BIT03
000004                          BIT2==  BIT02
000002                          BIT1==  BIT01
000001                          BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;
000040                          EF.START==      32.                     ; START COMMAND WAS ISSUED
000037                          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
000036                          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
000035                          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
000034                          EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
                                ;
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
000340                          PRI07== 340
000300                          PRI06== 300
```

```
                000240                  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
  210
  218
  219                                   ; REGISTER USAGE.
  220                                   ;
  221                                   ;       R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
  222                                   ;       R1 - COMMAND SEQUENCE TABLE POINTER.
  223                                   ;       R2 - GENERAL PURPOSE REGISTER.
  224                                   ;       R3 - GENERAL PURPOSE REGISTER.
  225                                   ;       R4 - GENERAL PURPOSE REGISTER.
  226                                   ;       R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
  227                                   ;       R6 - STACK POINTER.
  228                                   ;       R7 - PROGRAM COUNTER.
  229
  230                                   ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
  231
  232           100000                  TS.SC==100000                   ;SPECIAL CONDITION BIT.
  233           040000                  TS.UPE==40000                   ;UNIBUS PARITY ERROR
  234           020000                  TS.SPE==20000                   ;SERIAL BUS PARITY ERROR.
  235           010000                  TS.RMR==10000                   ;REGISTER MODIFICATION REFUSED.
  236           004000                  TS.NXM==4000                    ;NON-EXISTENT MEMORY.
  237           002000                  TS.NBA==2000                    ;NEED BUFFER ADDRESS.
  238           001000                  TS.A17==1000                    ;BUS ADDRESS BIT 17.
  239           000400                  TS.A16==400                     ;BUS ADDRESS BIT 16.
  240           000200                  TS.SSR==200                     ;UNIT READY BIT.
  241           000100                  TS.OFL==100                     ;OFF LINE.
  242           177717                  TSC.FCC==177717                 ;FATAL CLASS CODE MASK.
  243           177761                  TSC.TCC==177761                 ;TERMINATION CLASS CODE MASK.
  244
  245                                   ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
  246
  247           100000                  ACK.C==100000                   ;ACKNOWLEDGE BIT
  248           040000                  CVC.C==40000                    ;CLEAR VOLUME CHECK.
  249           020000                  OPP.C==20000                    ;OPPOSITE BIT
  250           010000                  SWB.C==10000                    ;SWAP BYTE BIT
```

```
GLOBAL EQUATES SECTION

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

                        ;BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.

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

                        ;BIT DEFINITIONS FOR EXTENDED CONTROL WORD

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

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

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

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

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

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

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

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

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

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

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


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

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

                        ;MISCELLANEOUS DEFINITIONS.

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

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

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

                        RDF==   ACK.C!BRF.C!CMD.CO
                                                ;READ FORWARD

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

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

```
GLOBAL AREAS    MACRO M1113  30-NOV-83 10:17                                    SEQ 047
GLOBAL EQUATES SECTION

     365          104105                    WTV==   ACK.C!BRF.C!VFY.C!CMD.C0!CMD.C2
     366                                                                  ;WRITE VERIFY
     367
     368          104010                    SRF==   ACK.C!BRF.C!CMD.C3
     369                                                                  ;SPACE RECORD FORWARD
     370
     371          104410                    SRR==   ACK.C!BRF.C!MOD.C0!CMD.C3
     372                                                                  ;SPACE RECORD REVERSE
     373
     374          105401                    RNR==   ACK.C!BRF.C!MOD.C1!MOD.C0!CMD.C0
     375                                        ;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVERSE
     376
     377          125401                    RNF==   ACK.C!BRF.C!OPP.C!MOD.C1!MOD.C0!CMD.C0
     378                                        ;READ REV RETRY2 - REREAD NEXT FORWARD, IE.READ FORWARD, SPACE REVERSE
     379
     380          105001                    RPF==   ACK.C!BRF.C!MOD.C1!CMD.C0
     381                                        ;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, READ FORWARD
     382
     383          125001                    RPR==   ACK.C!BRF.C!OPP.C!MOD.C1!CMD.C0
     384                                        ;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SPACE FORWARD
     385
     386          105005                    WRR==   ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.C0
     387                                                                  ;WRITE RETRY
     388
     389          102010                    RWD==   ACK.C!MOD.C2!CMD.C3
     390                                                                  ;REWIND COMMAND
     391
     392          100012                    MBR==   ACK.C!CMD.C3!CMD.C1
     393                                                                  ;MESSAGE BUFFER RELEASE
     394
     395          100011                    WTM==   ACK.C!CMD.C3!CMD.C0
     396                                                                  ;WRITE TAPE MARK.
     397
     398          101011                    WTR==   ACK.C!MOD.C1!CMD.C3!CMD.C0
     399                                                                  ;WRITE TAPE MARK RETRY.
     400
     401          105010                    SFF==   ACK.C!BRF.C!MOD.C1!CMD.C3
     402                                                                  ;SPACE FILE FORWARD
     403
     404          105410                    SFR==   ACK.C!BRF.C!MOD.C0!MOD.C1!CMD.C3
     405                                                                  ;SPACE FILE REVERSE
     406
     407          100017                    GES==   ACK.C!CMD.C0!CMD.C1!CMD.C2!CMD.C3
     408                                                                  ;GET EXTENDED STATUS
     409
     410          100411                    ERS==   ACK.C!MOD.C0!CMD.C3!CMD.C0
     411                                                                  ;ERASE 3 INCHES OF TAPE
     412
     413          100412                    UNL==   ACK.C!MOD.C0!CMD.C3!CMD.C1
     414                                                                  ;UNLOAD COMMAND
     415
     416          101012                    CLN==   ACK.C!MOD.C1!CMD.C3!CMD.C1
     417                                                                  ;ERASE TAPE.
     418
     419          140004                    SCH==   ACK.C!CVC.C!CMD.C2        ;SET DEVICE CHARACTERISTICS.
     420
     421          140006                    WSM==   ACK.C!CVC.C!CMD.C2!CMD.C1       ;WRITE SUB-SYS MEM
```

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

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

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

                177777          END==   177777                  ;END OF COMMAND SEQUENCES

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


                                ;       COMMAND PACKET.

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


                                ;       GET STATUS COMMAND PACKET.

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


                                ;       MESSAGE BUFFER RELEASE COMMAND PACKET.

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

002344  100012                  BRCPK:: .WORD   MBR


                                ;       REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)

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

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


                                ;       WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.

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

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

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

                        ;       SET CHARACTERISTIC BLOCK.

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


                        ;       WRITE SUB-SYSTEM MEMORY CHARACTERISTIC BLOCK.

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

                        ;       TS05 REGISTER ADDRESSES.

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


                        ;       ADDRESSES OF MESSAGE PACKETS.

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

                        ;       ADDRESSES OF INTERRUPT HANDLING ROUTINES.

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

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

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

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

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

```
                                        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
                                ;       COUNTER AREA.

        002626                  CNTBGN=.
002626                          WRBC::  .BLKW   20              ;BYTES WRITTEN.
002666                          RRBC::  .BLKW   20              ;BYTES READ REV.
002726                          RFBC::  .BLKW   20              ;BYTES READ FWD.
002766                          WRREC:: .BLKW   4               ;RECOVERABLE WRITE ERRORS.
002776                          WRUNR:: .BLKW   4               ;UNRECOVERABLE WRITE ERRORS.
003006                          RRREC:: .BLKW   4               ;RECOVERABLE READ REV ERRORS.
003016                          RRUNR:: .BLKW   4               ;UNRECOVERABLE READ REV ERRORS.
003026                          RFREC:: .BLKW   4               ;RECOVERABLE READ FWDERRORS.
003036                          RFUNR:: .BLKW   4               ;UNRECOVERABLE READ FWD ERRORS.
003046                          BT0::   .BLKW   21.             ;UNIT 0 BAT TAPE SPOTS LOG
003120                          BT1::   .BLKW   21.             ;UNIT 1 BAT TAPE SPOTS LOG
003172                          BT2::   .BLKW   21.             ;UNIT 2 BAT TAPE SPOTS LOG
003244                          BT3::   .BLKW   21.             ;UNIT 3 BAT TAPE SPOTS LOG
003316                          WRTYCT:: .BLKW  4               ;WRITE RETRY COUNTER
003326                          PASCNT:: .BLKW  4               ;PASS COUNT.
003336                          SCCNT:: .BLKW   4               ;SPECIAL CONDITION COUNT.
003346                          VFYCNT:: .BLKW  4               ;COUNT OF TS05 DATA COMPARE ERRORS.
003356                          HRDCNT:: .BLKW  4               ;COUNT OF HARD ERRORS.
003366                          FTLCNT:: .BLKW  4               ;COUNT OF FATAL ERRORS.
        003376                  CNTEND=.                        ;END OF STATICTICAL COUNTERS.
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                  DATAWT:: .WORD  0               ;WRITE BUFFER ADDRESS.
        003406                  DIABLK==DATAWT                  ;WRITE BUFFER ALSO USED FOR DIAG CMD.
003410  000000                  DATARD:: .WORD  0               ;READ BUFFER ADDRESS.
003412  000000                  NCNT::  .WORD   0               ;STORAGE FOR VALUE OF N.
003414  000000                  NCNT1:: .WORD   0               ;TEMP STORAGE FOR VALUE OF N.
003416  000000                  BRFCNT:: .WORD  0               ;STORAGE FOR BPCR VALUE.
```

GLOBAL DATA SECTION

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

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

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

                                ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.

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

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

GLOBAL DATA SECTION

```
                        PWRFLG:: .BYTE  0               ;POWER FAILURE FLAG - SET ONLY DURING INIT.
                        TRAPD4:: .BYTE  0               ;TRAPED AT 4 FLAG
                        MISCFG:: .BYTE  0               ;MISCELLANEOUS FLAG
                        TSUNT:: .WORD   0               ;NUMBER OF THE UNIT UNDER TEST PLUS HSSP&BUF
                        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

                        OPFLAG:: .WORD  0       ;READ ONLY OPERATOR FLAG WORD
                                .EVEN

                                ;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.

                        CMDSEQ:: .WORD  SCH             ;SET CHARACTERISTICS.
                                .WORD   CH.EAI
                                .WORD   1
                                .WORD   0
                        CMDSE2:: .WORD  RWD             ;REWIND.
                                .WORD   1               ;BYTE COUNT.
                                .WORD   1               ;ONCE.
                                .WORD   RANP            ;PATTERN.
                                .WORD   WRT             ;WRITE.
                                .WORD   DATCNT          ;MAX BUFFER LENGTH.
                                .WORD   32000.          ;32,000 RECORDS.
                                .WORD   RANP            ;RANDOM PATTERN.
                                .WORD   RDR             ;READ REV.
                                .WORD   DATCNT          ;MAX BUFFER LENGTH.
                                .WORD   32000.          ;32,000 RECORDS
                                .WORD   RANP            ;RANDOM PATTERN.
                                .WORD   RDF             ;READ FWD.
                                .WORD   DATCNT          ;MAX BUFFER LENGTH.
                                .WORD   32000.          ;32,000 RECORDS.
                                .WORD   RANP            ;RANDOM PATTERN.
                                .WORD   RWD             ;REWIND.
                                .WORD   1               ;BYTE COUNT.
                                .WORD   1               ;ONCE.
                                .WORD   RANP            ;PATTERN.
                                .BLKW   40.             ;EXTENSTION TO DOUBLE BUFFER SIZE
                        SEQEND:: .WORD  END             ;SOFT END OF SEQUENCE TABLE.
                                .WORD   END
                                .WORD   END
                                .WORD   END
                                .WORD   END             ;HARD END OF SEQUENCE TABLE.
                                ;THE FOLLOWING IS THE TS05 COMMAND TABLE

                        CMDTBL:: .WORD  DRI             ;DRIVE INIT.
                                .WORD   RDF             ;READ FORWARD.
                                .WORD   RDR             ;READ REVERSE.
                                .WORD   WRT             ;WRITE
                                .WORD   WTV             ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND
                                                        ;CHECK DATA ON ALL RECORDS, RDF AND
                                                        ;CHECK DATA ON ALL RECORDS.)
                                .WORD   SRF             ;SPACE "N" RECORDS FORWARD.
                                .WORD   SRR             ;SPACE "N" RECORDS REVERSE.
```

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

                                ;       THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.

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

```
                                        .EVEN


                                .SBTTL  GLOBAL TEXT SECTION

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


                                ;
                                ; FORMAT STATEMENTS USED IN PRINT CALLS
                                ;

                                        .NLIST  BEX

004162  045  116  045  CODELM::  .ASCIZ /%N%AUNIT %D1%A TS05 CODE LEVEL %03%N%N/
004231  045  116  045  SWSET::   .ASCIZ  /%N%AUNIT %D1%A TS05 SWITCH SETTINGS %03%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  /%ARECORD TOO LONG: >%D4%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 TSDB 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
```

```
                        .SBTTL  GLOBAL ERROR REPORT SECTION

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


                                BGNMSG  DTAERM
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  016746  175546                                                  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  010267  001034                  MOV     R2,RECRED               ;SAVE R2
006032  010367  175400                  MOV     R3,TIME1                ;SAVE R3
006036  010467  175376                  MOV     R4,TIME2                ;SAVE R4
006042  004767  002016                  JSR     PC,RECTAP                       ;RETRIEVE RECORD READ
006046  016702  001014                  MOV     RECRED,R2               ;RESTORE R2
006052  010367  001010                  MOV     R3,RECRED               ;SAVE RECORD READ
006056  016703  175354                  MOV     TIME1,R3                ;RESTORE R3
006062  016704  175352                  MOV     TIME2,R4                ;RESTORE R4
006066                          PRINTB  #STAER6,RECRED          ;PRINT RECORD READ
006066  016746  000774                                                  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
                        L10002:
006116  104423                                                          TRAP    C$MSG


                                BGNMSG  STAERM
                        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  016746  175400                                                  MOV     TSNP,-(SP)
006134  012746  006436                                                  MOV     #STAER1,-(SP)
```

```
                006140  012746  000004                                          MOV     #4,-(SP)
                006144  010600                                                  MOV     SP,R0
                006146  104414                                                  TRAP    C$PNTB
                006150  062706  000012                                          ADD     #12,SP
        860     006154                  PRINTB  #STAER7
                006154  012746  006530                                          MOV     #STAER7,-(SP)
                006160  012746  000001                                          MOV     #1,-(SP)
                006164  010600                                                  MOV     SP,R0
                006166  104414                                                  TRAP    C$PNTB
                006170  062706  000004                                          ADD     #4,SP
        861     006174  016702  174130          MOV     CMDPKT,R2
        862     006200  042702  177740          BIC     #177740,R2
        863     006204  005302                  DEC     R2                      ;IF CMD IS A READ
        864     006206  005702                  TST     R2
        865     006210  001016                  BNE     50000$
        866     006212  004767  001646          JSR     PC,RECTAP                       ;THEN RETRIEVE
        867     006216  010367  001642          MOV     R3,RECTAP               ;AND
        868     006222                  PRINTB  #STAER6,RECRED          ;TYPE RECORD READ
                006222  016746  000640                                          MOV     RECRED,-(SP)
                006226  012746  006562                                          MOV     #STAER6,-(SP)
                006232  012746  000002                                          MOV     #2,-(SP)
                006236  010600                                                  MOV     SP,R0
                006240  104414                                                  TRAP    C$PNTB
                006242  062706  000006                                          ADD     #6,SP
        869     006246          50000$: PRINTX  #STAER2
                006246  012746  006616                                          MOV     #STAER2,-(SP)
                006252  012746  000001                                          MOV     #1,-(SP)
                006256  010600                                                  MOV     SP,R0
                006260  104415                                                  TRAP    C$PNTX
                006262  062706  000004                                          ADD     #4,SP
        870     006266          PRINTX  #STAER3,CMDPKT,@TSD8(R5),MSGPKT+MS.RFC,TSSREG,CTCC
                006266  016746  175156                                          MOV     CTCC,-(SP)
                006272  016746  175156                                          MOV     TSSREG,-(SP)
                006276  016746  174056                                          MOV     MSGPKT+MS.RFC,-(SP)
                006302  017546  002514                                          MOV     @TSD8(R5),-(SP)
                006306  016746  174016                                          MOV     CMDPKT,-(SP)
                006312  012746  006675                                          MOV     #STAER3,-(SP)
                006316  012746  000006                                          MOV     #6,-(SP)
                006322  010600                                                  MOV     SP,R0
                006324  104415                                                  TRAP    C$PNTX
                006326  062706  000016                                          ADD     #16,SP
        871     006332          PRINTX  #STAER4,CMDPKT+2,CMDPKT+4,CMDPKT+6
                006332  016746  174000                                          MOV     CMDPKT+6,-(SP)
                006336  016746  173772                                          MOV     CMDPKT+4,-(SP)
                006342  016746  173764                                          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
        872     006366          PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3,MSGPKT+MS.XS
4
                006366  016746  174000                                          MOV     MSGPKT+MS.XS4,-(SP)
                006372  016746  173772                                          MOV     MSGPKT+MS.XS3,-(SP)
                006376  016746  173764                                          MOV     MSGPKT+MS.XS2,-(SP)
                006402  016746  173756                                          MOV     MSGPKT+MS.XS1,-(SP)
                006406  016746  173750                                          MOV     MSGPKT+MS.XS0,-(SP)
                006412  012746  006753                                          MOV     #STAER5,-(SP)
```

```
GLOBAL AREAS            MACRO M1113  30-NOV-83 10:17                                                    SEQ 057
GLOBAL ERROR REPORT SECTION

        006416  012746  000006                                                          MOV     #6,-(SP)
        006422  010600                                                                  MOV     SP,R0
        006424  104415                                                                  TRAP    C$PNTX
        006426  062706  000016                                                          ADD     #16,SP
    873 006432                          EXIT    MSG
        006432  000167                                                                  .WORD   J$JMP
        006434  000432                                                                  .WORD   L10003-2-.
    874
    875                                 .NLIST  BEX
    876 006436      045     101     130 STAER1: .ASCIZ  /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
    877                                 .EVEN
    878 006530      045     101     120 STAER7: .ASCIZ  /%APREVIOUS CMD WAS  XXX  /
    879 006562      045     123     061 STAER6: .ASCIZ  /%S11%A* RECORD READ:%D5%A *//
    880 006616      045     116     045 STAER2: .ASCIZ  /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/
    881 006675      045     117     066 STAER3: .ASCIZ  /%O6%S2%O6%S2%O6%S2%O6%S2%D1%N/
    882 006733      045     117     066 STAER4: .ASCII  /%O6%N/
    883 006740      045     117     066         .ASCII  /%O6%N/
    884 006745      045     117     066         .ASCIZ  /%O6%N/
    885 006753      045     101     130 STAER5: .ASCII  /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%S4%AXST4%N/
    886 007027      045     117     066         .ASCIZ  /%O6%S2%O6%S2%O6%S2%O6%S2%O6%N/
    887                                 .LIST   BEX
    888                                 .EVEN
    889 007066  000000                  RECRED: .WORD   0                       ;RECORD READ FROM TAPE
    890
    891 007070                          ENDMSG
        007070                          L10003:
        007070  104423                                                                  TRAP    C$MSG
    892
    893                                 .SBTTL  GLOBAL SUBROUTINES SECTION
    894
    895                                 ;++
    896                                 ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
    897                                 ; THAT ARE USED IN MORE THAN ONE TEST.
    898                                 ;--
    899
    900
    901
    902                                 ;*
    903                                 ;
    904                                 ;ROUTINE TO DO A SOFT INITIALIZE OF THE CONTROLLER
    905                                 ;BY WRITING INTO THE TSSR REGISTER. AFTER THE INIT,
    906                                 ;THE TSSR REGISTER IS TESTED FOR ERRORS. ANY ERRORS
    907                                 ;DETECTED SHOULD BE TREATED AS DEVICE FATAL ERRORS.
    908                                 ;
    909                                 ;INPUTS:
    910                                 ;
    911                                 ;       R5      CURRENT UNIT NUMBER
    912                                 ;
    913                                 ;
    914                                 ;OUTPUTS:
    915                                 ;
    916                                 ;       R0      CONTENTS OF TSSR, IF ERROR
    917                                 ;       CARRY   SET IF INIT WAS OKAY
    918                                 ;               CLEAR IF FATAL ERROR
    919                                 ;
    920                                 ;CALLING SEQUENCE:
    921                                 ;       JSR     PC,FIRSTU
```

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

007072                          SOFINIT::
                                                                ; (SAVREG) SAVE THE REGISTERS
007072  012775  000000  002524          MOV     #0,@TSSR(R5)    ; DO THE INIT.
007100  004767  003574                  JSR     PC,WSSR         ;WAIT FOR UNIT TO BE READY
007104  012703  000550                  MOV     #360.,R3
007110  004767  000070          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  016727  172766                                                  MOV     L$DLY,(PC)+
007130  000000                                                          .WORD   0
007132  005367  177772                                                  DEC     -6(PC)
007136  001375                                                          BNE     .-4
007140  005367  177756                                                  DEC     -22(PC)
007144  001367                                                          BNE     .-20
007146  005303                          DEC     R3
007150  001357                          BNE     2$
007152  017500  002524          3$:     MOV     @TSSR(R5),R0            ;GET THE TSSR REGISTER
007156  010004                          MOV     R0,R4                   ;TSSR CONTENTS
007160  042704  176277                  BIC     #^C<TS.A17!TS.A16!TS.OFL>,R4
007164  052704  002200                  BIS     #TS.SSR!TS.NBA,R4       ;R4 HAS EXPECTED CONTENTS
007170  020400                          CMP     R4,R0                   ;ONLY EXPECTED BITS SET ?
007172  001402                          BEQ     5$                      ;BRANCH IF OKAY
007174  000241                          CLC                             ;CLEAR THE CARRY FOR ERROR
007176  000401                          BR      10$                     ;GO TO EXIT
007200  000261                  5$:     SEC                             ;SET THE CARRY BIT
007202  000207                  10$:    RTS     PC                      ;RETURN TO CALLER

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

```
        007226  000000                                                          .WORD   0
        007230  016727  172662                                                  MOV     L$DLY,(PC)+
        007234  000000                                                          .WORD   0
        007236  005367  177772                                                  DEC     -6(PC)
        007242  001375                                                          BNE     .-4
        007244  005367  177756                                                  DEC     -22(PC)
        007250  001367                                                          BNE     .-20
   969  007252  005316                  DEC     (SP)            ;REDUCE DELAY COUNT
   970  007254  001356                  BNE     2$              ;RETRY UNTIL TIMER EXPIRES
   971  007256  000241                  CLC                     ; C = 0, CONTROLLER STILL RUNNING...
   972  007260  000401                  BR      4$              ;...OR HUNG-UP AFTER 300 MSEC.
   973  007262  000261          3$:     SEC                     ; C = 1, CONTROLLER IS STOPPED.
   974  007264  005326          4$:     DEC     (SP)+           ;RESTORE STACK WITHOUT CHANGING CARRY BIT
   975  007266  000207                  RTS     PC
   976
   977
   978
   979                          ;+
   980                          ;
   981                          ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND AND CHECK FEATURES
   982                          ;
   983                          ;INPUT:
   984                          ;
   985                          ;       R4      ADDRESS OF COMMAND PACKET
   986                          ;       R5      CURRENT UNIT NUMBER
   987                          ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
   988                          ;
   989                          ;OUTPUT:
   990                          ;
   991                          ;       R0      TSSR CONTENTS
   992                          ;       CARRY   SET - WRITE CHARACTERISTICS COMMAND OK
   993                          ;               CLR - WRITE CHARACTERISTICS FAILED
   994                          ;
   995                          ;IMPLICIT OUTPUT:
   996                          ;
   997                          ;       SOFTWARE SWITCHES SET AS FOLLOWS:
   998                          ;               EXTFEA = EXTENDED FEATURES PRESENT
   999                          ;               BENBSW = BUFFER ENABLE SWITCH ON OR OFF
  1000                          ;
  1001                          ;
  1002                          ;SIDE EFFECTS:
  1003                          ;
  1004                          ;
  1005                          ;-
  1006
  1007  007270                  WRTCHK::
  1008  007270  010475  002514  10$:     MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
  1009  007274  004767  177704          JSR     PC,WAITF                ;WAIT FOR SSR
  1010  007300  103401                  BCS     40$                     ;BR, IF SSR IS SET AND OK
  1011  007302  000421                  BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
  1012  007304  005724          40$:    TST     (R4)+                   ;STEP IT
  1013  007306  011402                  MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
  1014  007310  011203                  MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
  1015  007312  032763  000200  000012  BIT     #X2.EFE,MS.XS2(R3)      ;EXTENDED FEATURES BIT SET?
  1016  007320  001402                  BEQ     45$                     ;BR IF NO
  1017  007322  005267  172774          INC     EXTFEA                  ;SET EXTENDED FEATURES SW SWITCH
  1018  007326                  45$:
```

```
GLOBAL AREAS            MACRO M1113  30-NOV-83 10:17                                    SEQ 060
GLOBAL SUBROUTINES SECTION

 1019 007326  032763  000100  000012          BIT     #X2.BFE,MS.XS2(R3)      ;BUFFER ENABLE SWITCH SET
 1020 007334  001402                          BEQ     50$                     ;BR, IF SWITCH NOT SET
 1021 007336  005267  172762                  INC     BENBSW                  ;SET SOFTWARE SWITCH FOR ENABLED
 1022 007342                          50$:
 1023 007342  000261                  55$:    SEC                             ;SET CARRY NO TROUBLE
 1024 007344  000401                          BR      70$                     ;EXIT
 1025 007346  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
 1026 007350  017500  002524          70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
 1027 007354  000207                          RTS     PC                      ;RETURN
 1028
 1029                                 ;+
 1030                                 ;
 1031                                 ;ROUTINE TO CHECK WRITE LOCK CONDITION
 1032                                 ;
 1033                                 ;INPUT:
 1034                                 ;
 1035                                 ;       R4      ADDRESS OF COMMAND PACKET
 1036                                 ;       R5      CURRENT UNIT NUMBER
 1037                                 ;
 1038                                 ;-
 1039 007356                          WLKCHK::
 1040 007356  010475  002514          10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
 1041 007362  004767  177616                  JSR     PC,WAITF                ;WAIT FOR SSR
 1042 007366  103401                          BCS     40$                     ;BR, IF SSR IS SET AND OK
 1043 007370  000420                          BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
 1044 007372  005724                  40$:    TST     (R4)+                   ;STEP IT
 1045 007374  011402                          MOV     (R4),R2                 ;POINT TO WRT CHARA DATA PACKET
 1046 007376  011203                          MOV     (R2),R3                 ;GET ADDRESS OF MESSAGE BUFFER
 1047 007400  032763  000004  000006          BIT     #X0.WLK,MS.XS0(R3)      ;IS UNIT WRITE LOCKED?
 1048 007406  001407                          BEQ     55$                     ;NO,PROCEED WITH TESTING
 1049 007410                                  ERRHRD  1,UNIWLK                ;TAPE IS WRITE LOCKED
      007410  104456                                                          TRAP    C$ERHRD
      007412  000001                                                          .WORD   1
      007414  005653                                                          .WORD   UNIWLK
      007416  000000                                                          .WORD   0
 1050 007420  004767  007554                  JSR     PC,DROPU                ;DROP IT
 1051 007424  000402                          BR      60$                     ;EXIT WITH CARRY=0
 1052 007426  000261                  55$:    SEC                             ;SET CARRY NO TROUBLE
 1053 007430  000401                          BR      70$                     ;EXIT
 1054 007432  000241                  60$:    CLC                             ;CARRY CLEAR = ERROR
 1055 007434                          70$:
 1056 007434  000207                          RTS     PC                      ;RETURN
 1057
 1058
 1059                                 ;+
 1060                                 ;
 1061                                 ;ROUTINE TO ISSUE A WRITE CHARACTERISTICS COMMAND
 1062                                 ;
 1063                                 ;INPUT:
 1064                                 ;
 1065                                 ;       R4      ADDRESS OF COMMAND PACKET
 1066                                 ;       R5      CURRENT UNIT NUMBER
 1067                                 ;       REQUIRES A CALL TO SOFINIT BE DONE PREVIOUSLY
 1068                                 ;
 1069                                 ;OUTPUT:
 1070                                 ;
 1071                                 ;       R0      TSSR CONTENTS
```

```
1072                                    ;       CARRY   SET - WRITE CHARACTERISTICS COMMAND OK
1073                                    ;               CLR - WRITE CHARACTERISTICS FAILED
1074                                    ;
1075                                    ;IMPLICIT OUTPUT:
1076                                    ;
1077                                    ;
1078                                    ;
1079                                    ;SIDE EFFECTS:
1080                                    ;
1081                                    ;
1082                                    ;-
1083
1084 007436                            WRTCHR::
1085 007436  010475  002514            10$:    MOV     R4,@TSDB(R5)            ;SEND OUT COMMAND
1086 007442  004767  177536                    JSR     PC,WAITF                ;WAIT FOR SSR
1087 007446  103401                            BCS     50$                     ;BR, IF SSR IS SET AND OK
1088 007450  000402                            BR      60$                     ;BR IF TROUBLE CARRY = CLEAR
1089 007452                            50$:
1090 007452  000261                            SEC                             ;SET CARRY NO TROUBLE
1091 007454  000401                            BR      70$                     ;EXIT
1092 007456  000241                    60$:    CLC                             ;CARRY CLEAR = ERROR
1093 007460  017500  002524            70$:    MOV     @TSSR(R5),R0            ;RETURN TSSR CONTENTS
1094 007464  000207                            RTS     PC                      ;RETURN
1095
1096
1097                                    ;+
1098                                    ;
1099                                    ;ROUTINE TO DO SET UP OF RUNNING CONDITIONS
1100                                    ;
1101                                    ;INPUTS:
1102                                    ;
1103                                    ;       R5      CURRENT UNIT NUMBER
1104                                    ;
1105                                    ;
1106                                    ;OUTPUTS:
1107                                    ;
1108                                    ;
1109                                    ;CALLING SEQUENCE:
1110                                    ;       JSR     PC,FIRSTU
1111                                    ;       JSR     PC,SOFINIT
1112                                    ;       BCS     CONTINUE
1113                                    ;       ERRDF                   ;REPORT FATAL ERROR
1114                                    ;       JSR     PC,MDSET
1115                                    ;
1116                                    ;-
1117
1118 007466                            MDSET:: BREAK                           ; DO A SUPVSR BREAK FIRST.
      007466  104422                                                                TRAP    C$BRK
1119 007470  004767  000272                    JSR     PC,SETDEF               ;RESTORE DEFAULT
1120 007474  004767  177656                    JSR     PC,WLKCHK               ;CHECK WRITE LOCK
1121 007500  103416                            BCS     1$                      ;C=1 IS O.K.
1122 007502                                    DELAY   1                       ;WAIT
      007502  012727  000001                                                       MOV     #1,(PC)+
      007506  000000                                                                .WORD   0
      007510  016727  172402                                                        MOV     L$DLY,(PC)+
      007514  000000                                                                .WORD   0
      007516  005367  177772                                                        DEC     -6(PC)
```

```
                007522  001375                                                          BNE     .-4
                007524  005367  177756                                                  DEC     -22(PC)
                007530  001367                                                          BNE     .-20
1123            007532                          BREAK                   ;BREAK TO SUPER
                007532  104422                                                          TRAP    C$BRK
1124            007534                          DOCLN                   ;DO CLEAN AND ABORT
                007534  104444                                                          TRAP    C$DCLN
1125            007536  005767  172550          1$:     TST     TS1MD   ;RUN IN DEFAULT MODE?
1126            007542  001064                  BNE     10$             ;YES,RETURN
1127            007544  004767  000216          JSR     PC,SETDEF       ;RESTORE DEFAULT
1128            007550  004767  177514          JSR     PC,WRTCHK       ;GO DO SWITCH CHECK
1129            007554  005767  172540          TST     HSSW            ;DO WE RUN AT 100IPS?
1130            007560  001415                  BEQ     3$              ;NO
1131            007562  052767  000040  173742  BIS     #EF.HSS,TSUNT   ;YES,SET THE BIT
1132            007570  005767  172526          TST     EXTFEA          ;ARE WE SET?
1133            007574  001002                  BNE     2$              ;YES
1134            007576  004767  000122          JSR     PC,INVRT        ;INVERT THE SWITCH
1135            007602  004767  000160          2$:     JSR     PC,SETDEF       ;NOW SET THE MODES
1136            007606  004767  177624          JSR     PC,WRTCHR       ;DO IT
1137            007612  000443                  BR      11$
1138            007614  005767  172476          3$:     TST     WTBUF   ;RUN WITH WRITE BUFFERING?
1139            007620  001415                  BEQ     5$              ;NO
1140            007622  052767  000030  173702  BIS     #EF.RWB,TSUNT   ;YES SET THE BITS
1141            007630  005767  172466          TST     EXTFEA          ;ARE WE SET?
1142            007634  001002                  BNE     4$              ;YES
1143            007636  004767  000062          JSR     PC,INVRT        ;INVERT THE SWITCH
1144            007642  004767  000120          4$:     JSR     PC,SETDEF       ;NOW SET THE MODES
1145            007646  004767  177564          JSR     PC,WRTCHR       ;DO IT
1146            007652  000423                  BR      11$
1147            007654  005767  172434          5$:     TST     RDBUF   ;RUN WITH READ BUFFERING?
1148            007660  001415                  BEQ     10$             ;NO
1149            007662  052767  000020  173642  BIS     #EF.RBO,TSUNT   ;YES SET THE BITS
1150            007670  005767  172426          TST     EXTFEA          ;ARE WE SET?
1151            007674  001002                  BNE     6$              ;YES
1152            007676  004767  000022          JSR     PC,INVRT        ;INVERT THE SWITCH
1153            007702  004767  000060          6$:     JSR     PC,SETDEF       ;NOW SET THE MODES
1154            007706  004767  177524          JSR     PC,WRTCHR       ;DO IT
1155            007712  000403                  BR      11$
1156
1157            007714  016767  173612  172562  10$:    MOV     TSUNT,SCHBK+10  ;AND UNIT #
1158
1159            007722  000207                  11$:    RTS     PC              ;RETURN
1160
1161
1162                                            ;
1163                                            ; SUBROUTINE TO INVERT SENSE OF EXT'D FEATURES SWITCH
1164                                            ;
1165                                            ;INPUTS:
1166                                            ;
1167                                            ;
1168                                            ;
1169                                            ;OUTPUTS:
1170                                            ;
1171
1172
1173            007724                          INVRT::
1174            007724  012767  140006  172376          MOV     #WSM,CMDPKT+CP.CMD      ;WRT SUB-SYS MEM
```

```
1175 007732  012767  002506  172372          MOV     #WSMBK,CMDPKT+CP.ADL    ;MSG BUF ADDR
1176 007740  012767  000006  172370          MOV     #6,CMDPKT+CP.CNT        ;BYTE COUNT
1177 007746  012767  100010  172532          MOV     #100010,WSMBK           ;INVERT THE SWITCH
1178 007754  012704  002330                  MOV     #CMDPKT,R4              ;
1179 007760  004767  177452                  JSR     PC,WRTCHR               ;DO IT
1180 007764  000207                          RTS     PC                      ;RETURN
1181
1182                                 ;
1183                                 ; SUBROUTINE TO SETUP DEFAULT SET CHAR CMD
1184                                 ;
1185                                 ;INPUTS:
1186                                 ;
1187                                 ;
1188                                 ;
1189                                 ;OUTPUTS:
1190                                 ;
1191                                 ;       R4      ADDRESS OF COMMAND PACKET
1192
1193 007766                          SETDEF::
1194 007766  012701  140004                  MOV     #SCH,R1                 ;WRITE CHAR CMD
1195 007772  010167  172332                  MOV     R1,CMDPKT+CP.CMD        ;SET UP COMMAND
1196 007776  012767  002474  172326          MOV     #SCHBK,CMDPKT+CP.ADL    ;SET UP ADR LO TO POINT TO MSG BUF(MSGPKO)
1197 010004  012767  000012  172324          MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
1198 010012  012767  000040  172462          MOV     #DFTSCH,SCHBK+6         ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
1199 010020  016767  173506  172456          MOV     TSUNT,SCHBK+10          ;UNIT #
1200 010026  012704  002330                  MOV     #CMDPKT,R4              ;ADDRESS OF CMD PACKET
1201 010032  000207                          RTS     PC                      ;RETURN
1202
1203
1204                                 ;       MODULES TO HANDLE TS05 INTERRUPTS.
1205
1206
1207 010034                                  BGNSRV  TS5IN0
     010034                          TS5IN0::
1208 010034  005267  173432                  INC     INTFLG                  ;SET INTERRUPT OCCURRED FLAG.
1209 010040                                  ENDSRV
     010040                          L10004:
     010040  000002                                                          RTI
1210
1211 010042                                  BGNSRV  TS5IN1
     010042                          TS5IN1::
1212 010042  005267  173426                  INC     INTFLG+2        ;SET INTERRUPT OCCURRED FLAG.
1213 010046                                  ENDSRV
     010046                          L10005:
     010046  000002                                                          RTI
1214
1215 010050                                  BGNSRV  TS5IN2
     010050                          TS5IN2::
1216 010050  005267  173422                  INC     INTFLG+4        ;SET INTERRUPT OCCURRED FLAG.
1217 010054                                  ENDSRV
     010054                          L10006:
     010054  000002                                                          RTI
1218
1219 010056                                  BGNSRV  TS5IN3
     010056                          TS5IN3::
1220 010056  005267  173416                  INC     INTFLG+6        ;SET INTERRUPT OCCURRED FLAG.
1221 010062                                  ENDSRV
```

```
     010062                                  L10007:
     010062  000002                                                                              RTI

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

     010064  032767  000400  173326  RECTAP::BIT        #MOD.CO,CMDWRD                      ;READ REV FETCH
     010072  001430                          BEQ        50001$
     010074  016702  172260                  MOV        MSGPKT+MS.RFC,R2                    ;FIND LAST READ AD.
     010100  066702  173304                  ADD        DATARD,R2
     010104  032702  000001                  BIT        #BIT00,R2                           ;ODD AD., REASSEMBLE
     010110  001417                          BEQ        50002$
     010112  005202                          INC        R2                                  ;REC COUNT STARTING
     010114  111203                          MOVB       (R2),R3                             ;WITH UPPER BYTE FETCH
     010116  142703  177400                  BICB       #177400,R3
     010122  000303                          SWAB       R3
     010124  005302                          DEC        R2          ;LET R2 := R2 - #1                ;LOWER BYTE AD.
     010126  105767  173366                  TSTB       SWBFLG      ;IFB SWBFLG NE #0 THEN
     010132  001401                          BEQ        50003$
     010134  005302                          DEC        R2            ;LET R2 := R2 - #1                      ;LOWER BYTE AD. ON SWAP

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

     010160                          50005$:
     010160  000207                          RTS        PC

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

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

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

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                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

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

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

010226  012701  003540         EXALL:: MOV     #CMDSEQ,R1      ;INIT SEQUENCE TABLE POINTER.
010232                         50006$:
010232  021127  177777                 CMP     (R1),#END       ;WHILE THERE ARE CMDS IN THE SEQUENCE TABLE.
010236  001530                         BEQ     50007$
010240  004767  000726                 JSR     PC,SETUP        ;GO SETUP THE COMMAND BLOCK.
010244                         50010$: BREAK                   ; DO A SUPVSR BREAK FIRST.
010244  104422                                                                 TRAP    C$BRK
010246  026767  173140  173140         CMP     NCNT,NCNT1      ;WHILE THERE ARE RECORDS REMAINING:
010254  002116                         BGE     50011$
010256  004767  000602                 JSR     PC,CMDAC        ;STORE CMD ASCII IN ERROR MESSAGE.
010262  105767  173227                 TSTB    RANDOM          ;IF IN RANDOM MODE:
010266  001435                         BEQ     50012$
010270  026727  173124  104005         CMP     CMDWRD,#WRT     ;IF CMD IS A WRITE THEN:
010276  001031                         BNE     50013$
010300  105767  173212                 TSTB    VFYFLG          ;IF DATA IS NOT TO BE VERIFIED THEN:
010304  001026                         BNE     50014$
010306  066767  173122  173116         ADD     RANS,RANB       ;LET RANB := RANB + RANS  ;GENERATE
010314  066767  173112  173112         ADD     RANB,RANS       ;LET RANS := RANS + RANB  ;RANDOM
010322  016767  173106  173066         MOV     RANS,BRFCNT     ;LET BRFCNT := RANS        ;LENGTH
010330  046767  173074  173060         BIC     LENMSK,BRFCNT   ;MASK RANDOM LENGTH.
010336  026727  173054  000022         CMP     BRFCNT,#18.     ;DO NOT ALLOW BYTE COUNT OF LESS THAN 18
010344  002003                         BGE     50015$
010346  012767  000022  173042         MOV     #18.,BRFCNT     ;CHANGE COUNT OF 0-17 TO 18.

010354                         50015$:
010354  016767  173036  171754         MOV     BRFCNT,CMDPKT+CP.CNT    ;MOVE BRF TO CMD PACKET.

010362                         50014$:

010362                         50013$:

010362                         50012$:
010362  004767  000136                 JSR     PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
010366  004767  007106                 JSR     PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
010372  012702  000001                 MOV     #1,R2           ;LET R2 := #1           ;SET ALL UNITS AT BOT/EOT.
010376  004767  006500                 JSR     PC,FIRSTU               ;FIND FIRST UNIT.

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

```
1333 010412  032767  000400  173000          BIT     #MOD.CO,CMDWRD          ;IF CMD IS REVERSE THEN:
1334 010420  001406                          BEQ     50020$
1335 010422  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)      ;IF NOT AT BOT THEN:
1336 010430  001001                          BNE     50021$
1337 010432  005002                          CLR     R2                  ;LET R2 := #0 ;CLEAR EOT/BOT FLAG.
1338
1339 010434                          50021$:
1340 010434  000411                          BR      50022$                          ;ELSE IF CMD IS NOT REVERSE:
1341 010436                          50020$:
1342 010436  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)
1343 010444  001404                          BEQ     50023$
1344 010446  032767  000001  172744          BIT     #CMD.CO,CMDWRD
1345 010454  001001                          BNE     50024$
1346 010456                          50023$:
1347                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1348 010456  005002                          CLR     R2                  ;CLEAR EOT/BOT FLAG.
1349
1350 010460                          50024$:
1351
1352 010460                          50022$:
1353 010460  004767  006464                  JSR     PC,NEXTU                ;FIND NEXT UNIT
1354 010464  000746                          BR      50016$
1355 010466                          50017$:
1356 010466  020227  000001                  CMP     R2,#1                   ;IF ALL UNIT ARE AT EOT/BOT THEN:
1357 010472  001001                          BNE     50025$
1358 010474  000412                          BR      EXARTN          ;RETURN WITH R2 = #1.
1359
1360 010476                          50025$:
1361 010476  005267  172710                  INC     NCNT        ;LET NCNT := NCNT + #1      ;UPDATE RECORD COUNT.
1362 010502  016767  172712  172714          MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
1363
1364 010510  000655                          BR      50010$
1365 010512                          50011$:
1366 010512  004767  005350                  JSR     PC,VFYDAT       ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
1367                                                 ;VERIFY THE LAST N RECORDS OF DATA.
1368
1369 010516  000645                          BR      50006$
1370 010520                          50007$:
1371 010520  005002                          CLR     R2      ;LET R2 := #0   ;SET NORMAL RETURN INDICATOR.
1372 010522  000207                  EXARTN: RTS PC                          ;RETURN.
1373
1374
1375
1376                                 ;       SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
1377                                 ;       ALL INTERRUPTS, AND CHECK ALL STATUS.
1378                                 ;       INPUTS:
1379                                 ;       OUTPUTS:
1380                                 ;       REGISTERS:
1381                                 ;       CALLS:          EXCUTE,GOWAIT,NEXTU,FIRSTU.
1382
1383 010524  004767  006352          EXSUB:: JSR     PC,FIRSTU               ;SET UP FOR FIRST UNIT.
1384 010530                          50026$:
1385 010530  026527  002604  177777          CMP     DEVTBL(R5),#END         ;WHILE THERE ARE MORE DEVICES:
1386 010536  001465                          BEQ     50027$
1387 010540  032767  000400  172652          BIT     #MOD.CO,CMDWRD      ;IF CMD IS REVERSE THEN:
1388 010546  001421                          BEQ     50030$
1389 010550  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)  ;IF NOT AT BOT
```

```
1390 010556  001014                          BNE     50031$
1391 010560  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)     ;BUT IF AT EOT
1392 010566  001406                          BEQ     50032$
1393 010570  105767  172730                  TSTB    ALLEOT                 ;AND ALL OTHERS AT EOT
1394 010574  001402                          BEQ     50033$
1395 010576  004767  001252                  JSR     PC,EXCUTE                      ;THEN EXECUTE REV CMD
1396                                                                ;IF NOT ALL AT EOT, FREEZE UNIT(S) AT EOT
1397 010602                          50033$:
1398 010602  000402                          BR      50034$         ;IF NOT AT BOT AND
1399 010604                          50032$:
1400 010604  004767  001244                  JSR     PC,EXCUTE                      ;NOT AT EOT, EXEC REV CMD
1401
1402 010610                          50034$:
1403
1404 010610                          50031$:
1405 010610  000435                          BR      50035$                         ;ELSE IF CMD IS NOT REVERSE:
1406 010612                          50030$:
1407 010612  026727  172610  000002          CMP     CMDLG,#2
1408 010620  001011                          BNE     50036$
1409 010622  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)
1410 010630  001405                          BEQ     50036$
1411                                                        ;CLEAR BAD SPOT COUNTS WHEN WRITING FROM BOT
1412 010632  016567  002616  172652          MOV     BTADDR(R5),BTPT            ;LET BTPT := BTADDR(R5)
1413 010640  005077  172646                  CLR     @BTPT              ;LET @BTPT := #0
1414
1415 010644                          50036$:
1416 010644  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)
1417 010652  001404                          BEQ     50037$
1418 010654  032767  000001  172536          BIT     #CMD.CO,CMDWRD
1419 010662  001003                          BNE     50040$
1420 010664                          50037$:
1421                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1422 010664  004767  001164                  JSR     PC,EXCUTE                  ;ISSUE CMD TO TS05
1423
1424 010670  000405                          BR      50041$
1425 010672                          50040$:
1426 010672  105767  172626                  TSTB    ALLEOT             ;IFB ALLEOT NE #0 THEN
1427 010676  001402                          BEQ     50042$
1428 010700  004767  001150                  JSR     PC,EXCUTE
1429
1430 010704                          50042$:
1431
1432 010704                          50041$:
1433
1434 010704                          50035$:
1435 010704  004767  006240                  JSR     PC,NEXTU           ;FIND NEXT UNIT IN TEST CYCLE.
1436
1437 010710  000707                          BR      50026$
1438 010712                          50027$:
1439 010712  105767  172601                  TSTB    RPTFLG             ;IF REPORT HAS BEEN REQUESTED THEN:
1440 010716  001403                          BEQ     50043$
1441 010720  105067  172573                  CLRB    RPTFLG                     ;CLR THE FLAG,
1442 010724                                  DORPT                      ;PRINT THE PERFORMANCE REPORT.
     010724  104424                                                                TRAP    C$DRPT
1443 010726                          50043$:
1444 010726  004767  006150                  JSR     PC,FIRSTU                  ;SET UP FOR FIRST UNIT.
1445 010732                          50044$:
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1446 010732  026527  002604  177777          CMP     DEVTBL(R5),#END   ;WHILE THERE ARE MORE DEVICES:
1447 010740  001450                           BEQ     50045$
1448 010742  032767  000400  172450          BIT     #MOD.CO,CMDWRD      ;IF CMD IS REVERSE THEN:
1449 010750  001421                           BEQ     50046$
1450 010752  032765  000002  003502          BIT     #XO.BOT,EOTFLG(R5)  ;IF NOT AT BOT
1451 010760  001014                           BNE     50047$
1452 010762  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)      ;BUT IF AT EOT
1453 010770  001406                           BEQ     50050$
1454 010772  105767  172526                   TSTB    ALLEOT                          ;AND ALL OTHERS AT EOT
1455 010776  001402                           BEQ     50051$
1456 011000  004767  001360                   JSR     PC,GOWAIT                       ;THEN WAIT FOR CMD END
1457                                                                                   ;IF NOT ALL AT EOT, DO NOT WAIT
1458 011004                        50051$:
1459                                                                                   ;NOT AT BOT, AND NOT AT EOT
1460 011004  000402                           BR      50052$
1461 011006                        50050$:
1462 011006  004767  001352                   JSR     PC,GOWAIT                       ;WAIT FOR INT,CHECK STAT
1463
1464 011012                        50052$:
1465
1466
1467 011012                        50047$:
1468 011012  000420                           BR      50053$                          ;ELSE IF CMD IS FORWARD:
1469 011014                        50046$:
1470 011014  032765  000001  003502          BIT     #XO.EOT,EOTFLG(R5)
1471 011022  001404                           BEQ     50054$
1472 011024  032767  000001  172366          BIT     #CMD.CO,CMDWRD
1473 011032  001003                           BNE     50055$
1474 011034                        50054$:
1475                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1476 011034  004767  001324                   JSR     PC,GOWAIT                   ;WAIT FOR INT,CHECK STATUS.
1477
1478 011040  000405                           BR      50056$
1479 011042                        50055$:
1480 011042  105767  172456                   TSTB    ALLEOT              ;IFB ALLEOT NE #0 THEN
1481 011046  001402                           BEQ     50057$
1482 011050  004767  001310                   JSR     PC,GOWAIT
1483
1484 011054                        50057$:
1485
1486 011054                        50056$:
1487
1488 011054                        50053$:
1489 011054  004767  006070                   JSR     PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
1490
1491 011060  000724                           BR      50044$
1492 011062                        50045$:
1493 011062  000207                           RTS     PC                          ;RETURN.
1494
1495                               ;       THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
1496                               ;       COMMAND IN THE STANDARD ERROR MESSAGE.  ON ENTRY LOCATION CMDWRD
1497                               ;       CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
1498                               ;       INPUTS:
1499                               ;       OUTPUTS:
1500                               ;       REGISTERS:      R3, R4.
1501                               ;       CALLS:          GCMDA
1502
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1503 011064  016704  172330          CMDAC:: MOV     CMDWRD,R4;LET R4 := CMDWRD              ;R4 = CMD BINARY.
1504 011070  004767  000042                  JSR     PC,GCMDA                ;GET CMD ASCII.
1505 011074  112367  175340                  MOVB    (R3)+,STAER1+2          ;MOVE CMD ASCII
1506 011100  112367  175335                  MOVB    (R3)+,STAER1+3          ;
1507 011104  111367  175332                  MOVB    (R3),STAER1+4           ;INTO MSG.
1508 011110  016704  172310                  MOV     PCMDWD,R4                       ;R4 = PREVIOUS CMD BINARY.
1509 011114  004767  000016                  JSR     PC,GCMDA                ;GET CMD ASCII.
1510 011120  112367  175430                  MOVB    (R3)+,STAER7+24                 ;MOVE CMD ASCII
1511 011124  112367  175425                  MOVB    (R3)+,STAER7+25
1512 011130  111367  175422                  MOVB    (R3),STAER7+26                  ;INTO MSG.
1513 011134  000207                          RTS     PC                      ;RETURN. GO EXECUTE NEXT FUNCTION.
1514
1515
1516                                  ;       SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
1517                                  ;       ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
1518                                  ;       INPUTS:         R4 = PRESENT COMMAND WORD.
1519                                  ;       OUTPUTS:        R3 = ADDRESS OF PRESENT COMMAND ASCII.
1520                                  ;       REGISTERS:
1521                                  ;       CALLS:
1522
1523 011136  005003          GCMDA:: CLR     R3;LET R3 := #0                 ;INIT CMD TBL POINTER.
1524 011140                  50060$:
1525 011140  026304  003752                  CMP     CMDTBL(R3),R4           ;UNTIL CURRENT CMD IS FOUND:
1526 011144  001403                          BEQ     50061$
1527 011146  062703  000002                  ADD     #2,R3     ;LET R3 := R3 + #2            ;SEARCH CMD TABLE.
1528 011152  000772                          BR      50060$
1529 011154                  50061$:
1530 011154  010304                          MOV     R3,R4   ;LET R4 := R3
1531 011156  006203                          ASR     R3                      ;POINT TO ASCII FOR THAT COMMAND
1532 011160  000240                          NOP
1533 011162  060403                          ADD     R4,R3
1534 011164  062703  004040                  ADD     #CMDASC,R3
1535 011170  000207                          RTS     PC                      ;RETURN.
1536
1537                                  ;       THIS SUBROUTINE LOADS THE TS05 COMMAND PACKET FROM ONE
1538                                  ;       ENTRY IN THE SEQUENCE TABLE.
1539                                  ;       INPUTS:
1540                                  ;       OUTPUTS:
1541                                  ;       REGISTERS:      R2, R3.
1542                                  ;       CALLS:          GENPAT.
1543
1544 011172  005067  172230          SETUP:: CLR     CMDLG                   ;CLR CMD LOGGING CODE(DISABLES LOGGING)
1545 011176  012167  171126                  MOV     (R1)+,CMDPKT            ;LOAD THE COMMAND WORD.
1546 011202  011167  171130                  MOV     (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
1547 011206  011167  172204                  MOV     (R1),BRFCNT             ;SAVE BRF FOR THIS COMMAND.
1548 011212  016702  171112                  MOV     CMDPKT,R2               ;GET CMD.
1549 011216  042702  177740                  BIC     #NLCMD.C,R2             ;CLR ALL BUT CMD BITS.
1550 011222  010203                          MOV     R2,R3                   ;SAVE IT TWICE.
1551 011224  162703  000010                  SUB     #CMD.C3,R3              ;POSITION COMMAND?
1552 011230  001003                          BNE     2$                      ;BR IF NOT.
1553 011232  011167  171074                  MOV     (R1),CMDPKT+2           ;MOVE BPCR IN 2ND PKT WORD FOR POSITION CMD.
1554 011236  000464                          BR      3$
1555 011240  026727  171064  100011  2$:     CMP     CMDPKT,#WTM             ;IF CMD IS A WRITE TAPE MARK THEN:
1556 011246  001003                          BNE     50062$
1557 011250  012767  000002  172150          MOV     #2,CMDLG                  ;WTM LOGGING CODE IS 2.
1558
1559 011256                  50062$:
```

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1560 011256  010203                        MOV     R2,R3
1561 011260  162703  000001                SUB     #CMD.CO,R3              ;IS IT A READ?
1562 011264  001017                        BNE     1$                      ;BR IF NOT.
1563 011266  016767  172116  171036        MOV     DATARD,CMDPKT+CP.ADL    ;IF SO, LOAD THE BUFFER ADDR.
1564 011274  032767  000400  171026        BIT     #MOD.CO,CMDPKT          ;IF CMD IS A READ REV THEN:
1565 011302  001404                        BEQ     50063$
1566 011304  012767  000004  172114        MOV     #4,CMDLG                ;LOGGING CODE IS 4.
1567                                                                        ;ELSE - IF CMD IS A READ FWD:
1568 011312  000403                        BR      50064$
1569 011314                         50063$:
1570 011314  012767  000006  172104        MOV     #6,CMDLG                        ;LOGGING CODE IS 6.
1571
1572 011322                         50064$:
1573 011322  000432                        BR      3$                      ;CONTINUE.
1574 011324  010203                 1$:    MOV     R2,R3                   ;IS IT
1575 011326  162703  000004                SUB     #CMD.C2,R3              ;A SET CHARACTERISTICS CMD?
1576 011332  001014                        BNE     4$                      ;BR IF NOT.
1577 011334  012767  002474  170770        MOV     #SCHBK,CMDPKT+CP.ADL    ;SET UP ADR LO FOR SET CHAR.
1578 011342  012767  000012  170766        MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
1579 011350  011167  171126                MOV     (R1),SCHBK+6            ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
1580 011354  016767  172152  171122        MOV     TSUNT,SCHBK+10          ;UNIT #
1581 011362  000412                        BR      3$                      ;CONTINUE.
1582 011364  010203                 4$:    MOV     R2,R3                   ;IS IT
1583 011366  162703  000006                SUB     #CMD.C1!CMD.C2,R3       ;A DIAGNOSTIC (DIA) CMD?
1584 011372  001006                        BNE     3$                      ;BR IF NOT.
1585 011374  012767  000020  170734        MOV     #DIACNT,CMDPKT+CP.CNT   ;LOAD BUFFER EXTENT.
1586 011402  012767  003406  170722        MOV     #DIABLK,CMDPKT+CP.ADL   ;LOAD BUFFER ADR LOW.
1587 011410  005721                 3$:    TST     (R1)+                   ;POINT TO N (NUMBER OF TIMES TO EXECUTE THIS INS
1588 011412  012167  171776                MOV     (R1)+,NCNT1             ;SAVE NUMBER OF OPERATIONS
1589 011416  005067  171770                CLR     NCNT                    ;CLEAR OPERATION COUNTER.
1590 011422  012167  172020                MOV     (R1)+,PATERN            ;SAVE PATTERN CODE FOR CURRENT CMD.
1591 011426  010203                        MOV     R2,R3                   ;IS IT
1592 011430  162703  000005                SUB     #CMD.CO!CMD.C2,R3       ;A WRITE?
1593 011434  001010                        BNE     5$                      ;BR IF NOT.
1594 011436  016767  171744  170666        MOV     DATAWT,CMDPKT+CP.ADL    ;LOAD WRITE BUFFER LO ORDER.
1595 011444  004767  000106                JSR     PC,GENPAT               ;GO GENERATE THE WRITE PATTERN.
1596 011450  012767  000002  171750        MOV     #2,CMDLG                ;WRITE LOGGING CODE IS 2.
1597 011456  032767  000100  170644  5$:   BIT     #VFY.C,CMDPKT           ;IF DATA VERIFICATION IS REQUIRED:
1598 011464  001407                        BEQ     50065$
1599 011466  112767  000001  172022        MOVB    #1,VFYFLG               ;SET VERIFY FLAG.
1600 011474  042767  000100  170626        BIC     #VFY.C,CMDPKT           ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
1601                                                                        ;IF DATA VERIFICATION IS NOT REQUIRED:
1602 011502  000402                        BR      50066$
1603 011504                         50065$:
1604 011504  105067  172006                CLRB    VFYFLG                  ;CLR VERIFY FLAG.
1605
1606 011510                         50066$:
1607 011510  016767  171704  171706        MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS CMD WORD.
1608 011516  016767  170606  171674        MOV     CMDPKT,CMDWRD           ;SAVE PRESENT CMD WORD.
1609 011524  105767  171770                TSTB    SWBFLG                  ;IF SWAP BYTES IS ENABLED:
1610 011530  001403                        BEQ     50067$
1611 011532  052767  010000  170570        BIS     #SWB.C,CMDPKT           ;SET SWAP BIT IN COMMAND.
1612
1613 011540                         50067$:
1614 011540  042767  004000  170562        BIC     #BRF.C,CMDPKT           ;CLR BRF BIT (INTERNAL ONLY).
1615 011546  016767  170556  171646        MOV     CMDPKT,CMDSAV           ;SAVE 1ST WORD OF COMMAND PACKET.
1616 011554  000207                        RTS     PC                      ;RETURN.
```

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

011556  016703  171664          GENPAT::MOV     PATERN,R3       ;SETUP PATTERN ROUTINE POINTER
011562  006303                          ASL     R3
011564  016704  171626                  MOV     BRFCNT,R4       ;SET LENGTH OF WRITE BFR
011570  005204                          INC     R4
011572  042704  000001                  BIC     #1,R4           ;ROUNDED UP TO NEXT WORD
011576  162704  000002                  SUB     #2,R4           ;WITH FIRST WORD RESERVED
011602  016702  171600                  MOV     DATAWT,R2       ;FOR RECORD COUNT
011606  062702  000002                  ADD     #2,R2
011612  004773  011620                  JSR     PC,@PATTBL(R3)  ;GO GENERATE THE APPROPRIATE PATTERN.
011616  000207                          RTS     PC              ;RETURN TO SETUP SUBROUTINE.

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

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

                                        ;INCREMENTING PATTERN.  0 - 377.

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

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

011676  000207                  2$:     RTS     PC              ;RETURN.

                                        ;ALL ONE'S PATTERN.

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

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

```
1674
1675                                        ;ALL ZEROES PATTERN.
1676
1677 011720  005003                PATR2:: CLR     R3              ;CLR PATTERN REGISTER.
1678 011722  004767  177756                JSR     PC,ZROPAT       ;GO GENERATE IT.
1679 011726  000207                        RTS     PC              ;RETURN.
1680
1681                                        ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
1682
1683 011730  012703  000401          PATR3:: MOV     #401,R3         ;INIT PATTERN REGISTER.
1684 011734  162704  000002          WLKZRO: SUB     #2,R4;LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
1685 011740  100404                        BMI     1$              ;BR IF DONE.
1686 011742  010322                        MOV     R3,(R2)+        ;LOAD DATA.
1687 011744  006303                        ASL     R3              ;SHIFT PATTERN.
1688 011746  005503                        ADC     R3              ;ADD CARRY BACK INTO PATTERN.
1689 011750  000771                        BR      WLKZRO          ;DO IT AGAIN.
1690 011752  000207                1$:     RTS     PC              ;RETURN.
1691
1692                                        ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
1693
1694 011754  012703  177376          PATR4:: MOV     #177376,R3      ;INIT PATTERN REGISTER.
1695 011760  004767  177750                JSR     PC,WLKZRO       ;GO GENERATE ;IT.
1696 011764  000207                        RTS     PC              ;RETURN.
1697
1698                                        ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
1699                                        ;COMPLEMENTED.
1700
1701 011766  012703  125125          PATR5:: MOV     #125125,R3      ;INIT PATTERN REGISTER.
1702 011772  004767  177706                JSR     PC.ZROPAT       ;GO GENERATE IT.
1703 011776  000207                        RTS     PC              ;RETURN.
1704
1705                                        ;ALTERNATING BYTES OF 000 AND 377.
1706
1707 012000  012703  177400          PATR6:: MOV     #177400,R3      ;INIT PATTERN REGISTER.
1708 012004  162704  000002          1$:     SUB     #2,R4           ;DECREMENT WORD COUNT.
1709 012010  100402                        BMI     2$              ;BR IF DONE.
1710 012012  010322                        MOV     R3,(R2)+        ;LOAD DATA.
1711 012014  000773                        BR      1$              ;DO IT AGAIN.
1712 012016  000207                2$:     RTS     PC              ;RETURN.
1713
1714                                        ;RANDOM PATTERN GENERATOR
1715
1716 012020  162704  000002          PATR7:: SUB     #2,R4           ;DECREMENT WORD COUNT
1717 012024  100411                        BMI     GIT             ;BR IF DONE.
1718 012026  066767  171402  171376        ADD     RANS,RANB
1719 012034  066767  171372  171372        ADD     RANB,RANS       ;GET NEW #.
1720 012042  016722  171366                MOV     RANS,(R2)+      ;SAVE #.
1721 012046  000764                        BR      PATR7           ;CONTINUE.
1722 012050  000207                GIT:    RTS     PC              ;RETURN
1723
1724                                        ;       NO PATTERN GENERATION.
1725
1726 012052  000207                PATR8:: RTS     PC              ;RETURN.
1727
1728                                        ;       THIS SUBROUTINE INITIATES TSO5 COMMAND EXECUTION
1729                                        ;       AND CHECKS FOR TSO5 RESPONSE.
1730                                        ;       INPUTS:
```

```
1731                                    ;       OUTPUTS:
1732                                    ;       REGISTERS:      R2, R3.
1733                                    ;       CALLS:          DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.
1734
1735 012054  012767  177777  171354  EXCUTE:: MOV     #-1,TIME1              ;INIT TIMEOUT COUNTER.
1736 012062                          50071$: ;REPEAT                         ;WAIT -
1737 012062  005367  171350                  DEC     TIME1                  ;UPDATE TIMEOUT COUNTER.
1738 012066  005767  171344                  TST     TIME1                  ;IF TIMED OUT:
1739 012072  001011                          BNE     50072$
1740 012074  004767  000634                  JSR     PC,MOVMSG              ;MOVE CURRENT PACKET MSG.
1741 012100                                  ERRDF   2,NSSRM,STAERM         ;REPORT TS05 NOT READY
     012100  104455                                                                  TRAP    C$ERDF
     012102  000002                                                                  .WORD   2
     012104  004536                                                                  .WORD   NSSRM
     012106  006120                                                                  .WORD   STAERM
1742 012110  004767  005064                  JSR     PC,DROPU               ;DROP THE UNIT.
1743 012114  000522                          BR      EXCRTN                 ;RETURN.
1744
1745 012116                          50072$:
1746 012116  032775  000200  002524          BIT     #TS.SSR,@TSSR(R5)      ;WAIT UNTIL DEVICE IS READY.
1747 012124  001756                          BEQ     50071$
1748 012126  026727  171266  140004          CMP     CMDWRD,#SCH            ;IF WE ARE DOING A SET CHAR CMD THEN:
1749 012134  001022                          BNE     50073$
1750 012136  010567  171310                  MOV     R5,R5SAVE                ;SAVE CURRENT DEVICE POINTER.
1751 012142  004767  004734                  JSR     PC,FIRSTU                ;FIND FIRST UNIT.
1752 012146                          50074$:
1753 012146  026527  002604  177777          CMP     DEVTBL(R5),#END    ;WHILE DEVTBL(R5) NE #END DO
1754 012154  001405                          BEQ     50075$
1755 012156  004767  000516                  JSR     PC,WSSR                  ;WAIT FOR UNIT READY OR TIME OUT.
1756 012162  004767  004762                  JSR     PC,NEXTU                 ;FIND NEXT UNIT.
1757
1758 012166  000767                          BR      50074$
1759 012170                          50075$:
1760 012170  016705  171256                  MOV     R5SAVE,R5                ;RESTORE CURRENT DEVICE POINTER.
1761 012174  016567  002544  170272          MOV     MSGPKA(R5),SCHBK         ;SET UP ADR OF MSG PKT IN SCH BLOCK.
1762
1763 012202                          50073$:
1764 012202  016503  002544                  MOV     MSGPKA(R5),R3          ;ADR OF THIS UNIT'S MSG PACKET.
1765 012206  005002                          CLR     R2                             ;CLR COUNTER.
1766 012210                          50076$:
1767 012210  020227  000020                  CMP     R2,#MSGCNT             ;WHILE THERE ARE MORE LOCATIONS:
1768 012214  001405                          BEQ     50077$
1769 012216  012723  177777                  MOV     #-1,(R3)+              ;INIT THE MSG PACKET WITH ALL 1'S
1770 012222  062702  000002                  ADD     #2,R2                  ;UPDATE COUNTER.
1771
1772 012226  000770                          BR      50076$
1773 012230                          50077$:
1774 012230  105767  167756                  TSTB    DINT                   ;ARE INTERRUPTS DISABLED.
1775 012234  001023                          BNE     1$                     ;BR IF YES.
1776 012236  126527  003472  000001          CMPB    INTFLG(R5),#1          ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
1777 012244  003412                          BLE     50100$
1778 012246  017567  002524  171200          MOV     @TSSR(R5),TSSREG       ;FREEZE THE CURRENT STATUS REG FOR PRINT
1779 012254                                  ERRDF   15,TOOMM,STAERM  ;REPORT TOO MANY INTERRUPTS.
     012254  104455                                                                  TRAP    C$ERDF
     012256  000017                                                                  .WORD   15
     012260  004727                                                                  .WORD   TOOMM
     012262  006120                                                                  .WORD   STAERM
```

```
1780 012264  004767  004710                JSR     PC,DROPU                        ;DROP THE UNIT
1781 012270  000434                        BR      EXCRTN                    ;RETURN - UNIT HAS BEEN DROPPED.
1782
1783 012272                        50100$:
1784 012272  005065  003472                CLR     INTFLG(R5)                ;CLR INTERRUPT FLAG FOR THIS DEV.
1785 012276  052767  000200  170024        BIS     #IE.C,CMDPKT              ;SET INT ENABLE BIT.
1786 012304  105767  171161        1$:     TSTB    ERRREC;IFB ERRREC EQ #0 THEN            ;IF NOT RETRYING
1787 012310  001005                        BNE     50101$
1788 012312  005265  003376                INC     RECCNT(R5)                ;LET RECCNT(R5) := RECCNT(R5) + #1
1789 012316  016577  003376  171062        MOV     RECCNT(R5),@DATAWT        ;THEN UPDATE REC COUNT TO WRITE IT ON TAPE
1790
1791 012324                        50101$:
1792 012324  012775  002330  002514        MOV     #CMDPKT,@TSDB(R5)         ;LOAD TSDB WITH CMDPKT ADDRESS
1793                                                                          ;THIS INITIATES COMMAND EXECUTION.
1794 012332  032775  000200  002524        BIT     #TS.SSR,@TSSR(R5)         ;IF READY DID NOT DROP THEN:
1795 012340  001410                        BEQ     50102$
1796 012342  004767  000366                JSR     PC,MOVMSG                 ;MOVE CURRENT MESSAGE PACKET TO COMMON.
1797 012346                                ERRDF   3,TOERM,STAERM            ;REPORT NO TSO5 RESPONSE.
     012346  104455                                                                 TRAP    C$ERDF
     012350  000003                                                                 .WORD   3
     012352  004453                                                                 .WORD   TOERM
     012354  006120                                                                 .WORD   STAERM
1798 012356  004767  004616                JSR     PC,DROPU                  ;DROP THE UNIT
1799
1800 012362                        50102$:
1801 012362  000207                EXCRTN: RTS     PC                        ;RETURN.
1802
1803                               ;       THIS SUBROUTINE WAITS FOR THE TSO5 INERRUPT OR DONE BIT TO SET AND ALLOWS THE
1804                               ;       OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
1805                               ;       UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
1806                               ;       LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
1807                               ;       INPUTS:
1808                               ;       OUTPUTS:
1809                               ;       REGISTERS:      R2, R3.
1810                               ;       CALLS:          DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
1811
1812 012364  012767  177777  171044  GOWAIT:: MOV    #-1,TIME1                 ;INIT TIME OUT COUNTER.
1813 012372                        50103$: ;REPEAT                           ;REPEAT UNTIL INTERRUPT OCCURES:
1814 012372                                BREAK                             ;GO TO THE SUPER TO ALLOW TTY INPUT.
     012372  104422                                                                TRAP    C$BRK
1815 012374  026727  171020  102010        CMP     CMDWRD,#RWD               ;IF COMMAND WAS REWIND THEN:
1816 012402  001014                        BNE     50104$
1817 012404                                DELAY   10.                       ;WAIT  EXTRA MSECS EACH LOOP.
     012404  012727  000012                                                         MOV     #10.,(PC)+
     012410  000000                                                                 .WORD   0
     012412  016727  167500                                                         MOV     L$DLY,(PC)+
     012416  000000                                                                 .WORD   0
     012420  005367  177772                                                         DEC     -6(PC)
     012424  001375                                                                 BNE     .-4
     012426  005367  177756                                                         DEC     -22(PC)
     012432  001367                                                                 BNE     .-20
1818 012434                        50104$:
1819 012434  026727  170760  105010        CMP     CMDWRD,#SFF       ;IF CMDWRD EQ #SFF OR CMDWRD EQ #SFR THEN
1820 012442  001404                        BEQ     50105$
1821 012444  026727  170750  105410        CMP     CMDWRD,#SFR
1822 012452  001014                        BNE     50106$
1823 012454                        50105$:
```

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1824 012454                                DELAY   12.             ;ADD DELAY FOR SPACE TAPE MARK COMMANDS
     012454  012727  000014                                                MOV     #12.,(PC)+
     012460  000000                                                        .WORD   0
     012462  016727  167430                                                MOV     L$DLY,(PC)+
     012466  000000                                                        .WORD   0
     012470  005367  177772                                                DEC     -6(PC)
     012474  001375                                                        BNE     .-4
     012476  005367  177756                                                DEC     -22(PC)
     012502  001367                                                        BNE     .-20
1825 012504                          50106$:
1826 012504  105767  167502                    TSTB    DINT                    ;IF INTERRUPTS ARE ENABLED.
1827 012510  001003                            BNE     50107$
1828 012512  016502  003472                    MOV     INTFLG(R5),R2   ;FETCH INTERRUPT OCCURRED FLAG.
1829
1830 012516  000406                            BR      50110$
1831 012520                          50107$:
1832 012520  012703  000200                    MOV     #TS.SSR,R3      ;SET UP A MASK FOR THE DONE BIT.
1833 012524  005103                            COM     R3
1834 012526  017502  002524                    MOV     @TSSR(R5),R2      ;FETCH DONE BIT.
1835 012532  040302                            BIC     R3,R2
1836
1837 012534                          50110$:
1838 012534  005367  170676                    DEC     TIME1           ;UPDATE TIMEOUT COUNTER.
1839 012540  005702                            TST     R2              ;REPEAT UNTIL INTERRUPT OR READY OCCURES.
1840 012542  001003                            BNE     50111$
1841 012544  005767  170666                    TST     TIME1
1842 012550  001310                            BNE     50103$
1843 012552                          50111$:
1844 012552  005767  170660                    TST     TIME1                   ;IF TIME OUT HAS OCCURRED:
1845 012556  001022                            BNE     50112$
1846 012560  016577  003376  170620            MOV     RECCNT(R5),@DATAWT
1847 012566  005377  170614                    DEC     @DATAWT
1848 012572  004767  000136                    JSR     PC,MOVMSG       ;MOVE CURRENT MSG PACKET TO COMMON AREA.
1849 012576                                    ERRDF   4,NOINTM,STAERM ;REPORT NO INTERRUPT.
     012576  104455                                                        TRAP    C$ERDF
     012600  000004                                                        .WORD   4
     012602  004670                                                        .WORD   NOINTM
     012604  006120                                                        .WORD   STAERM
1850 012606  004767  004366                    JSR     PC,DROPU                ;DROP THE UNIT.
1851 012612  012703  003472                    MOV     #ENDERF,R3      ;LET R3 := #ENDERF
1852 012616  004767  000042                    JSR     PC,CLRERR               ;CLEAR ALL ERROR FLAGS
1853
1854 012622  000417                            BR      50113$
1855 012624                          50112$:
1856 012624  004767  000104                    JSR     PC,MOVMSG       ;MOVE CURRENT MSG. PACKET TO COMMON AREA.
1857 012630  004767  000164                    JSR     PC,RECUD        ;UPDATE THE RECORD COUNT.
1858 012634  004767  000350                    JSR     PC,CHKERR       ;CHECK FOR STATUS ERRORS.
1859 012640  105767  170617                    TSTB    WRTYFG          ;IFB WRTYFG EQ #0 THEN
1860 012644  001006                            BNE     50114$
1861 012646  004767  002714                    JSR     PC,LOG          ;LOG BYTES AND ERRORS.
1862 012652  012703  003472                    MOV     #ENDERF,R3      ;LET R3 := #ENDERF
1863 012656  004767  000002                    JSR     PC,CLRERR       ;CLEAR ALL ERROR FLAGS
1864
1865 012662                          50114$:
1866
1867 012662                          50113$:
1868 012662  000207                            RTS     PC                      ;RETURN IF DONE.
```

```
1869
1870                                    ;       SUBROUTINE TO CLEAR FLAGS.
1871                                    ;       INPUTS:         R3 = LWA TO BE CLEARED + 2.
1872                                    ;       OUTPUTS:
1873                                    ;       REGISTERS:      R2
1874                                    ;       CALLS:
1875
1876 012664  012702  003460            CLRERR:: MOV    #BGNFLG,R2      ;LET R2 := #BGNFLG
1877 012670                            50115$: ;REPEAT
1878 012670  005022                            CLR     (R2)+           ;LET (R2)+ := #0
1879 012672  020203                            CMP     R2,R3           ;UNTIL R2 EQ R3
1880 012674  001375                            BNE     50115$
1881 012676  000207                            RTS     PC
1882
1883
1884                                    ;       SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
1885                                    ;       INPUTS:
1886                                    ;       OUTPUTS:
1887                                    ;       REGISTERS:
1888                                    ;       CALLS:
1889
1890 012700                            WSSR::
1891 012700  012767  177777  170530            MOV     #-1,TIME1               ;INIT TIMEOUT COUNTER.
1892 012706                            50116$:                                   ;REPEAT UNTIL DEV READY OR TIMEOUT:
1893 012706                                    BREAK                             ;BREAK TO THE SUPERVISOR.
     012706  104422                                                                   TRAP    C$BRK
1894 012710  005367  170522                    DEC     TIME1                   ;UPDATE TIMEOUT COUNTER.
1895 012714  032775  000200  002524            BIT     #TS.SSR,@TSSR(R5) ;UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
1896 012722  001003                            BNE     50117$
1897 012724  005767  170506                    TST     TIME1
1898 012730  001366                            BNE     50116$
1899 012732                            50117$:
1900 012732  000207                            RTS     PC                      ;RETURN.
1901
1902
1903
1904                                    ;       SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
1905                                    ;       TO UPDATE THE CURRENT TERMINATION CLASS CODE.
1906                                    ;       INPUTS:
1907                                    ;       OUTPUTS:
1908                                    ;       REGISTERS:      R2, R3.
1909                                    ;       CALLS:
1910
1911 012734  017567  002524  170512    MOVMSG::MOV     @TSSR(R5),TSSREG        ;FREEZE THE STATUS REG CONTENTS
1912 012742  016702  170506                    MOV     TSSREG,R2               ;EXTRACT THE TERMINATION CLASS CODE.
1913 012746  042702  177761                    BIC     #TSC.TCC,R2
1914 012752  010267  170472                    MOV     R2,CTCC                 ;AND SAVE IT
1915 012756  006267  170466                    ASR     CTCC
1916 012762  016503  002544                    MOV     MSGPKA(R5),R3           ;ADR OF THIS DEVICE'S MSG.
1917 012766  005002                            CLR     R2                              ;CLR COUNTER.
1918 012770                            50120$:
1919 012770  020227  000020                    CMP     R2,#MSGCNT              ;WHILE THERE ARE MORE LOCATIONS:
1920 012774  001405                            BEQ     50121$
1921 012776  012362  002354                    MOV     (R3)+,MSGPKT(R2)        ;MOVE MSG TO COMMON AREA.
1922 013002  062702  000002                    ADD     #2,R2                   ;UPDATE COUNTER.
1923
1924 013006  000770                            BR      50120$
```

GLOBAL SUBROUTINES SECTION

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1925 013010                          50121$:
1926 013010  016767  167346  170464          MOV     MSGPKT+MS.XSO,EOTFLG     ;MOVE XSTATO TO EOT FLAG.
1927 013016  000207                  RTS     PC
1928
1929                                 ;       SUBROUTINE TO ADJUST THE RECORD COUNT.
1930                                 ;       INPUTS:
1931                                 ;       OUTPUTS:
1932                                 ;       REGISTERS:
1933                                 ;       CALLS:
1934
1935 013020  105767  170441          RECUD:: TSTB    RECLOG           ;IF RECORD HAS NOT BEEN LOGGED:
1936 013024  001070                  BNE     50122$
1937 013026  005365  003376                  DEC     RECCNT(R5)         ;LET RECCNT(R5) := RECCNT(R5) - #1
1938 013032  032767  000001  170410          BIT     #BIT0,CTCC       ;IF TAPE MOVED
1939 013040  001057                  BNE     50123$
1940 013042  032767  100000  167316          BIT     #X2.OPM,MSGPKT+MS.XS2
1941 013050  001453                  BEQ     50123$
1942 013052  105267  170407                  INCB    RECLOG                   ;SET RECORD LOGGED.
1943 013056  026727  170336  102010          CMP     CMDWRD,#RWD              ;IF THIS IS A REWIND CMD:
1944 013064  001003                  BNE     50124$
1945 013066  005065  003376                  CLR     RECCNT(R5)               ;CLEAR RECORD COUNT.
1946
1947 013072  000442                  BR      50125$
1948 013074                          50124$:
1949 013074  032767  004000  170316          BIT     #BRF.C,CMDWRD            ;IF BRF USED, UPDATE RECORD COUNT.
1950 013102  001436                  BEQ     50126$
1951 013104  032767  000400  170306          BIT     #MOD.CO,CMDWRD             ;IF A FORWARD CMD:
1952 013112  001007                  BNE     50127$
1953 013114  032767  000400  170302          BIT     #MOD.CO,PCMDWD             ;IF PREV CMD WAS A FWD ALSO:
1954 013122  001002                  BNE     50130$
1955 013124  005265  003376                  INC     RECCNT(R5)                 ;INCREMENT RECORD COUNT.
1956
1957 013130                          50130$:
1958                                                                         ;IF REVERSE CMD:
1959 013130  000423                  BR      50131$
1960 013132                          50127$:
1961 013132  032767  000400  170264          BIT     #MOD.CO,PCMDWD           ;IF PREVIOUS CMD WAS A REV ALSO:
1962 013140  001417                  BEQ     50132$
1963 013142  032765  000002  003502          BIT     #X0.BOT,EOTFLG(R5)       ;WHEN NOT AT BOT THEN
1964 013150  001013                  BNE     50133$
1965 013152  105767  170313                  TSTB    ERRREC                    ;CHECK THE ERROR RETRY INDICATOR
1966 013156  001406                  BEQ     2$                                ;BR, IF WE ARE NOT NOW IN ERROR RETRY
1967 013160  105767  170332                  TSTB    VFYFLG                    ;CHECK THE WRITE VERIFY INDICATOR
1968 013164  001403                  BEQ     2$                                ;BR, IF WE ARE NOT IN WRT/VFY MODE
1969 013166  105767  170273                  TSTB    RECLOG                    ;CHECK IF THIS RECORD HAS BEEN COUNTED
1970 013172  001002                  BNE     10$                               ;BR, IF HAVE ALREADY BUMPED RECORD CNTR.
1971 013174  005365  003376          2$:     DEC     RECCNT(R5)                ;DECREMENT RECORD COUNT.
1972 013200                          10$:
1973
1974 013200                          50133$:
1975
1976 013200                          50132$:
1977
1978 013200                          50131$:
1979
1980
1981 013200                          50126$:
```

GLOBAL SUBROUTINES SECTION

```
1982
1983 013200                          50125$:
1984
1985 013200                          50123$:
1986 013200  016577  003376  170200          MOV     RECCNT(R5),@DATAWT      ;LET @DATAWT := RECCNT(R5)
1987
1988 013206                          50122$:
1989 013206  000207                          RTS     PC                      ;RETURN.
1990
1991                                 ;       THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
1992                                 ;       SUBROUTINE IS CALLED TO CHECK THE TS05 STATUS.
1993                                 ;       IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
1994                                 ;       IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
1995                                 ;       THEN AN ERROR RFC IS REPORTED.
1996                                 ;       INPUTS:
1997                                 ;       OUTPUTS:
1998                                 ;       REGISTERS:      R2, R4.
1999                                 ;       CALLS:          TCC0-TCC7.
2000
2001 013210  032767  100000  170236  CHKERR:: BIT     @TS.SC,TSSREG           ;IF SPECIAL COND STATUS IS SET THEN:
2002 013216  001441                          BEQ     50134$
2003 013220  026727  170224  000002          CMP     CTCC,@2                   ;IF TCC IS NOT 2 THEN:
2004 013226  001405                          BEQ     50135$
2005 013230  105767  170235                  TSTB    ERRREC                  ;IF NOT IN ERROR RECOVERY:
2006 013234  001002                          BNE     50136$
2007 013236  005265  003336                  INC     SCCNT(R5)                 ;INC SC COUNTER.
2008
2009 013242                          50136$:
2010
2011 013242                          50135$:
2012 013242  032767  004000  170204          BIT     @TS.NXM,TSSREG          ;WHEN NON-EXISTANT MEMO
2013 013250  001004                          BNE     50137$
2014 013252  032767  040000  170174          BIT     @TS.UPE,TSSREG
2015 013260  001412                          BEQ     50140$
2016 013262                          50137$:
2017 013262  032767  100000  167076          BIT     @X2.OPM,MSGPKT+MS.XS2           ;AND TAPE NOT MOVED
2018 013270  001003                          BNE     50141$
2019 013272  012702  000005                  MOV     @5,R2                           ;SET TCC5 INDEX
2020
2021 013276  000402                          BR      50142$
2022 013300                          50141$:
2023 013300  012702  000004                  MOV     @4,R2                   ;TAPE MOVED, SET TCC4 INDEX
2024
2025 013304                          50142$:
2026
2027 013304  000402                          BR      50143$
2028 013306                          50140$:
2029 013306  016702  170136                  MOV     CTCC,R2                         ;SET DETECTED TCC INDEX
2030
2031 013312                          50143$:
2032 013312  006302                          ASL     R2                      ;CURRENT TCC X 2.
2033 013314  004772  013414                  JSR     PC,@TCCRA(R2)           ;GO TO THE TCC HANDLING SUBROUTINE.
2034
2035 013320  000426                          BR      50144$
2036 013322                          50134$:
2037 013322  032767  004000  170070          BIT     @BRF.C,CMDWRD           ;IF BRF IS USED IN THIS CMD THEN:
2038 013330  001422                          BEQ     50145$
```

```
2039 013332  005767  167022              TST     MSGPKT+MS.RFC           ;IF THERE IS AN RFC THEN:
2040 013336  001417                      BEQ     50146$
2041 013340  105767  170151              TSTB    RANDOM          ;IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
2042 013344  001403                      BEQ     50147$
2043 013346  105767  170144              TSTB    VFYFLG
2044 013352  001411                      BEQ     50150$
2045 013354                      50147$:                                 ;IF NOT IN RANDOM OR IF CMD IS WTV:
2046
2047 013354  105767  170141              TSTB    IRE                 ;IF RFC ERROR REPORTS ARE ALLOWED:
2048 013360  001006                      BNE     50151$
2049 013362  005265  003356              INC     HRDCNT(R5)              ;UPDATE HARD ERROR COUNT
2050 013366                              ERRHRD  13,RFCERM,STAERM        ;REPORT RFC ERROR
     013366  104456                                                          TRAP    C$ERHRD
     013370  000015                                                          .WORD   13
     013372  004521                                                          .WORD   RFCERM
     013374  006120                                                          .WORD   STAERM
2051
2052 013376                      50151$:
2053
2054 013376                      50150$:
2055
2056 013376                      50146$:
2057
2058 013376                      50145$:
2059
2060 013376                      50144$:
2061 013376  105767  170065              TSTB    RWERR                   ;IF A READ/WRITE ERROR HAS OCCURRED THEN:
2062 013402  001403                      BEQ     50152$
2063 013404  016767  170012  166716      MOV     CMDSAV,CMDPKT             ;RESTORE CMD PACKET AFTER ERROR RECOV.
2064
2065 013412                      50152$:
2066 013412  000207                      RTS     PC                      ;RETURN.
2067
2068                             ;       ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
2069
2070 013414  013434              TCCRA:  TCC0
2071 013416  013452                      TCC1
2072 013420  013470                      TCC2
2073 013422  013600                      TCC3
2074 013424  013616                      TCC4
2075 013426  014232                      TCC5
2076 013430  014330                      TCC6
2077 013432  014472                      TCC7
2078
2079                             ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
2080                             ;       CONDITION ERROR.
2081                             ;       INPUTS:
2082                             ;       OUTPUTS:
2083                             ;       REGISTERS:
2084                             ;       CALLS:
2085
2086 013434  005265  003356      TCC0::  INC     HRDCNT(R5)              ;UPDATE HARD ERROR COUNT.
2087 013440                              ERRHRD  5,SCERM,STAERM          ;REPORT SPECIAL CONDITION ERROR.
     013440  104456                                                          TRAP    C$ERHRD
     013442  000005                                                          .WORD   5
     013444  004475                                                          .WORD   SCERM
     013446  006120                                                          .WORD   STAERM
```

GLOBAL SUBROUTINES SECTION

```
2088 013450  000207                          RTS PC                          ;RETURN.
2089
2090
2091                              ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
2092                              ;       THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
2093                              ;       SUCH AS GOING OFFLINE OR COMING ONLINE.
2094                              ;       INPUTS:
2095                              ;       OUTPUTS:
2096                              ;       REGISTERS:      R2,R4
2097                              ;       CALLS:          DROPU
2098
2099 013452                       TCC1::  ERRDF   6,ATTNM,STAERM          ;REPORT ATTENTION-UNIT OFF LINE.
     013452  104455                                                                  TRAP    C$ERDF
     013454  000006                                                                  .WORD   6
     013456  004603                                                                  .WORD   ATTNM
     013460  006120                                                                  .WORD   STAERM
2100 013462  004767  003512                  JSR     PC,DROPU                ;DROP THE UNIT.
2101 013466  000207                          RTS     PC                      ;RETURN.
2102
2103                              ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
2104                              ;       A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
2105                              ;       TO THE PROGRAM.  BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, BOT, EOT.
2106                              ;       INPUTS:
2107                              ;       OUTPUTS:
2108                              ;       REGISTERS:
2109                              ;       CALLS:
2110
2111 013470  032767  000002  166664  TCC2::  BIT     #X0.BOT,MSGPKT+MS.XS0
2112 013476  001404                          BEQ     50153$
2113 013500  105767  170010                  TSTB    EXPBOT
2114 013504  001401                          BEQ     50153$
2115                                                                    ;IF AT BOT AND BOT IS EXPECTED:
2116 013506  000433                          BR      TC2RTN          ;RETURN-TCC2 CAUSED BY EXPECTED BOT.
2117
2118 013510                       50153$:
2119 013510  032767  170002  166644          BIT     #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT,MSGPKT+MS.XS0
2120                                                                    ;IF #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT SETIN MSGPKT+MS.XS0 THEN
2121
2122 013516  001427                          BEQ     50154$
2123                                                                    ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
2124 013520  105767  167771                  TSTB    RANDOM          ;IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
2125 013524  001403                          BEQ     50155$
2126 013526  105767  167764                  TSTB    VFYFLG
2127 013532  001421                          BEQ     50156$
2128 013534                       50155$:
2129                                                                    ;IF NOT IN RANDOM OR IF CMD IS WTV:
2130 013534  105767  167761                  TSTB    IRE             ;IF RFC ERROR REPORTS ARE ALLOWED:
2131 013540  001016                          BNE     50157$
2132 013542  105767  167723                  TSTB    ERRREC          ;IF WE ARE IN ERROR RECOVERY THEN:
2133 013546  001403                          BEQ     50160$
2134 013550  105267  167714                  INCB    UNREC           ;SET UNRECOVERABLE FLAG FOR LOG.
2135                                                                    ;ELSE - IF NOT IN ERROR RECOVERY:
2136 013554  000402                          BR      50161$
2137 013556                       50160$:
2138 013556  005265  003336                  INC     SCCNT(R5)       ;INCREMENT THE SPEC COND COUNTER.
2139
2140 013562                       50161$:
```

```
2141 013562  005265  003356                  INC     HRDCNT(R5)          ;UPDATE HARD ERROR COUNT.
2142 013566                                  ERRHRD  7,TSAM,STAERM           ;REPORT TAPE STATUS ALERT.
     013566  104456                                                              TRAP    C$ERHRD
     013570  000007                                                              .WORD   7
     013572  004705                                                              .WORD   TSAM
     013574  006120                                                              .WORD   STAERM
2143
2144 013576                          50157$:
2145
2146 013576                          50156$:
2147
2148 013576                          50154$:
2149
2150 013576  000207                  TC2RTN:   RTS   PC                          ;RETURN.
2151
2152
2153                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 3, FUNCTION REJECT.
2154                                 ;       THE SPECIFIED FUNCTION WAS NOT INITIATED.  BITS OF INTEREST ARE
2155                                 ;       RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
2156                                 ;       INPUTS:
2157                                 ;       OUTPUTS:
2158                                 ;       REGISTERS:      R2,R4
2159                                 ;       CALLS:          DROPU
2160
2161 013600                          TCC3::  ERRDF   8,FUNRM,STAERM          ;REPORT FUNCTION REJECT.
     013600  104455                                                              TRAP    C$ERDF
     013602  000010                                                              .WORD   8
     013604  004622                                                              .WORD   FUNRM
     013606  006120                                                              .WORD   STAERM
2162 013610  004767  003364                  JSR     PC,DROPU                    ;DROP THE UNIT.
2163 013614  000207                         RTS     PC                          ;RETURN.
2164
2165                                 ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
2166                                 ;       TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
2167                                 ;       THE FUNCTION WAS INITIATED.  RECOVERY PROCEDURE IS TO LOG THE
2168                                 ;       ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
2169                                 ;       2 WRITE-ERROR-RECOVERY ALGORITHMS CAN BE SELECTED:
2170                                 ;       THE FIRST ONE, VIA BADTSW SWITCH,  DOES DETECT BAD SPOTS ON TAPE.
2171                                 ;       IT CALLS A WRITE RETRY SUBR UNTIL THE RECORD IS RECOVERED
2172                                 ;       OR 20 BAD SPOTS HAVE BEEN LOGGED. ON REACHING 20 BAD
2173                                 ;       SPOTS LOGGED, A BAD TAPE OVERFLOW MSG IS PRINTED AND THE
2174                                 ;       UNIT DROPPED.
2175                                 ;       THE SECOND ALGORITHM ISSUES THE TS05 WRITE RETRY COMMAND
2176                                 ;       UP TO 16 TIMES BEFORE DROPPING THE UNIT OR PROCEEDING
2177                                 ;       WITH THE NEXT RECORD ON RECOVERY.
2178                                 ;       INPUTS:
2179                                 ;       OUTPUTS:
2180                                 ;       REGISTERS:      R2,R4.
2181                                 ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU, WRTY
2182
2183 013616  026727  167604  000002  TCC4::  CMP     CMDLG,#2            ;IF CMDLG EQ #2 ANDB BADTSW NE #0 THEN
2184 013624  001125                          BNE     50162$
2185 013626  105767  166356                  TSTB    BADTSW
2186 013632  001522                          BEQ     50162$
2187 013634  105767  167631                  TSTB    ERRREC      ;IFB ERRREC EQ #0 ANDB ERCVER NE #0 THEN
2188 013640  001007                          BNE     50163$
2189 013642  105767  166341                  TSTB    ERCVER
```

```
2190 013646  001404                        BEQ     50163$
2191 013650                                ERRSOFT 9,RERM,STAERM   ;
     013650  104457                                                TRAP    C$ERSOFT
     013652  000011                                                .WORD   9
     013654  005017                                                .WORD   RERM
     013656  006120                                                .WORD   STAERM
2192
2193 013660                          50163$:
2194 013660  105767  166327                TSTB    IREC        ;IFB IREC EQ #0 THEN
2195 013664  001102                        BNE     50164$
2196 013666  105267  167577                INCB    ERRREC      ;RETRY FLAG FOR EXCUTE SUBR: DON'T UPDATE REC CN
2197 013672  105267  167566                INCB    WRTYER      ;REWRITE ERROR FLAG FOR WRTY SUBR
2198 013676  105767  167561                TSTB    WRTYFG      ;FIRST RETRY ON THIS RECORD: SUBSEQUENT
2199 013702  001072                        BNE     50165$
2200                                                           ;RETRIES WITH TCC4 ERRORS BY-PASS THIS SECTION
2201 013704  016767  167510  001174        MOV     CMDWRD,WTYWRD   ;SAVE WRITE COMMAND PACKET
2202 013712  016767  166412  001164        MOV     CMDPKT,WTYCMD
2203 013720  016767  166412  001162        MOV     CMDPKT+CP.CNT,WTYBRF
2204 013726  105267  167535                INCB    RWERR           ;LOG SUBR FLAG: COUNT WRT ERRORS
2205 013732  105267  167525                INCB    WRTYFG          ;RETRY IN PROGRESS FLAG
2206
2207 013736                          50166$:       ;REPEAT
2208 013736  005265  003316                INC     WRTYCT(R5)      ;COUNT GLOBAL WRITE RETRIES
2209 013742  005067  167512                CLR     RETRYC          ;CLEAR # OF RETRIES PER RECORD
2210 013746  105067  167510                CLRB    RPTCNT          ;CLEAR # OF REPEATS
2211 013752  004767  000660                JSR     PC,WRTY         ;CALL WRITE RETRY
2212 013756  105767  167502                TSTB    WRTYER          ;REPEAT RETRIES ON SAME RECORD
2213 013762  001404                        BEQ     50167$
2214 013764  027727  167522  000050        CMP     @BTPT,#40.
2215 013772  103761                        BLO     50166$
2216 013774                          50167$:
2217                                                           ;UNTIL RECOVERED OR 20 BAD SPOTS
2218 013774  027727  167512  000050        CMP     @BTPT,#40.      ;WHEN 20 BAD SPOTS LOGGED
2219 014002  103423                        BLO     50170$
2220 014004                                PRINTB  #BTMSG2         ;PRINT BAD TAPE OVERFLOW MSG
     014004  012746  015177                                        MOV     #BTMSG2,-(SP)
     014010  012746  000001                                        MOV     #1,-(SP)
     014014  010600                                                MOV     SP,R0
     014016  104414                                                TRAP    C$PNTB
     014020  062706  000004                                        ADD     #4,SP
2221 014024  004767  001266                JSR     PC,BORERS       ;ERASE BAD RECORD
2222 014030  005365  003376                DEC     RECCNT(R5)
2223 014034  004767  003140                JSR     PC,DROPU        ;DROP UNIT
2224 014040  005065  003376                CLR     RECCNT(R5)
2225 014044  012775  002350  002514        MOV     #RWCPK,@TSDB(R5)    ;REWIND UNIT
2226
2227 014052                          50170$:
2228 014052  105067  167405                CLRB    WRTYFG          ;RETRY COMPLETE FLAG
2229 014056  105267  167447                INCB    MISCFG          ;DO NOT HALT ON THIS CMD FLG
2230 014062  016767  001020  167334        MOV     WTYWRD,PCMDWD   ;RESTORE ORIGINAL WRT CMD AFTER RECOVERY
2231
2232 014070                          50165$:
2233
2234 014070  000402                        BR      50171$
2235 014072                          50164$:
2236 014072  105267  167372                INCB    UNREC       ;LET UNREC :B= UNREC + #1   ;
2237
```

```
2238 014076                          50171$:
2239
2240 014076  000454                        BR      50172$
2241 014100                          50162$:
2242 014100  004767  000404                JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED.
2243 014104  026727  167316  000002        CMP     CMDLG,#2                        ;IF READ CMD THEN:
2244 014112  003411                        BLE     50173$
2245 014114  012702  000020                MOV     #RRECL,R2               ;R2=READ RETRY COUNT LIMIT / 2
2246 014120  006202                        ASR     R2
2247 014122  026702  167332                CMP     RETRYC,R2       ;IF RETRY COUNT IS MORE THAN HALF LIMIT:
2248 014126  002403                        BLT     50174$
2249 014130  052767  020000  166172        BIS     #OPP.C,CMDPKT           ;SET OPPOSITE BIT FOR RETRY2.
2250
2251 014136                          50174$:
2252
2253 014136                          50173$:
2254 014136  005767  167316                TST     RETRYC      ;IF THIS IS THE ORIGINAL ERROR THEN:
2255 014142  001007                        BNE     50175$
2256 014144  105767  166037                TSTB    ERCVER
2257 014150  001404                        BEQ     50175$
2258 014152                                ERRSOFT 9,RERM,STAERM   ;REPORT RECOVERABLE ERROR
     014152  104457                                                        TRAP    C$ERSOFT
     014154  000011                                                        .WORD   9
     014156  005017                                                        .WORD   RERM
     014160  006120                                                        .WORD   STAERM
2259                                                        ;PROVIDED OPERATOR HAS ENABLED THE REPORT
2260 014162                          50175$:
2261 014162  005267  167272                INC     RETRYC          ;UPDATE RETRY COUNT.
2262 014166  052767  001000  166134        BIS     #MOD.C1,CMDPKT  ;SET RETRY BIT IN CMD PACKET.
2263 014174  105767  166013                TSTB    IREC            ;IF ERROR RECOVERY ENABLED:
2264 014200  001011                        BNE     50176$
2265 014202  105267  167263                INCB    ERRREC          ;SET ERROR RECOVERY FLAG.
2266 014206  012602                        MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
2267 014210  012602                        MOV     (SP)+,R2
2268 014212  004767  175636                JSR     PC,EXCUTE                       ;GO EXECUTE THE RETRY COMMAND.
2269 014216  000167  176142                JMP     GOWAIT                  ;GO WAIT FOR INTERRUPT + CHECK STATUS.
2270                                                                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
2271 014222  000402                        BR      50177$
2272 014224                          50176$:
2273 014224  105267  167240                INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.
2274
2275 014230                          50177$:
2276
2277 014230                          50172$:
2278 014230  000207                        RTS PC                          ;RETURN
2279
2280                                 ;      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
2281                                 ;      TAPE POSITION HAS NOT CHANGED.  RECOVERY PROCEDURE IS TO LOG THE
2282                                 ;      ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
2283                                 ;      INPUTS:
2284                                 ;      OUTPUTS:
2285                                 ;      REGISTERS:      R2,R4.
2286                                 ;      CALLS:          RTLE, EXCUTE, GOWAIT, DROPU.
2287
2288 014232  004767  000252          TCC5::  JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED
2289 014236  005767  167216                TST     RETRYC                  ;IF THIS IS THE ORIGINAL ERROR THEN:
2290 014242  001004                        BNE     50200$
```

```
                                        ERRSOFT 10,RERM,STAERM  ;REPORT RECOVERABLE ERROR.
014244  104457                                                          TRAP    C$ERSOFT
014246  000012                                                          .WORD   10
014250  005017                                                          .WORD   RERM
014252  006120                                                          .WORD   STAERM
                                50200$:
014254  005267  167200                  INC     RETRYC          ;UPDATE RETRY COUNTER.
014260  105767  165727                  TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED:
014264  001016                          BNE     50201$
014266  105267  167177                  INCB    ERRREC          ;SET ERROR RECOVERY FLAG.
014272  005265  003376                  INC     RECCNT(R5)      ;UPDATE REC COUNT
014276  016577  003376  167102          MOV     RECCNT(R5),@DATAWT              ;AND INSERT IT INTO WRT BFR
014304  012602                          MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
014306  012602                          MOV     (SP)+,R2
014310  004767  175540                  JSR     PC,EXCUTE                       ;GO RE-ISSUE THE COMMAND.
014314  000167  176044                  JMP     GOWAIT                  ;GO WAIT FOR INTERRUPT + CHECK STATUS.
                                                                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
014320  000402                          BR      50202$
                                50201$:
014322  105267  167142                  INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.

                                50202$:
014326  000207                          RTS     PC                              ;RETURN.


                                ;       SUBROUTINE TO HANDLE 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.  THIS DIAGNOSTIC WILL REWIND AND RETRY THE
                                ;       COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
                                ;       DROPPED FROM THE TEST SEQUENCE.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2, R4
                                ;       CALLS:          RTLE, WSSR, EXCUTE, GOWAIT, DROPU

014330  036767  163454  166032  TCC6::  BIT     X3.DCK,MSGPKT+MS.XS3;IF X3.DCK NOTSETIN MSGPKT+MS.XS3 THEN
014336  001016                          BNE     50203$
                                                                        ;IF THERE IS NO DENSITY CHECK THEN:
014340  005767  167062                  TST     CMDLG                   ;IF CMD IS A READ OR WRITE THEN:
014344  001404                          BEQ     50204$
014346  105267  167115                  INCB    RWERR           ;SET RD/WR ERROR FLAG.
014352  105267  167112                  INCB    UNREC           ;SET UNRECOVERABLE ERROR FLAG.

                                50204$:
014356                                  ERRDF   11,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
014356  104455                                                          TRAP    C$ERDF
014360  000013                                                          .WORD   11
014362  005041                                                          .WORD   URERM
014364  006120                                                          .WORD   STAERM
014366  004767  002606                  JSR     PC,DROPU                        ;REPORT ERROR + DROP UNIT.
                                                                        ;ELSE-IF THERE IS DENSITY CHECK:
014372  000436                          BR      50205$
014374                          50203$:
014374  004767  000110                  JSR     PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED.
014400  005767  167054                  TST     RETRYC                  ;IF THIS IS THE ORIGINAL ERROR THEN:
014404  001004                          BNE     50206$
```

```
014406                              ERRSOFT 11,URERM,STAERM         ;REPORT DENSITY CHECK ERROR
014406  104457                                                                          TRAP    C$ERSOFT
014410  000013                                                                          .WORD   11
014412  005041                                                                          .WORD   URERM
014414  006120                                                                          .WORD   STAERM

014416                      50206$:
014416  005267  167036              INC     RETRYC                   ;UPDATE RETRY COUNT.
014422  105767  167073              TSTB    IRE                      ;IF ERROR RECOVERY IS ENABLED THEN:
014426  001016                      BNE     50207$
014430  105267  167035              INCB    ERRREC                     ;SET ERROR RECOVERY FLAG.
014434  012775  002350  002514      MOV     #RWCPK,@TSDB(R5)           ;ISSUE A REWIND COMMAND.
014442  004767  176232              JSR     PC,WSSR                    ;WAIT FOR SUBSYSTEM READY.
014446  012602                      MOV     (SP)+,R2                 ;POP 2 RTN ADRS FROM STACK.
014450  012602                      MOV     (SP)+,R2
014452  004767  175376              JSR     PC,EXCUTE                  ;REISSUE THE COMMAND.
014456  000167  175702              JMP     GOWAIT                     ;WAIT FOR INTERRUPT
                                                                     ;ELSE-IF ERR REC DISABLED:
014462  000402                      BR      50210$
014464                      50207$:
014464  105267  167000              INCB    UNREC                    ;SET UNRECOVERABLE ERROR FLAG.

014470                      50210$:

014470                      50205$:
014470  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:

014472                      TCC7::  ERRDF   12,FATSM,STAERM          ;REPORT FATAL SUBSYSTEM ERROR.
014472  104455                                                                          TRAP    C$ERDF
014474  000014                                                                          .WORD   12
014476  004642                                                                          .WORD   FATSM
014500  006120                                                                          .WORD   STAERM
014502  004767  002472              JSR     PC,DROPU                 ;DROP THE UNIT.
014506  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:
                            ;       OUTPUTS:
                            ;       REGISTERS:      R2, R4.
                            ;       CALLS:          DROPU

014510  005767  166712      RTLE::  TST     CMDLG                    ;IF CMD IS NOT A READ OR WRITE THEN:
014514  001010                      BNE.    50211$
014516                              ERRDF   11,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
014516  104455                                                                          TRAP    C$ERDF
```

```
                014520  000013                                                          .WORD   11
                014522  005041                                                          .WORD   URERM
                014524  006120                                                          .WORD   STAERM
  2388          014526  004767  002446                JSR     PC,DROPU                        ;DROP THE UNIT.
  2389          014532  012602                        MOV     (SP)+,R2                ;POP  RTN ADRS FROM STACK.
  2390          014534  000437                        BR      RTLRTN                  ;AND RETURN.
  2391
  2392          014536                        50211$:
  2393          014536  105267  166725                INCB    RWERR           ;SET READ/WRITE ERROR FLAG.
  2394          014542  026727  166660  000002        CMP     CMDLG,#2                ;IF CMD IS A WRT OR WTM:
  2395          014550  001016                        BNE     50212$
  2396          014552  026727  166702  000020        CMP     RETRYC,#WRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
  2397          014560  001011                        BNE     50213$
  2398          014562  105267  166702                INCB    UNREC           ;SET UNRECOVERABLE FLAG
  2399          014566                                ERRDF   14,RLEXM,STAERM ;REPORT RETRY LIMIT EXCEEDED.
                014566  104455                                                          TRAP    C$ERDF
                014570  000016                                                          .WORD   14
                014572  004556                                                          .WORD   RLEXM
                014574  006120                                                          .WORD   STAERM
  2400          014576  004767  002376                JSR     PC,DROPU                ;DROP THE UNIT.
  2401          014602  012602                        MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
  2402          014604                        50213$:
  2403                                                                                  ;ELSE - CMD IS A READ:
  2404          014604  000413                        BR      50214$
  2405          014606                        50212$:
  2406          014606  026727  166646  000020        CMP     RETRYC,#RRECL   ;IF RETRY COUNT HAS REACHED LIMIT:
  2407          014614  001007                        BNE     50215$
  2408          014616  105267  166646                INCB    UNREC           ;SET UNRECOVERABLE FLAG
  2409          014622                                ERRHRD  14,RLEXM,STAERM ;REPORT RECOVERABLE ERROR.
                014622  104456                                                          TRAP    C$ERHRD
                014624  000016                                                          .WORD   14
                014626  004556                                                          .WORD   RLEXM
                014630  006120                                                          .WORD   STAERM
  2410          014632  012602                        MOV     (SP)+,R2                ;POP 2 RTN ADRS FROM STACK.
  2411          014634                        50215$:
  2412
  2413          014634                        50214$:
  2414          014634  000207                RTLRTN: RTS     PC                              ;RETURN
  2415
  2416                                          ;       SUBR TO REWRITE A BAD, BUT RECOVERABLE WRITTEN RECORD.
  2417                                          ;       REWRITE RECORD ON SAME SPOT: REPEAT 4 TIMES.
  2418                                          ;       IF ALL 4 REPEATS GOOD, RECORD IS RECOVERED
  2419                                          ;       AND A RECOVERABLE WRITE ERROR IS LOGGED.
  2420                                          ;       IF ANY OF 4 REPEATS BAD, ERASE BAD RECORD, LOG SUSPECTED
  2421                                          ;       BAD SPOT, RETRY AGAIN. RETRY 4 TIMES, UP TO 4 REPEATS EACH.
  2422                                          ;       IF RECORD NOT GOOD AFTER 4 RETRIES, ERASE IT, EXIT WITH
  2423                                          ;       ERROR FLAG WRTYER SET, PRINTING RETRY FAILED.
  2424                                          ;       THIS ALL SCHEME IS REENTERED 20 TIMES MAX, IE 20 BAD
  2425                                          ;       SPOTS MAX ARE ALLOWED.
  2426                                          ;
  2427                                          ;       INPUTS:
  2428                                          ;       OUTPUTS:
  2429                                          ;       REGISTERS:      R3,R4
  2430                                          ;       CALLS:          BORERS, REWRT
  2431
  2432          014636                        WRTY::  ;BEGIN RETRY      ;REPEAT
  2433
```

```
2434 014636                          50217$:
2435                                      ;BEGIN REPEAT              ;REPEAT
2436
2437 014636                          50221$:
2438 014636  004767  000454               JSR     PC,BORERS            ;BACKSPACE/ERASE ONE RECORD
2439 014642  105067  166616               CLRB    WRTYER               ;CLEAR WRITE RETRY ERROR
2440 014646  004767  000620               JSR     PC,REWRT             ;REWRITE RECORD ON SAME SPOT
2441 014652  105267  166604               INCB    RPTCNT               ;COUNT REPEATS
2442 014656  126727  166600  000004       CMPB    RPTCNT,#4            ;LIMIT: 4 REPEATS OR RECOVERED
2443 014664  001403                       BEQ     50222$
2444 014666  105767  166572               TSTB    WRTYER
2445 014672  001761                       BEQ     50221$
2446 014674                          50222$:
2447                                      ;END REPEAT
2448 014674                          50220$:
2449 014674  005267  166560               INC     RETRYC               ;COUNT RETRIES
2450 014700  105767  166560               TSTB    WRTYER
2451 014704  001001                       BNE     50223$
2452 014706  000457                       BR      50216$               ;EXIT RETRY LOOP IF RECOVERED
2453
2454 014710                          50223$:
2455 014710  105767  165273               TSTB    ERCVER          ;IFB ERCVER NE #0 THEN
2456 014714  001415                       BEQ     50225$
2457 014716                               PRINTB  #BTMSG1,RETRYC,<B,RPTCNT>    ;PRINT SUSPECTED BAD SPOT
     014716  005046                                                              CLR     -(SP)
     014720  156716  166536                                                      BISB    RPTCNT,(SP)
     014724  016746  166530                                                      MOV     RETRYC,-(SP)
     014730  012746  015112                                                      MOV     #BTMSG1,-(SP)
     014734  012746  000003                                                      MOV     #3,-(SP)
     014740  010600                                                              MOV     SP,R0
     014742  104414                                                              TRAP    C$PNTB
     014744  062706  000010                                                      ADD     #10,SP
2458 014750                          50225$:
2459 014750  026727  166504  000001       CMP     RETRYC,#1            ;ON FIRST RETRY, LOGG BAD SPOT
2460 014756  001021                       BNE     50226$
2461 014760  016567  002616  166524       MOV     BTADDR(R5),BTPT      ;BTPT IS BOTH THE BAD SPOT COUNTER
2462 014766  017704  166520               MOV     @BTPT,R4             ;AND THE LOGGING INDEX
2463 014772  062704  000002               ADD     #2,R4
2464 014776  010477  166510               MOV     R4,@BTPT
2465 015002  020427  000050               CMP     R4,#40.         ;IF R4 LOS #40. THEN
2466 015006  101005                       BHI     50227$
2467 015010  016703  166476               MOV     BTPT,R3         ;STORE FIRST 20 BAD SPOTS
2468 015014  060304                       ADD     R3,R4           ;LET R4 := R4 + R3          ;
2469 015016  016514  003376               MOV     RECCNT(R5),(R4) ;LET (R4) := RECCNT(R5)     ;
2470
2471 015022                          50227$:
2472
2473 015022                          50226$:
2474 015022  105267  166477               INCB    ERSFLG          ;ERASE FLAG TO ERASE BAD RECORD
2475 015026  105067  166435               CLRB    RWERR           ;CANCELL "LOG" ERROR FLAG ON FAILING RET
2476 015032  105067  166424               CLRB    RPTCNT          ;CLEAR REPEAT COUNT FOR NEXT RETRY
2477
2478 015036                          50224$:
2479 015036  026727  166416  000004       CMP     RETRYC,#4                    ;LIMIT: 4 RETRIES
2480 015044  001274                       BNE     50217$
2481                                      ;END RETRY
2482 015046                          50216$:
```

```
                                                TSTB    WRTYER  ;IFB WRTYER NE #0 THEN
                                                BEQ     50230$
                                                TSTB    ERCVER    ;IFB ERCVER NE #0 THEN
                                                BEQ     50231$
                                                PRINTB  #BTMSG3                 ;PRINT RETRY FAILED
015062  012746  015247                                                          MOV     #BTMSG3,-(SP)
015066  012746  000001                                                          MOV     #1,-(SP)
015072  010600                                                                  MOV     SP,R0
015074  104414                                                                  TRAP    C$PNTB
015076  062706  000004                                                          ADD     #4,SP

                                        50231$:

                                        50230$:
                                                RTS     PC

015104  000000                         WTYCMD: .WORD   0               ;STORAGE FOR WRITE CMD WHILE RETRYING
015106  000000                         WTYWRD: .WORD   0               ;STORAGE FOR WRITE CMD WORD WHILE RETRYING
015110  000000                         WTYBRF: .WORD   0               ;STORAGE FOR WRITE BPCR WHILE RETRYING

015112      045     101     123     BTMSG1: .ASCIZ  /%ASUSPECT BAD SPOT AFTER %D1%A RETRY, %D1%A REPEAT%N/
015115      125     123     120
015120      105     103     124
015123      040     102     101
015126      104     040     123
015131      120     117     124
015134      040     101     106
015137      124     105     122
015142      040     045     104
015145      061     045     101
015150      040     122     105
015153      124     122     131
015156      054     040     045
015161      104     061     045
015164      101     040     122
015167      105     120     105
015172      101     124     045
015175      116     000
015177      045     116     045     BTMSG2: .ASCIZ  /%N%ABAD TAPE OVERFLOW: CHANGE TAPE!%N%N/
015202      101     102     101
015205      104     040     124
015210      101     120     105
015213      040     117     126
015216      105     122     106
015221      114     117     127
015224      072     040     103
015227      110     101     116
015232      107     105     040
015235      124     101     120
015240      105     041     045
015243      116     045     116
015246      000
015247      045     101     122     BTMSG3: .ASCIZ  /%ARETRY FAILED ON BAD SPOT...ERASED!%N/
015252      105     124     122
015255      131     040     106
015260      101     111     114
015263      105     104     040
```

```
         015266     117     116     040
         015271     102     101     104
         015274     040     123     120
         015277     117     124     056
         015302     056     056     105
         015305     122     101     123
         015310     105     104     041
         015313     045     116     000
 2501                                                .EVEN
 2502
 2503                                        ;       SUBR TO BACSPACE ONE RECORD
 2504                                        ;       IF THE ERASE FLAG IS SET, THEN ERASE THAT RECORD
 2505                                        ;       INPUTS:         ERSFLG  1 = DO ERASE
 2506                                        ;       OUTPUTS:
 2507                                        ;       REGISTERS:
 2508                                        ;       CALLS:          EXCUTE, GOWAIT, CKHAE
 2509
 2510 015316  016767  166076  166100  BORERS::MOV     CMDWRD,PCMDWD   ;SET COMMAND  TO SPACE REV
 2511 015324  012767  104410  166066          MOV     #SRR,CMDWRD     ;LET CMDWRD := #SRR     ;
 2512 015332  016767  166062  164770          MOV     CMDWRD,CMDPKT   ;LET CMDPKT := CMDWRD CLR.BY #BRF.C     ;
 2513 015340  042767  004000  164762          BIC     #BRF.C,CMDPKT
 2514 015346  016767  164756  166046          MOV     CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT   ;
 2515 015354  012767  000001  164750          MOV     #1,CMDPKT+CP.ADL        ;LET CMDPKT+CP.ADL := #1        ;
 2516 015362  005067  166040                  CLR     CMDLG   ;LET CMDLG := #0                ;
 2517 015366  004767  173472                  JSR     PC,CMDAC                ;
 2518 015372  004767  174456                  JSR     PC,EXCUTE               ;
 2519 015376  004767  174762                  JSR     PC,GOWAIT               ;
 2520 015402  004767  002072                  JSR     PC,CKHAE                ;
 2521 015406  105767  166113                  TSTB    ERSFLG          ;WHEN ERASE FLAG IS SET, DO ERASE
 2522 015412  001426                          BEQ     50232$
 2523 015414  016767  166000  166002          MOV     CMDWRD,PCMDWD     ;LET PCMDWD := CMDWRD ;
 2524 015422  012767  100411  165770          MOV     #ERS,CMDWRD       ;LET CMDWRD := #ERS   ;
 2525 015430  016767  165764  164672          MOV     CMDWRD,CMDPKT     ;LET CMDPKT := CMDWRD ;
 2526 015436  016767  164666  165756          MOV     CMDPKT,CMDSAV     ;LET CMDSAV := CMDPKT ;
 2527 015444  004767  173414                  JSR     PC,CMDAC                ;
 2528 015450  004767  174400                  JSR     PC,EXCUTE
 2529 015454  004767  174704                  JSR     PC,GOWAIT
 2530 015460  004767  002014                  JSR     PC,CKHAE
 2531 015464  105067  166035                  CLRB    ERSFLG          ;LET ERSFLG :B= #0
 2532
 2533 015470                          50232$:
 2534 015470  000207                          RTS     PC
 2535
 2536                                        ;       SUBR TO REWRITE A BADLY WRITTEN RECORD
 2537
 2538 015472  016767  165722  165724  REWRT:: MOV     CMDWRD,PCMDWD   ;RESTORE WRITE COMMAND PACKET
 2539 015500  016767  177402  165712          MOV     WTYWRD,CMDWRD   ;LET CMDWRD := WTYWRD   ;
 2540 015506  016767  177372  164614          MOV     WTYCMD,CMDPKT   ;LET CMDPKT := WTYCMD   ;
 2541 015514  016767  164610  165700          MOV     CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT   ;
 2542 015522  016767  165660  164602          MOV     DATAWT,CMDPKT+CP.ADL    ;LET CMDPKT+CP.ADL := DATAWT    ;
 2543 015530  016767  177354  164600          MOV     WTYBRF,CMDPKT+CP.CNT    ;LET CMDPKT+CP.CNT := WTYBRF    ;
 2544 015536  012767  000002  165662          MOV     #2,CMDLG        ;LET CMDLG := #2                ;
 2545 015544  004767  173314                  JSR     PC,CMDAC
 2546 015550  004767  174300                  JSR     PC,EXCUTE                       ;RE-WRITE RECORD
 2547 015554  004767  174604                  JSR     PC,GOWAIT                       ;
 2548 015560  004767  001714                  JSR     PC,CKHAE                        ;
 2549 015564  000207                          RTS     PC
```

```
2550
2551                                    ;       SUBROUTINE TO LOG BYTES READ/WRITTEN.
2552                                    ;       ALSO UPDATES READ/WRITE ERROR COUNTERS.
2553                                    ;       INPUTS:
2554                                    ;       OUTPUTS:
2555                                    ;       REGISTERS:      R2, R3, R4.
2556                                    ;       CALLS:
2557
2558 015566  105767  165674            LOG::   TSTB    ERLOG           ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED THEN:
2559 015572  001126                            BNE     50233$
2560 015574  105267  165666                    INCB    ERLOG           ;SET LOG DONE FLAG.
2561 015600  016704  165622                    MOV     CMDLG,R4        ;GET CURRENT CMD LOGGING CODE.
2562 015604  005704                            TST     R4              ;IF THERE IS A CODE THEN:
2563 015606  001520                            BEQ     50234$
2564 015610  162704  000002                    SUB     #2,R4           ;ADJUST THE CODE FOR TABLE INDEX.
2565 015614  010502                            MOV     R5,R2           ;R2 = ADR OF BYTE COUNT LSW.
2566 015616  066402  016052                    ADD     BINC(R4),R2
2567 015622  062702  002626                    ADD     #CNTBGN,R2
2568 015626  066712  165564                    ADD     BRFCNT,(R2)             ;ADD BRF TO LSW.
2569 015632  026767  164522  165556            CMP     MSGPKT+MS.RFC,BRFCNT  ;IF THE RFC IS LOWER OR THE SAME AS BRF THEN
2570 015640  101002                            BHI     50235$
2571 015642  166712  164512                    SUB     MSGPKT+MS.RFC,(R2)      ;SUBTRACT RFC FROM EXPECTED BRF.
2572
2573 015646                            50235$:
2574 015646  010203                            MOV     R2,R3                   ;R3 = ADR OF 2ND WORD.
2575 015650  062703  000010                    ADD     #10,R3
2576
2577 015654                            50236$:   ;WHILE (R2) GT #999. DO
2578 015654  021227  001747                    CMP     (R2),#999.
2579 015660  003404                            BLE     50237$
2580 015662  162712  001750                    SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
2581 015666  005213                            INC     (R3)        ;LET (R3) := (R3) + #1      ;2ND WORD.
2582
2583 015670  000771                            BR      50236$
2584 015672                            50237$:
2585 015672  010302                            MOV     R3,R2     ;LET R2 := R3 + #10           ;R2 = ADR OF 3RD WORD.
2586 015674  062702  000010                    ADD     #10,R2
2587 015700                            50240$:   ;WHILE (R3) GT #999. DO
2588 015700  021327  001747                    CMP     (R3),#999.
2589 015704  003404                            BLE     50241$
2590 015706  162713  001750                    SUB     #1000.,(R3)     ;UPDATE BYTE COUNT
2591 015712  005212                            INC     (R2)        ;LET (R2) := (R2) + #1      ;3RD WORD.
2592
2593 015714  000771                            BR      50240$
2594 015716                            50241$:
2595 015716  010203                            MOV     R2,R3     ;LET R3 := R2 + #10           ;R3 = ADR OF 4TH WORD.
2596 015720  062703  000010                    ADD     #10,R3
2597 015724                            50242$:   ;WHILE (R2) GT #999. DO
2598 015724  021227  001747                    CMP     (R2),#999.
2599 015730  003404                            BLE     50243$
2600 015732  162712  001750                    SUB     #1000.,(R2)     ;UPDATE BYTE COUNT
2601 015736  005213                            INC     (R3)        ;LET (R3) := (R3) + #1      ;4TH WORD.
2602
2603 015740  000771                            BR      50242$
2604 015742                            50243$:
2605 015742  105767  165521                    TSTB    RWERR                   ;IF R/W ERROR, UPDATE ERROR COUNT.
2606 015746  001440                            BEQ     50244$
```

```
GLOBAL AREAS    MACRO M1113  30-NOV-83 10:17                                                    SEQ 091
GLOBAL SUBROUTINES SECTION

 2607 015750  010502                        MOV     R5,R2                   ;R2 = ADR OF COUNTER.
 2608 015752  066402  016060                ADD     EINC(R4),R2
 2609 015756  062702  002766                ADD     #WRREC,R2
 2610 015762  105767  165502                TSTB    UNREC           ;IS THE ERROR UNRECOVERABLE?
 2611 015766  001404                        BEQ     50245$
 2612 015770  062702  000010                ADD     #10,R2          ;YES, POINT TO NEXT COUNTER.
 2613 015774  005212                        INC     (R2)            ;UPDATE THE ERROR COUNTER
 2614                                                                ;ELSE - IF ERROR IS RECOVERABLE:
 2615 015776  000424                        BR      50246$
 2616 016000                          50245$:
 2617 016000  005212                        INC     (R2)            ;UPDATE THE ERROR COUNTER
 2618 016002  105767  164205                TSTB    IREC            ;IF ERROR RECOVERY IS ENABLED:
 2619 016006  001020                        BNE     50247$
 2620 016010  105767  165506                TSTB    DROPED          ;IF UNIT HAS NOT BEEN DROPPED:
 2621 016014  001015                        BNE     50250$
 2622 016016  105767  164165                TSTB    ERCVER
 2623 016022  001412                        BEQ     50250$
 2624 016024                                PRINTB  #NURTY1,RETRYC      ;PRINT # OF RETRIES TO RECOVER
      016024  016746  165430                                                  MOV     RETRYC,-(SP)
      016030  012746  005422                                                  MOV     #NURTY1,-(SP)
      016034  012746  000002                                                  MOV     #2,-(SP)
      016040  010600                                                          MOV     SP,R0
      016042  104414                                                          TRAP    C$PNTB
      016044  062706  000006                                                  ADD     #6,SP
 2625                                                               ;PROVIDED PRINT HAS BEEN ENABLED
 2626 016050                          50250$:
 2627
 2628 016050                          50247$:
 2629
 2630
 2631 016050                          50246$:
 2632
 2633 016050                          50244$:
 2634
 2635 016050                          50234$:
 2636
 2637 016050                          50233$:
 2638 016050  000207                        RTS     PC
 2639
 2640                                 ;      INDEXES TO BYTE COUNTERS.
 2641 016052  000000                  BINC:  0                               ;WRITE.
 2642 016054  000040                         40                              ;READ REV.
 2643 016056  000100                         100                             ;READ FWD.
 2644                                 ;      INDEXES TO READ/WRITE ERROR COUNTERS.
 2645 016060  000000                  EINC:  0                               ;WRITE.
 2646 016062  000020                         20                              ;READ REV.
 2647 016064  000040                         40                              ;READ FWD.
 2648
 2649                                 ;      IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
 2650                                 ;      TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
 2651                                 ;      READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
 2652                                 ;      INPUTS:
 2653                                 ;      OUTPUTS:
 2654                                 ;      REGISTERS:
 2655                                 ;      CALLS:          VFEXC.
 2656
 2657 016066  105767  165424          VFYDAT::TSTB    VFYFLG          ;IF DATA IS TO BE VERIFIED:
```

```
2658 016072  001426                        BEQ     502518
2659 016074  016767  165320  165322        MOV     CMDWRD,PCMDWD     ;SAVE THE PREVIOUS COMMAND WORD.
2660 016102  012767  104401  165310        MOV     #RDR,CMDWRD       ;COMMAND IS READ REV.
2661 016110  012767  000004  165310        MOV     #4,CMDLG          ;SET UP CMD LOGGING INDEX.
2662 016116  004767  000030                JSR     PC,VFEXC          ;GO READ ALL THE RECORDS REV.
2663 016122  016767  165272  165274        MOV     CMDWRD,PCMDWD     ;SAVE THE PREVIOUS COMMAND WORD.
2664 016130  012767  104001  165262        MOV     #RDF,CMDWRD       ;COMMAND IS READ FWD.
2665 016136  012767  000006  165262        MOV     #6,CMDLG          ;SET UP CMD LOGGING INDEX.
2666 016144  004767  000002                JSR     PC,VFEXC                ;GO READ ALL RECORDS FWD.
2667
2668 016150                        502518:
2669 016150  000207                        RTS     PC      ;RETURN.
2670
2671
2672
2673
2674                                ;       SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
2675                                ;       INPUTS:
2676                                ;       OUTPUTS:
2677                                ;       REGISTERS:      R2
2678                                ;       CALLS:          CMDAC, FIRSTU, VFISU, NEXTU, CKHAE.
2679
2680 016152  016767  165242  164150 VFEXC:: MOV     CMDWRD,CMDPKT   ;COMMAND PACKET = READ REV OR FWD.
2681 016160  042767  004000  164142        BIC     #BRF.C,CMDPKT
2682 016166  105767  165326                TSTB    SWBFLG                  ;IF BYTES ARE TO BE SWAPPED:
2683 016172  001403                        BEQ     502528
2684 016174  052767  010000  164126        BIS     #SWB.C,CMDPKT     ;SET SWAB BIT IN CMD PACKET.
2685
2686 016202                        502528:
2687 016202  016767  164122  165212        MOV     CMDPKT,CMDSAV           ;SAVE COMMAND PACKET 1ST WORD.
2688 016210  016767  165174  164114        MOV     DATARD,CMDPKT+CP.ADL    ;SAVE BUFFER START ADDRESS.
2689 016216  005067  165170                CLR     NCNT                    ;CLEAR NUMBER OF OPERATIONS.
2690
2691 016222                        502538: ;WHILE NCNT LT NCNT1 DO         ;WHILE THERE ARE RECORDS REMAINING:
2692 016222  026767  165164  165164        CMP     NCNT,NCNT1
2693 016230  002062                        BGE     502548
2694 016232  004767  172626                JSR     PC,CMDAC                ;STORE CMD ASCII IN ERROR MSG.
2695 016236  004767  000640                JSR     PC,FIRSTU         ;SET UP FOR FIRST UNIT.
2696 016242                        502558:   ;WHILE  DEVTBL(R5) NE #END DO ;WHILE THERE ARE DEVICES REMAINING:
2697 016242  026527  002604  177777        CMP     DEVTBL(R5),#END
2698 016250  001442                        BEQ     502568
2699 016252  032767  000400  165140        BIT     #MOD.CO,CMDWRD            ;IF CMD IS REVERSE THEN:
2700 016260  001421                        BEQ     502578
2701 016262  032765  000002  003502        BIT     #XO.BOT,EOTFLG(R5)         ;IF NOT AT BOT
2702 016270  001014                        BNE     502608
2703 016272  032765  000001  003502        BIT     #XO.EOT,EOTFLG(R5)         ;BUT IF AT EOT
2704 016300  001406                        BEQ     502618
2705 016302  105767  165216                TSTB    ALLEOT                    ;AND ALL OTHERS AT EOT
2706 016306  001402                        BEQ     502628
2707 016310  004767  000064                JSR     PC,VFISU                  ;THEN READ VERIFY
2708                                                                        ;IF NOT ALL AT EOT, FREEZE UNIT(S)
2709 016314                        502628:
2710                                                                            ;IF NOT AT BOT AND
2711 016314  000402                        BR      502638
2712 016316                        502618:
2713 016316  004767  000056                JSR     PC,VFISU                       ;NOT AT EOT, READ VFY
2714
```

```
2715 016322                          50263$:
2716
2717 016322                          50260$:
2718 016322  000412                    BR      50264$                          ;ELSE IF CMD IS NOT REVERSE:
2719 016324                          50257$:
2720 016324  032765  000001  003502      BIT     #XO.EOT,EOTFLG(R5)
2721 016332  001404                      BEQ     50265$
2722 016334  032767  000001  165056      BIT     #CMD.CO,CMDWRD
2723 016342  001002                      BNE     50266$
2724 016344                          50265$:
2725                                                 ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
2726 016344  004767  000030              JSR     PC,VFISU                        ;ISSUE CMD, CHECK STATUS AND DATA.
2727
2728 016350                          50266$:
2729
2730 016350                          50264$:
2731 016350  004767  000574              JSR     PC,NEXTU                ;GO FIND THE NEXT UNIT.
2732
2733 016354  000732                      BR      50255$
2734 016356                          50256$:
2735 016356  004767  001116              JSR     PC,CKHAE                ;CHECK FOR HALT AFTER EACH CMD.
2736 016362  005267  165024              INC     NCNT                    ;UPDATE THE RECORD COUNT.
2737 016366  016767  165026  165030      MOV     CMDWRD,PCMDWD           ;SAVE PREVIOUS COMMAND WORD.
2738
2739 016374  000712                      BR      50253$
2740 016376                          50254$:
2741 016376  000207                      RTS     PC                      ;RETURN.
2742
2743                                 ;       SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
2744                                 ;       CHECK STATUS, CHECK DATA.
2745                                 ;       INPUTS:
2746                                 ;       OUTPUTS:
2747                                 ;       REGISTERS:      R2
2748                                 ;       CALLS:          EXCUTE, GOWAIT, CKDATA.
2749
2750 016400  016702  165004          VFISU:: MOV     DATARD,R2               ;INIT READ BUFFER POINTER.
2751 016404  062702  000010              ADD     #8.,R2
2752 016410                          50267$:     ;WHILE R2 NE DATARD DO      ;UNTIL 8 BYTES HAVE BEEN SET.
2753 016410  020267  164774              CMP     R2,DATARD
2754 016414  001403                      BEQ     50270$
2755 016416  012742  177777              MOV     #-1,-(R2)                   ;INIT READ BUFFER.
2756
2757 016422  000772                      BR      50267$
2758 016424                          50270$:
2759 016424  004767  173424              JSR     PC,EXCUTE               ;GO EXECUTE THE COMMAND.
2760 016430  105767  165066              TSTB    DROPED                  ;IF UNIT HAS NOT BEEN DROPPED THEN:
2761 016434  001002                      BNE     50271$
2762 016436  004767  173722              JSR     PC,GOWAIT               ;GO WAIT FOR DONE BIT.
2763
2764 016442                          50271$:
2765 016442  105767  165054              TSTB    DROPED                  ;IF UNIT HAS NOT BEEN DROPPED THEN:
2766 016446  001006                      BNE     50272$
2767 016450  032765  000002  003502      BIT     #XO.BOT,EOTFLG(R5)      ;WHEN NOT REVERSED INTO BOT, THEN
2768 016456  001002                      BNE     50273$
2769 016460  004767  000002              JSR     PC,CKDATA               ;GO VERIFY DATA.
2770
2771 016464                          50273$:
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```
2772
2773 016464                          50272$:
2774 016464  000207                         RTS     PC
2775
2776
2777                                  ;       SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
2778                                  ;       AND PRINT ERROR MESSAGE ON MISCOMPARE.
2779                                  ;       INPUTS:
2780                                  ;       OUTPUTS:
2781                                  ;       REGISTERS:      R2, R3, R4.
2782                                  ;       CALLS:          GCMDA
2783
2784 016466  016703  164724          CKDATA::MOV     BRFCNT,R3               ;COMPUTE REC LENGTH READ
2785 016472  166703  163662                  SUB     MSGPKT+MS.RFC,R3
2786 016476  005703                         TST     R3                      ;WHEN NO DATA RECEIVED
2787 016500  001015                         BNE     50274$
2788 016502                                  ERRHRD  17,WTVERM,DTAERM                ;PRINT ERROR AND EXIT
      016502  104456                                                                  TRAP    C$ERHRD
      016504  000021                                                                  .WORD   17
      016506  004430                                                                  .WORD   WTVERM
      016510  005752                                                                  .WORD   DTAERM
2789 016512                                  PRINTB  #DTAER4         ;COMPARE ROUTINE
      016512  012746  005337                                                          MOV     #DTAER4,-(SP)
      016516  012746  000001                                                          MOV     #1.-(SP)
      016522  010600                                                                  MOV     SP,R0
      016524  104414                                                                  TRAP    C$PNTB
      016526  062706  000004                                                          ADD     #4,SP
2790 016532  000560                         BR      50275$
2791 016534                          50274$:
2792 016534  020367  164656                 CMP     R3,BRFCNT               ;WHEN REC READ IS LONGER
2793 016540  101417                         BLOS    50276$
2794 016542                                      ERRHRD 17,WTVERM,DTAERM             ;THAN EXPECTED, PRINT
      016542  104456                                                                  TRAP    C$ERHRD
      016544  000021                                                                  .WORD   17
      016546  004430                                                                  .WORD   WTVERM
      016550  005752                                                                  .WORD   DTAERM
2795 016552                                      PRINTB #DTAER5,CMDPKT+CP.CNT        ;AN ERROR MESSAGE
      016552  016746  163560                                                          MOV     CMDPKT+CP.CNT,-(SP)
      016556  012746  005360                                                          MOV     #DTAER5,-(SP)
      016562  012746  000002                                                          MOV     #2,-(SP)
      016566  010600                                                                  MOV     SP,R0
      016570  104414                                                                  TRAP    C$PNTB
      016572  062706  000006                                                          ADD     #6,SP
2796                                                                 ;AND EXIT ROUTINE
2797 016576  000536                         BR      50277$
2798 016600                          50276$:
2799 016600  010367  000272                 MOV     R3,CKDCNT               ;SAVE VERIFICATION LENGTH - 1.
2800 016604  005367  000266                 DEC     CKDCNT
2801 016610  005067  000264                 CLR     CKDFF                   ;CLEAR # OF BYTES IN ERROR COUNTER.
2802 016614  005002                         CLR     R2                      ;INIT BYTE COUNTER
2803 016616  016703  164564                 MOV     DATAWT,R3               ;GET WRITE BUFFER ADDRESS.
2804 016622  016704  164562                 MOV     DATARD,R4               ;GET READ BUFFER ADDRESS.
2805 016626  105767  164671                 TSTB    T1SWB                   ;WHEN RUNNING TEST1-SUB 12.
2806 016632  001401                         BEQ     50300$
2807 016634  000313                         SWAB    (R3)                    ;SWAP FIRST WORD OF WRT BFR
2808                                                                 ;WHICH CONTAINS THE RECORD COUNT
2809 016636                          50300$:
```

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2810                                        ;REPEAT                         ;REPEAT UNTIL ALL DATA IS COMPARED:
2811 016636                          50301$:
2812 016636  020267  000234                 CMP     R2,CKDCNT               ;IF THIS IS THE LAST BYTE THEN:
2813 016642  001011                         BNE     50302$
2814 016644  105767  164650                 TSTB    SWBFLG                  ;IF BYTE SWAPPING IS ENABLED THEN:
2815 016650  001406                         BEQ     50303$
2816 016652  032767  000001  000216         BIT     #BIT00,CKDCNT           ;IF RECORD LENGTH IS ODD THEN:
2817 016660  001002                         BNE     50304$
2818 016662  105723                         TSTB    (R3)+           ;LAST BYTE WILL BE IN
2819 016664  105724                         TSTB    (R4)+           ;THE UPPER BYTE.
2820
2821 016666                          50304$:
2822
2823 016666                          50303$:
2824
2825 016666                          50302$:
2826 016666  121314                         CMPB    (R3),(R4)               ;ARE THEY EQUAL.
2827 016670  001452                         BEQ     3$                      ;BR IF SO.
2828 016672  005767  000202                 TST     CKDFF                   ;1 ST TIME THRU?
2829 016676  001010                         BNE     2$                      ;BR IF NOT.
2830 016700  005265  003346                 INC     VFYCNT(R5)              ;INC THE VERIFY ERROR COUNTER.
2831 016704  005265  003356                 INC     HRDCNT(R5)              ;INC THE HARD ERROR COUNT.
2832 016710                                 ERRHRD  17,WTVERM,DTAERM        ;REPORT WRITE/VERIFY ERROR.
     016710  104456                                                                TRAP    C$ERHRD
     016712  000021                                                                .WORD   17
     016714  004430                                                                .WORD   WTVERM
     016716  005752                                                                .WORD   DTAERM
2833 016720  005267  000154          2$:    INC     CKDFF;LET CKDFF := CKDFF + #1   ;INCREMENT # OF BYTES IN ERROR.
2834 016724  111467  164506                 MOVB    (R4),TIME1              ;SAVE WAS DATA FOR TYPOUT.
2835 016730  042767  177400  164500         BIC     #177400,TIME1           ;CLEAR GARBAGE.
2836 016736  111367  164476                 MOVB    (R3),TIME2              ;SAVE SHOULD BE DATA FOR TYPOUT.
2837 016742  042767  177400  164470         BIC     #177400,TIME2           ;CLEAR GARBAGE.
2838 016750  026727  000124  000013         CMP     CKDFF,#11.              ;IF ERROR BYTE COUNT IS LESS THAN 11:
2839 016756  002017                         BGE     50305$
2840 016760                                 PRINTX  #DTAER2,R2,<B,TIME1>,<B,TIME2>;PRINT ACTUAL & EXPECTED DATA
     016760  005046                                                                CLR     -(SP)
     016762  156716  164452                                                        BISB    TIME2,(SP)
     016766  005046                                                                CLR     -(SP)
     016770  156716  164442                                                        BISB    TIME1,(SP)
     016774  010246                                                                MOV     R2,-(SP)
     016776  012746  005226                                                        MOV     #DTAER2,-(SP)
     017002  012746  000004                                                        MOV     #4,-(SP)
     017006  010600                                                                MOV     SP,R0
     017010  104415                                                                TRAP    C$PNTX
     017012  062706  000012                                                        ADD     #12,SP
2841 017016                          50305$:
2842
2843 017016  105723                  3$:    TSTB    (R3)+                   ;UPDATE WRITE BUFFER ADDRESS.
2844 017020  105724                         TSTB    (R4)+                   ;UPDATE READ BUFFER ADDRESS.
2845 017022  105722                         TSTB    (R2)+                   ;UPDATE BYTE COUNTER.
2846 017024  020267  000046                 CMP     R2,CKDCNT               ;END OF DATA COMPARE REPEAT LOOP.
2847 017030  003702                         BLE     50301$
2848 017032  005267  000040                 INC     CKDCNT                  ;CKDCNT EQUALS RECORD LENGTH.
2849 017036  005767  000036                 TST     CKDFF                   ;IF COMPARE ERROR HAS OCCURED THEN:
2850 017042  001414                         BEQ     50306$
2851 017044                                 PRINTB  #DTAER3,CKDFF,CKDCNT    ;PRINT # OF BYTES IN ERROR.
     017044  016746  000026                                                        MOV     CKDCNT,-(SP)
```

```
        017050  016746  000024                                                  MOV     CKDFF,-(SP)
        017054  012746  005275                                                  MOV     #DTAER3,-(SP)
        017060  012746  000003                                                  MOV     #3,-(SP)
        017064  010600                                                          MOV     SP,R0
        017066  104414                                                          TRAP    C$PNTB
        017070  062706  000010                                                  ADD     #10,SP
  2852
  2853  017074                          50306$:
  2854
  2855  017074                          50277$:
  2856
  2857  017074                          50275$:
  2858  017074  000207                         RTS     PC                      ;OTHERWISE, RETURN.
  2859
  2860  017076  000000                 CKDCNT: .WORD   0                       ;# OF BYTES TO BE VERIFIED -1.
  2861  017100  000000                 CKDFF:  .WORD   0                       ;# OF BYTES IN ERROR COUNTER.
  2862
  2863                                  ;       SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
  2864                                  ;       INPUTS:
  2865                                  ;       OUTPUTS:
  2866                                  ;       REGISTERS:
  2867                                  ;       CALLS:
  2868
  2869  017102  105067  164414         FIRSTU:: CLRB   DROPED          ;CLR UNIT DROPPED FLAG
  2870  017106  005005                         CLR     R5                      ;CLR DEVICE POINTER.
  2871  017110  026527  002604  177774 50307$: CMP     DEVTBL(R5),#NINUSE      ;WHILE DEVICES ARE NOT IN USE:
  2872  017116  001003                         BNE     50310$
  2873  017120  062705  000002                 ADD     #2,R5   ;LET R5 := R5 + #2              ;POINT TO NEXT DEVICE.
  2874  017124  000771                         BR      50307$
  2875  017126                          50310$:
  2876  017126  026527  002604  177777         CMP     DEVTBL(R5),#END         ;IF ALL UNITS HAVE BEEN DROPPED THEN:
  2877  017134  001001                         BNE     50311$
  2878  017136                                 DOCLN                           ;DO CLEAN CODE AND TERMINATE PASS.
        017136  104444                                                                 TRAP    C$DCLN
  2879
  2880  017140                          50311$:
  2881  017140  016567  002604  162726         MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN "HEADER" FOR ERROR REPORT
  2882  017146  000207                         RTS     PC                      ;RETURN WITH 1ST DEVICE IN R5.
  2883
  2884
  2885                                  ;       SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
  2886                                  ;       INPUTS:
  2887                                  ;       OUTPUTS:
  2888                                  ;       REGISTERS:
  2889                                  ;       CALLS:
  2890
  2891  017150  105067  164346         NEXTU:: CLRB    DROPED                  ;CLR UNIT DROPPED FLAG
  2892                                          ;REPEAT                         ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
  2893  017154                          50312$:
  2894  017154  062705  000002                 ADD     #2,R5                   ;UPDATE DEVICE TABLE POINTER.
  2895  017160  026527  002604  177774         CMP     DEVTBL(R5),#NINUSE      ;UNTIL DEVTBL(R5) NE #NINUSE
  2896  017166  001772                         BEQ     50312$
  2897  017170  016567  002604  162676         MOV     DEVTBL(R5),L$LUN        ;SET UNIT # IN "HEADER" FOR ERROR REPORT
  2898  017176  000207                         RTS     PC                      ;RETURN.
  2899
  2900
  2901                                  ;       SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
```

```
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:          MOVMSG, PRXST, LOG

017200  005265  003366               DROPU:: INC     FTLCNT(R5)          ;INCREMENT THE FATAL ERROR COUNT.
017204  016704  163160                       MOV     MSGPKT+MS.XS3,R4    ;GET UDIAG ERROR CODE FROM XSTAT3.
017210  042704  000377                       BIC     #377,R4
017214  016503  002544                       MOV     MSGPKA(R5),R3       ;ADR OF THIS UNIT'S MSG PACKET.
017220  005002                             CLR     R2          ;LET R2 := #0                   ;CLR COUNTER.
017222                                  50313$: ;WHILE R2 NE #MSGCNT DO         ;WHILE THERE ARE MORE LOCATIONS:
017222  020227  000020                       CMP     R2,#MSGCNT
017226  001405                             BEQ     50314$
017230  012723  177777                       MOV     #-1,(R3)+                   ;INIT THE MSG PACKET WITH ALL 1'S
017234  062702  000002                       ADD     #2,R2       ;LET R2 := R2 + #2          ;UPDATE COUNTER.

017240  000770                             BR      50313$
017242                                  50314$:
017242  012775  002340  002514             MOV     #GSCPK,@TSDB(R5)            ;INITIATE A GET STATUS COMMAND.
017250  004767  173424                       JSR     PC,WSSR                     ;WAIT A WHILE FOR SSR=1
017254  004767  173454                       JSR     PC,MOVMSG                   ;MOVE MSG PACKET TO COMMON AREA.
017260  020427  157400                       CMP     R4,#X3.RNY                  ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
017264  001005                             BNE     50315$
017266                                      ERRDF   16,RNYM,STAERM              ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
017266  104455                                                                          TRAP    C$ERDF
017270  000020                                                                        .WORD   16
017272  004753                                                                        .WORD   RNYM
017274  006120                                                                        .WORD   STAERM

                                                                            ;ELSE-IF NOT A RUNNAWAY:
017276  000402                             BR      50316$
017300                                  50315$:
017300  004767  000106                       JSR     PC,PRXST                    ;PRINT EXTENDED STATUS REGISTERS.

017304                                  50316$:
017304  105767  164155                       TSTB    RECLOG                      ;IF THE RECORD HAS BEEN LOGGED THEN:
017310  001404                             BEQ     50317$
017312  105267  164204                       INCB    DROPED                      ;SET UNIT DROPPED FLAG.
017316  004767  176244                       JSR     PC,LOG                      ;LOG DATA BYTES + RD/WR ERRORS.

017322                                  50317$:
017322                                      DORPT                               ;PRINT PERFORMANCE REPORT
017322  104424                                                                          TRAP    C$DRPT
017324  005765  003326               DROPUA: TST     PASCNT(R5)                  ;IF PASCNT(R5) NE #0 THEN
017330  001402                             BEQ     50320$
017332  005365  003326                       DEC     PASCNT(R5)          ;LET PASCNT(R5) := PASCNT(R5) - #1

017336                                  50320$:
017336  016767  164172  000044             MOV     TSNP,DROPN                  ;SAVE # OF UNIT TO BE DROPPED.
017344  016700  164164                       MOV     TSNP,R0                     ;R0=LOGICAL DEVICE NUMBER
017350                                      DODU    R0                          ;DROP THE UNIT
017350  104451                                                                          TRAP    C$DODU
                                                                            ;EXEC BGNDU-ENDDU CODE IF IDU = 0

017352  026527  002604  177774             CMP     DEVTBL(R5),#NINUSE          ;IF UNIT NOT DROPPED
017360  001410                             BEQ     50321$
017362  105767  162625                       TSTB    IREC                          ;IF RECOVERY IS ENABLED THEN:
017366  001005                             BNE     50322$
```

```
GLOBAL AREAS    MACRO M1113  30-NOV-83 10:17                                                                SEQ 098
GLOBAL SUBROUTINES SECTION

   2953 017370  000240                          NOP
   2954 017372  000240                          NOP
   2955 017374  000240                          NOP
   2956 017376  105267  164124                  INCB    STAFLG              ;SET START FLAG TO ENABLE REWIND.
   2957
   2958 017402                          50322$:
   2959
   2960 017402                          50321$:
   2961 017402  105267  164114          DRORTN: INCB    DROPED                  ;SET UNIT DROPPED FLAG.
   2962 017406  000207                          RTS     PC                      ;RETURN.
   2963
   2964 017410  000000                  DROPN:  .WORD   0                       ;# OF UNIT TO BE DROPPED
   2965
   2966                                 ;       SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
   2967                                 ;       INPUTS:
   2968                                 ;       OUTPUTS:
   2969                                 ;       REGISTERS:
   2970                                 ;       CALLS:
   2971
   2972 017412                          PRXST:: PRINTX #GETSTM
        017412  012746  005507                                                          MOV     #GETSTM,-(SP)
        017416  012746  000001                                                          MOV     #1,-(SP)
        017422  010600                                                                  MOV     SP,R0
        017424  104415                                                                  TRAP    C$PNTX
        017426  062706  000004                                                          ADD     #4,SP
   2973 017432                                  PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3,MSGPKT+MS.XS
4
        017432  016746  162734                                                          MOV     MSGPKT+MS.XS4,-(SP)
        017436  016746  162726                                                          MOV     MSGPKT+MS.XS3,-(SP)
        017442  016746  162720                                                          MOV     MSGPKT+MS.XS2,-(SP)
        017446  016746  162712                                                          MOV     MSGPKT+MS.XS1,-(SP)
        017452  016746  162704                                                          MOV     MSGPKT+MS.XS0,-(SP)
        017456  012746  006753                                                          MOV     #STAER5,-(SP)
        017462  012746  000006                                                          MOV     #6,-(SP)
        017466  010600                                                                  MOV     SP,R0
        017470  104415                                                                  TRAP    C$PNTX
        017472  062706  000016                                                          ADD     #16,SP
   2974 017476  000207                          RTS PC
   2975
   2976                                 ;       SUBROUTINE TO HALT AFTER EACH COMMAND.
   2977                                 ;       INPUTS:
   2978                                 ;       OUTPUTS:
   2979                                 ;       REGISTERS:      R3, R4
   2980                                 ;       CALLS:
   2981
   2982 017500  105767  162502          CKHAE:: TSTB    HAE;IFB HAE NE #0 THEN          ;IF HALT FLAG IS SET:
   2983 017504  001430                          BEQ     50323$
   2984 017506  105767  164017                  TSTB    MISCFG    ;IFB MISCFG EQ #0 THEN                ;
   2985 017512  001023                          BNE     50324$
   2986 017514                                      MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
        017514  104450                                                                  TRAP    C$MANI
   2987 017516                                      BNCOMPLETE CKHRTN               ;BR IF NOT.
        017516  103023                                                                 BCC     CKHRTN
   2988 017520  016704  163674                  MOV     CMDWRD,R4           ;LET R4 := CMDWRD           ;COMMAND WORD.
   2989 017524  004767  171406                      JSR PC,GCMDA                    ;FETCH ADR OF CMD ASCII.
   2990 017530  112367  164552                  MOVB    (R3)+,HALTM                 ;MOVE CMD ASCII
   2991 017534  112367  164547                  MOVB    (R3)+,HALTM+1       ;LET HALTM+1 :8= (R3)+
   2992 017540  111367  164544                  MOVB    (R3),HALTM+2                ;INTO MESSAGE.
```

```
GLOBAL AREAS    MACRO M1113  30-NOV-83 10:17                                                                    SEQ 099
GLOBAL SUBROUTINES SECTION

 2993 017544                                    GMANIL HALTM,TIME1,1,YES    ;HALT - WAIT FOR AN OEPRATOR INPUT.
      017544  104443                                                                      TRAP    C$GMAN
      017546  000404                                                                      BR      10000$
      017550  003436                                                                      .WORD   TIME1
      017552  000130                                                                      .WORD   T$CODE
      017554  004306                                                                      .WORD   HALTM
      017556  000001                                                                      .WORD   1
      017560                          10000$:
 2994 017560                          10000$:
 2995
 2996 017560  000402                            BR      50325$
 2997 017562                          50324$:
 2998 017562  105067  163743                    CLRB    MISCFG      ;LET MISCFG :B= #0          ;
 2999
 3000 017566                          50325$:
 3001
 3002 017566                          50323$:
 3003 017566  000207                  CKHRTN:   RTS     PC                          ;RETURN
 3004                                           .EVEN
 3005
 3006 017570                                    ENDMOD
 3007
 3008
 3009                                 .TITLE MISCELLANEOUS SECTIONS
 3010                                 .SBTTL  REPORT CODING SECTION
 3011
 3012
 3013                                 ;++
 3014                                 ; THE REPORT CODING SECTION CONTAINS THE
 3015                                 ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
 3016                                 ;--
 3017
 3018 017570                                    BGNRPT
      017570                          L$RPT::
 3019 017570  010567  163656                    MOV     R5,R5SAVE               ;SAVE CURRENT DEVICE POINTER.
 3020 017574  004767  177302                    JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
 3021 017600                          50326$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
 3022 017600  026527  002604  177777          CMP     DEVTBL(R5),#END
 3023 017606  001562                          BEQ     50327$
 3024 017610                                    PRINTS      #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
      017610  016546  003376                                                              MOV     RECCNT(R5),-(SP)
      017614  016546  003326                                                              MOV     PASCNT(R5),-(SP)
      017620  016546  002604                                                              MOV     DEVTBL(R5),-(SP)
      017624  012746  020432                                                              MOV     #RPT1A,-(SP)
      017630  012746  000004                                                              MOV     #4,-(SP)
      017634  010600                                                                      MOV     SP,R0
      017636  104416                                                                      TRAP    C$PNTS
      017640  062706  000012                                                              ADD     #12,SP
 3025 017644                                    PRINTS      #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
      017644  016546  002626                                                              MOV     WRBC(R5),-(SP)
      017650  016546  002636                                                              MOV     WRBC+10(R5),-(SP)
      017654  016546  002646                                                              MOV     WRBC+20(R5),-(SP)
      017660  016546  002656                                                              MOV     WRBC+30(R5),-(SP)
      017664  012746  020507                                                              MOV     #RPT1B,-(SP)
      017670  012746  000005                                                              MOV     #5,-(SP)
      017674  010600                                                                      MOV     SP,R0
      017676  104416                                                                      TRAP    C$PNTS
```

```
                017700  062706  000014                                                  ADD     #14,SP
3026            017704                          PRINTS  #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
                017704  016546  002666                                                  MOV     RRBC(R5),-(SP)
                017710  016546  002676                                                  MOV     RRBC+10(R5),-(SP)
                017714  016546  002706                                                  MOV     RRBC+20(R5),-(SP)
                017720  016546  002716                                                  MOV     RRBC+30(R5),-(SP)
                017724  012746  020560                                                  MOV     #RPT1C,-(SP)
                017730  012746  000005                                                  MOV     #5,-(SP)
                017734  010600                                                          MOV     SP,R0
                017736  104416                                                          TRAP    C$PNTS
                017740  062706  000014                                                  ADD     #14,SP
3027            017744                          PRINTS  #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
                017744  016546  002726                                                  MOV     RFBC(R5),-(SP)
                017750  016546  002736                                                  MOV     RFBC+10(R5),-(SP)
                017754  016546  002746                                                  MOV     RFBC+20(R5),-(SP)
                017760  016546  002756                                                  MOV     RFBC+30(R5),-(SP)
                017764  012746  020631                                                  MOV     #RPT1D,-(SP)
                017770  012746  000005                                                  MOV     #5,-(SP)
                017774  010600                                                          MOV     SP,R0
                017776  104416                                                          TRAP    C$PNTS
                020000  062706  000014                                                  ADD     #14,SP
3028            020004                          PRINTS  #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
                020004  016546  003026                                                  MOV     RFREC(R5),-(SP)
                020010  016546  003006                                                  MOV     RRREC(R5),-(SP)
                020014  016546  002766                                                  MOV     WRREC(R5),-(SP)
                020020  012746  020735                                                  MOV     #RPT1F,-(SP)
                020024  012746  000004                                                  MOV     #4,-(SP)
                020030  010600                                                          MOV     SP,R0
                020032  104416                                                          TRAP    C$PNTS
                020034  062706  000012                                                  ADD     #12,SP
3029            020040                          PRINTS  #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
                020040  016546  003036                                                  MOV     RFUNR(R5),-(SP)
                020044  016546  003016                                                  MOV     RRUNR(R5),-(SP)
                020050  016546  002776                                                  MOV     WRUNR(R5),-(SP)
                020054  012746  021006                                                  MOV     #RPT1G,-(SP)
                020060  012746  000004                                                  MOV     #4,-(SP)
                020064  010600                                                          MOV     SP,R0
                020066  104416                                                          TRAP    C$PNTS
                020070  062706  000012                                                  ADD     #12,SP
3030            020074  105767  162110          TSTB    BADTSW  ;IFB BADTSW NE #0 THEN                  ;
3031            020100  001402                  BEQ     50330$
3032            020102  004767  000056              JSR PC,BTRPT        ;GO PRINT BAD TAPE SPOTS WHEN  ENABLED
3033
3034            020106                  50330$:
3035            020106                          PRINTS  #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)
                020106  016546  003346                                                  MOV     VFYCNT(R5),-(SP)
                020112  016546  003366                                                  MOV     FTLCNT(R5),-(SP)
                020116  016546  003356                                                  MOV     HRDCNT(R5),-(SP)
                020122  016546  003336                                                  MOV     SCCNT(R5),-(SP)
                020126  012746  021203                                                  MOV     #RPT1I,-(SP)
                020132  012746  000005                                                  MOV     #5,-(SP)
                020136  010600                                                          MOV     SP,R0
                020140  104416                                                          TRAP    C$PNTS
                020142  062706  000014                                                  ADD     #14,SP
3036            020146  004767  176776          JSR     PC,NEXTU                ;FIND THE NEXT UNIT.
3037
3038            020152  000612                  BR      50326$
```

```
                                50327$:
                                        MOV     R5SAVE,R5               ;RESTORE CURRENT DEVICE POINTER.
                                        EXIT    RPT
020160  000167                                                                    .WORD   J$JMP
020162  001130                                                                    .WORD   L10010-2-.
                                ;       SUBR TO PRINT BAD TAPES SPOTS DURING THE REPORT PRINTS
                                ;       WRITE RETRIES: CUMULATIVE COUNT
                                ;       BAD TAPE SPOTS: COUNT PER TAPE PASS ONLY, NOT CUMULATIVE.
                                ;       COUNT OF RECOVERABLE WRITE ERRORS EXCLUDES BAD TAPE SPOTS.
                                BTRPT:: PRINTS  #RPT1E,WRTYCT(R5)       ;PRINT GLOBAL WRITE RETRY COUNT
020164  016546  003316                                                            MOV     WRTYCT(R5),-(SP)
020170  012746  021057                                                            MOV     #RPT1E,-(SP)
020174  012746  000002                                                            MOV     #2,-(SP)
020200  010600                                                                    MOV     SP,R0
020202  104416                                                                    TRAP    C$PNTS
020204  062706  000006                                                            ADD     #6,SP
020210  016567  002616  163274        MOV     BTADDR(R5),BTPT         ;BTPT IS BOTH THE BAD TAPE SPOT COUNTER
020216  017703  163270                MOV     @BTPT,R3                ;AND THE LOGGING INDEX
020222  006203                        ASR     R3
020224                                PRINTS  #RPT1J,R3       ;PRINT # OF BAD TAPE SPOTS
020224  010346                                                                    MOV     R3,-(SP)
020226  012746  021107                                                            MOV     #RPT1J,-(SP)
020232  012746  000002                                                            MOV     #2,-(SP)
020236  010600                                                                    MOV     SP,R0
020240  104416                                                                    TRAP    C$PNTS
020242  062706  000006                                                            ADD     #6,SP
020246  005703                TST     R3                              ;PRINT RECORD # IF BAD SPOTS DETECTED
020250  001457                BEQ     50331$
020252  020327  000024        CMP     R3,#20.                 ;IF R3 HI #20. THEN             ;
020256  101402                BLOS    50332$
020260  012703  000024        MOV     #20.,R3                         ;20 BAD SPOTS IS THE LIMIT

                                50332$:
020264                            PRINTS        #CRLFSP           ;
020264  012746  005744                                                            MOV     #CRLFSP,-(SP)
020270  012746  000001                                                            MOV     #1,-(SP)
020274  010600                                                                    MOV     SP,R0
020276  104416                                                                    TRAP    C$PNTS
020300  062706  000004                                                            ADD     #4,SP
020304  016704  163202        MOV     BTPT,R4   ;LET R4 := BTPT + #2  ;FETCH A BAD SPOT ID
020310  062704  000002        ADD     #2,R4
020314  005002                CLR     R2                              ;R2 = PRINT COUNT PER LINE: 10 MAX
                                50333$:   ;REPEAT                       ;
020316                              PRINTS      #RPT1K,(R4)     ;PRINT A BAD SPOT ID
020316  011446                                                                    MOV     (R4),-(SP)
020320  012746  021174                                                            MOV     #RPT1K,-(SP)
020324  012746  000002                                                            MOV     #2,-(SP)
020330  010600                                                                    MOV     SP,R0
020332  104416                                                                    TRAP    C$PNTS
020334  062706  000006                                                            ADD     #6,SP
020340  005202                INC     R2              ;LET R2 := R2 + #1  ;COUNT PRINTS
020342  062704  000002        ADD     #2,R4           ;LET R4 := R4 + #2  ;NEXT
020346  020227  000012        CMP     R2,#10.         ;IF R2 EQ #10. THEN ;
020352  001014                BNE     50334$
020354                          PRINTS #CRLFSP                  ;GO TO NEXT PRINT LINE PAST 10 PRINTS
```

```
        020354  012746  005744                                                  MOV     #CRLFSP,-(SP)
        020360  012746  000001                                                  MOV     #1,-(SP)
        020364  010600                                                          MOV     SP,R0
        020366  104416                                                          TRAP    C$PNTS
        020370  062706  000004                                                  ADD     #4,SP
  3071  020374  162703  000012                  SUB     #10.,R3       ;LET R3 := R3 - #10.      ;ADJUST BAD SPOT COUNT
  3072  020400  162702  000012                  SUB     #10.,R2       ;LET R2 := R2 - #10.      ;ADJUST PRINT COUNT
  3073                                                                ;
  3074  020404                          50334$:                       ;
  3075  020404  020203                          CMP     R2,R3         ;UNTIL R2 EQ R3           ;LIMIT: # OF BAD SPOTS
  3076  020406  001343                          BNE     50333$
  3077                                                                ;
  3078  020410                          50331$:                       ;
  3079  020410                                  PRINTS  #CRLF         ;
        020410  012746  005741                                                  MOV     #CRLF,-(SP)
        020414  012746  000001                                                  MOV     #1,-(SP)
        020420  010600                                                          MOV     SP,R0
        020422  104416                                                          TRAP    C$PNTS
        020424  062706  000004                                                  ADD     #4,SP
  3080  020430  000207                          RTS PC
  3081
  3082                                          .NLIST  BEX
  3083  020432     045     116     045  RPT1A:  .ASCIZ  /%N%N%AUNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
  3084  020507     045     101     102  RPT1B:  .ASCIZ  /%ABYTES WRITTEN  %D3%A,%Z3%A,%Z3%A,%Z3%N/
  3085  020560     045     101     102  RPT1C:  .ASCIZ  /%ABYTES READ REV %D3%A,%Z3%A,%Z3%A,%Z3%N/
  3086  020631     045     101     102  RPT1D:  .ASCII  /%ABYTES READ FWD %D3%A,%Z3%A,%Z3%A,%Z3%N/
  3087  020701     045     123     062          .ASCIZ  /%S23%AWRT%S4%ARDR%S4%ARDF%N/
  3088  020735     045     101     122  RPT1F:  .ASCIZ  /%ARECOVERABLE ERRORS   %D5%S2%D5%S2%D5%N/
  3089  021006     045     101     125  RPT1G:  .ASCIZ  /%AUNRECOVERABLE ERRORS %D5%S2%D5%S2%D5%N/
  3090  021057     045     101     127  RPT1E:  .ASCIZ  /%AWRITE RETRIES%S8%D5%N/
  3091  021107     045     116     045  RPT1J:  .ASCIZ  /%N%D2%A BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:/
  3092  021174     045     104     065  RPT1K:  .ASCIZ  /%D5%S1/
  3093  021203     045     101     123  RPT1I:  .ASCII  "%ASPEC COND%S3%AHARD%S3%AFATAL%S3%ACOMPARE%N"
  3094  021257     045     123     063          .ASCIZ  /%S3%D5%S3%D5%S3%D5%S3%D5%N%N/
  3095                                          .LIST   BEX
  3096                                          .EVEN
  3097
  3098  021314                                  ENDRPT
        021314                          L10010:
        021314  104425                                                          TRAP    C$RPT
  3099
  3100                                  .SBTTL  LOAD DEVICE PROTECTION TABLE
  3101
  3102                                  ;++
  3103                                  ;TABLE FOR SUPERVISOR TO IDENTIFY THE P-TBL FOR THE LOAD DEV
  3104                                  ;THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD DEV
  3105                                  ;--
  3106
  3107  021316                                  BGNPROT
        021316                          L$PROT::
  3108
  3109  021316  000000                            .WORD 0               ;P-TBL OFFSET OF TSDB
  3110  021320  177777                            .WORD -1              ;P-TBL OFFSET OF MASS BUS UNIT #: -1 = NOT A MASS BUS DE
  3111  021322  177777                            .WORD -1              ;P-TBL OFFSET OF DRIVE #: -1 = NONE, THREE DRIVES PER CONTRO
LLER
  3112  021324                                  ENDPROT
  3113
  3114                                  .SBTTL  INITIALIZE SECTION
```

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

021324                                         BGNINIT
021324                                  L$INIT::

021324  032727  000003  002330          INIT10: BIT     #BIT0!BIT1,#CMDPKT    ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDRY:
021332  001421                                  BEQ     50335$
021334                                            ERRSF 1,CMDPKM              ;PRINT ERROR MSG.
021334  104454                                                                                  TRAP    C$ERSF
021336  000001                                                                                  .WORD   1
021340  004346                                                                                  .WORD   CMDPKM
021342  000000                                                                                  .WORD   0
021344                                            DELAY 200.                  ;GO TO SUPERVISOR, WAIT 2 SECONDS.
021344  012727  000310                                                                          MOV     #200.,(PC)+
021350  000000                                                                                  .WORD   0
021352  016727  160540                                                                          MOV     L$DLY,(PC)+
021356  000000                                                                                  .WORD   0
021360  005367  177772                                                                          DEC     -6(PC)
021364  001375                                                                                  BNE     .-4
021366  005367  177756                                                                          DEC     -22(PC)
021372  001367                                                                                  BNE     .-20
021374  000753                                    BR    INIT10                ;

021376                                  50335$:

021376  105767  160602                          TSTB    CLRFLG                ;IF CLR COUNTERS FLAG SET:
021402  001413                                  BEQ     50336$
021404  105067  160574                            CLRB  CLRFLG                ;INIT CLR FLAG.
021410  005002                                  CLR     R2          ;LET R2 := #0
021412                                  50337$:   ;WHILE R2 NE #CNTLEN DO
021412  020227  000550                          CMP     R2,#CNTLEN
021416  001405                                  BEQ     50340$
021420  005062  002626                          CLR     WRBC(R2)              ;CLR ALL STATISTICAL COUNTERS.
021424  062702  000002                          ADD     #2,R2       ;LET R2 := R2 + #2

021430  000770                                  BR      50337$
021432                                  50340$:

021432                                  50336$:

021432  105767  160547                          TSTB    RRANV           ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
021436  001406                                  BEQ     50341$
021440  012767  153624  161764                  MOV     #RANBC,RANB             ;RESET RANDOM BASE #.

021446  012767  032561  161760                  MOV     #RANSC,RANS             ;RESET RANDOM SAVE LOCATION.

021454                                  50341$:
021454                                          READEF  #EF.START             ;READ START COMMAND EVENT FLAG.
021454  012700  000040                                                                          MOV     #EF.START,R0
021460  104447                                                                                  TRAP    C$REFG
021462                                          BNCOMPLETE      INIT15        ;BRANCH IF NOT STARTING.
021462  103057                                                                                  BCC     INIT15
021464  105267  162036                          INCB    STAFLG                ;SET START COMMAND FLAG.
```

INITIALIZE SECTION

```
3156 021470  012705  000006            MOV     #6,R5    ;LET R5 := #6
3157 021474                      50342$: ;REPEAT                          ;INITIATE UNIT NUMBER TABLE
3158 021474  012765  177774  002604      MOV     #NINUSE,DEVTBL(R5)      ;BY STORING NOT IN USE IN EACH LOCATION.
3159 021502  162705  000002              SUB     #2,R5     ;LET R5 := R5 - #2
3160 021506  005705                      TST     R5       ;UNTIL R5 EQ #0
3161 021510  001371                      BNE     50342$
3162 021512  022767  000001  160272      CMP     #1,L$UNIT               ;ONLY ONE UNIT ALLOWED
3163 021520  001425                      BEQ     5034$                   ;OK
3164 021522                              PRINTF  #AUDRUN                 ;TELL THE MAN
     021522  012746  005146                                                      MOV     #AUDRUN,-(SP)
     021526  012746  000001                                                      MOV     #1,-(SP)
     021532  010600                                                              MOV     SP,R0
     021534  104417                                                              TRAP    C$PNTF
     021536  062706  000004                                                      ADD     #4,SP
3165 021542                              DELAY   25                      ;WAIT
     021542  012727  000025                                                      MOV     #25.,(PC)+
     021546  000000                                                              .WORD   0
     021550  016727  160342                                                      MOV     L$DLY,(PC)+
     021554  000000                                                              .WORD   0
     021556  005367  177772                                                      DEC     -6(PC)
     021562  001375                                                              BNE     .-4
     021564  005367  177756                                                      DEC     -22(PC)
     021570  001367                                                              BNE     .-20
3166 021572                              DOCLN                           ;ABORT
     021572  104444                                                              TRAP    C$DCLN
3167 021574  016705  160212      5034$:  MOV     L$UNIT,R5       ;LET R5 := L$UNIT SHIFT 1
3168 021600  006305                      ASL     R5
3169 021602                      50343$: ;REPEAT                          ;STORE ALL UNIT
3170 021602  162705  000002              SUB     #2,R5     ;LET R5 := R5 - #2            ;NUMBERS IN DEVTBL.
3171 021606  010565  002604              MOV     R5,DEVTBL(R5)     ;LET DEVTBL(R5) := R5 SHIFT -1
3172 021612  006265  002604              ASR     DEVTBL(R5)
3173 021616  005705                      TST     R5       ;UNTIL R5 EQ #0
3174 021620  001370                      BNE     50343$
3175
3176 021622                      INIT15: READEF #EF.PWR                  ;HAS THERE BE A POWER FAILURE?
     021622  012700  000034                                                      MOV     #EF.PWR,R0
     021626  104447                                                              TRAP    C$REFG
3177 021630                              BNCOMPLETE INIT16               ;BRANCH IF NOT.
     021630  103004                                                              BCC     INIT16
3178 021632  105267  161670              INCB    STAFLG                  ;IF SO - SET THE START FLAG.
3179 021636  105267  161665              INCB    PWRFLG                  ;IF SO - SET THE POWER FAIL FLAG.
3180
3181 021642                      INIT16: RFLAGS  OPFLAG                  ;READ AND STORE FLAGS SET BY OPERATOR
     021642  104421                                                              TRAP    C$RFLA
     021644  010067  161666                                                      MOV     R0,OPFLAG
3182 021650  005003                      CLR     R3       ;LET R3 := #0                  ;CLEAR EVENT FLAG
3183 021652  105767  161651              TSTB    PWRFLG           ;IF POWER FAIL HAS NOT OCCURRED THEN:
3184 021656  001020                      BNE     50344$
3185 021660                                      READEF #EF.NEW          ;UPDATE PASS COUNT WHEN
     021660  012700  000035                                                      MOV     #EF.NEW,R0
     021664  104447                                                              TRAP    C$REFG
3186 021666  103014                      BCC     50345$                  ;SUPERVISOR IS IN NEW PASS
3187 021670  105767  161632              TSTB    STAFLG                  ;AND DIAG WAS NEITHER STARTED
3188 021674  001010                      BNE     50346$
3189 021676                                        READEF #EF.RES        ;NOR
     021676  012700  000037                                                      MOV     #EF.RES,R0
     021702  104447                                                              TRAP    C$REFG
```

```
021704  103402                          BCS     50347$                  ;IFCOND CC THEN         ;RESTARTED
021706  005103                          COM     R3                        ;LET R3 := COMP R3    ;DO IT
021710  000401                          BR      50350$
021712                          50347$:
021712  005203                          INC     R3                              ;SET 1ST PASS IF NEW PASS AND
                                                                                ;RESTARTING
021714                          50350$:
021714  000401                          BR      50351$
021716                          50346$:
021716  005203                          INC     R3                              ;SET 1ST PASS IF NEW PASS AND
                                                                                ;STARTING
021720                          50351$:
                                                                ;DO NOT UPDATE IT ON CONTINUE
021720                          50345$:
                                                                ;OR ON POWER FAIL
021720                          50344$:
021720  004767  175156                  JSR     PC,FIRSTU                       ;INIT DEVICE POINTER.
021724  005002                          CLR     R2      ;LET R2 := #0                   ;INIT DEVICE COUNTER.
021726                          50352$: ;WHILE DEVTBL(R5) NE #END DO
021726  026527  002604  177777          CMP     DEVTBL(R5),#END
021734  001456                          BEQ     50353$
021736  005202                          INC     R2      ;LET R2 := R2 + #1
021740  010500                          MOV     R5,R0   ;LET R0 := R5 SHIFT -1
021742  006200                          ASR     R0
021744                                  GPHARD  R0,R0                           ;GET HARDWARE P TABLE FROM SUPER.
021744  104442                                                                          TRAP    C$GPHRD
021746  103044                          BCC     50354$  ;IFCOND CS THEN
021750  011065  002514                  MOV     (R0),TSDB(R5)                   ;SAVE TSDB ADDRESS.
021754  012065  002524                  MOV     (R0)+,TSSR(R5)                  ;SAVE TSSR ADDRESS.
021760  062765  000002  002524          ADD     #2,TSSR(R5)
021766  012065  002534                  MOV     (R0)+,TSVCT(R5)                 ;SAVE INTERRUPT VECTOR ADDRESS.
021772  011065  003532                  MOV     (R0),TSUNT(R5)                  ;SAVE NUMBER OF DRIVE
021776  011067  161532                  MOV     (R0),TSNP                       ;SAVE FOR PRINT OUT'S
022002                                  SETVEC  TSVCT(R5),TS5INT(R5),#INTPRI
022002  012746  000340                                                                  MOV     #INTPRI,-(SP)
022006  016546  002554                                                                  MOV     TS5INT(R5),-(SP)
022012  016546  002534                                                                  MOV     TSVCT(R5),-(SP)
022016  012746  000003                                                                  MOV     #3,-(SP)
022022  104437                                                                          TRAP    C$SVEC
022024  062706  000010                                                                  ADD     #10,SP
                                                                                ;SET UP INTERRUPT PROCESSING CONDITIONS.
022030  005065  003472                  CLR     INTFLG(R5)                      ;CLEAR INTERRUPT FLAGS.
022034  005703                          TST     R3                              ;ACTUAL PASSCOUNT UPDATE PER R3
022036  001410                          BEQ     50355$
022040  005703                          TST     R3              ;IF R3 LT #0 THEN
022042  002003                          BGE     50356$
022044  005265  003326                  INC     PASCNT(R5)                      ;LET PASCNT(R5) := PASCNT(R5) + #1
022050  000403                          BR      50357$
022052                          50356$:
022052  012765  000001  003326          MOV     #1,PASCNT(R5)                   ;LET PASCNT(R5) := #1
022060                          50357$:
022060                          50355$:
```

```
3240
3241 022060                                50354$:
3242 022060  005065  003376                       CLR     RECCNT(R5)              ;CLEAR RECORD COUNT
3243 022064  004767  175060                         JSR   PC,NEXTU                ;DO IT FOR ALL DEVICES.
3244
3245 022070  000716                        BR      50352$
3246 022072                                50353$:
3247
3248 022072  005702                        TST     R2                      ;IF THERE ARE NO UNITS:
3249 022074  001026                        BNE     50360$
3250 022076                                  PRINTF #AUDRPM                ;PRINT ALL UNITS DROPPED,
     022076  012746  005114                                                          MOV     #AUDRPM,-(SP)
     022102  012746  000001                                                          MOV     #1,-(SP)
     022106  010600                                                                  MOV     SP,R0
     022110  104417                                                                  TRAP    C$PNTF
     022112  062706  000004                                                          ADD     #4,SP
3251 022116                                  DELAY 200.                    ;GO TO SUPERVISOR, WAIT 2 SECONDS.
     022116  012727  000310                                                          MOV     #200.,(PC)+
     022122  000000                                                                  .WORD   0
     022124  016727  157766                                                          MOV     L$DLY,(PC)+
     022130  000000                                                                  .WORD   0
     022132  005367  177772                                                          DEC     -6(PC)
     022136  001375                                                                  BNE     .-4
     022140  005367  177756                                                          DEC     -22(PC)
     022144  001367                                                                  BNE     .-20
3252 022146                                  BREAK                         ;GO TO SUPERVISOR, CHECK TTY.
     022146  104422                                                                  TRAP    C$BRK
3253 022150                                DOCLN                           ;DO CLEAN CODE + ABORT PASS.
     022150  104444                                                                  TRAP    C$DCLN
3254
3255 022152                                50360$:
3256
3257
3258 022152                                SETPRI #PRI00                   ;LOWER CPU PRIORITY TO 0
     022152  012700  000000                                                          MOV     #PRI00,R0
     022156  104441                                                                  TRAP    C$SPRI
3259 022160  105767  160027                TSTB    IREC                    ;IF ERROR RECOVERY IS ENABLED
3260 022164  001033                        BNE     1$
3261 022166  032767  000020  161342        BIT     #ADR,OPFLAG
3262 022174  001027                        BNE     1$
3263 022176  004767  174700                JSR     PC,FIRSTU               ;AND AUTO-DROP NOT CALLED, THEN SET UP FOR FIRST
3264 022202                                50362$:                         ;WHILE THERE ARE MORE DEVICES:
3265 022202  026527  002604  177777        CMP     DEVTBL(R5),#END
3266 022210  001421                        BEQ     1$
3267 022212  105067  161312                CLRB    TRAPD4                  ;CLEAR TRAP FLAG
3268 022216                                SETVEC  #4,#TRAP4,#INTPRI       ;SET VECTOR 4,PRIORTY 86
     022216  012746  000340                                                          MOV     #INTPRI,-(SP)
     022222  012746  023730                                                          MOV     #TRAP4,-(SP)
     022226  012746  000004                                                          MOV     #4,-(SP)
     022232  012746  000003                                                          MOV     #3,-(SP)
     022236  104437                                                                  TRAP    C$SVEC
     022240  062706  000010                                                          ADD     #10,SP
3269                                                                    ;START 3.5 MINUTE COUNTER
3270 022244  012767  000001  161164        MOV     #1,TIME1                ;INCR TIME1 FROM #1 TO #25 BY #1
3271 022252  000404                        BR      50365$
3272 022254  000167  000622          1$:   JMP     50363$
3273
```

```
 022260                            50366$:
 022260  005267  161152                     INC     TIME1
 022264                            50365$:
 022264  026727  161146  000025             CMP     TIME1,#25
 022272  003134                             BGT     4$
 022274  012775  002340  002514             MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
 022302                                     DELAY   25                      ;WAIT
 022302  012727  000025                                                                     MOV     #25,(PC)+
 022306  000000                                                                             .WORD   0
 022310  016727  157602                                                                     MOV     L$DLY,(PC)+
 022314  000000                                                                             .WORD   0
 022316  005367  177772                                                                     DEC     -6(PC)
 022322  001375                                                                             BNE     .-4
 022324  005367  177756                                                                     DEC     -22(PC)
 022330  001367                                                                             BNE     .-20
 022332                                     CLRVEC  #4                      ;CLEAR VECTOR AT 4
 022332  012700  000004                                                                     MOV     #4,R0
 022336  104436                                                                             TRAP    C$CVEC
 022340  105767  161164                     TSTB    TRAPD4                  ;IFB TRAPD4 NE #0 THEN
 022344  001423                             BEQ     2$
 022346  005265  003366                     INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
 022352                                     PRINTF  #NODEV,TSSR(R5)         ;PRINT ERROR
 022352  016546  002524                                                                     MOV     TSSR(R5),-(SP)
 022356  012746  005543                                                                     MOV     #NODEV,-(SP)
 022362  012746  000002                                                                     MOV     #2,-(SP)
 022366  010600                                                                             MOV     SP,R0
 022370  104417                                                                             TRAP    C$PNTF
 022372  062706  000006                                                                     ADD     #6,SP
 022376  016567  002604  175004             MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
 022404  010500                             MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
 022406  006200                             ASR     R0
 022410                                     DODU    R0                      ;DROP THE UNIT
 022410  104451                                                                             TRAP    C$DODU
                                                                            ; EXEC BGNDU-ENDDU CODE IF IDU = 0
 022412                                     DOCLN                           ;DO CLEAN &ABORT
 022412  104444                                                                             TRAP    C$DCLN

 022414  105067  161110            2$:      CLRB    TRAPD4                  ;CLEAR TRAP FLAG
 022420                                     SETVEC  #4,#TRAP4,#INTPRI       ;SET VECTOR 4,PRIORTY @6
 022420  012746  000340                                                                     MOV     #INTPRI,-(SP)
 022424  012746  023730                                                                     MOV     #TRAP4,-(SP)
 022430  012746  000004                                                                     MOV     #4,-(SP)
 022434  012746  000003                                                                     MOV     #3,-(SP)
 022440  104437                                                                             TRAP    C$SVEC
 022442  062706  000010                                                                     ADD     #10,SP
 022446  005775  002524                     TST     @TSSR(R5)               ;CHECK FOR ADDRESS
 022452                                     DELAY   25                      ;WAIT
 022452  012727  000025                                                                     MOV     #25,(PC)+
 022456  000000                                                                             .WORD   0
 022460  016727  157432                                                                     MOV     L$DLY,(PC)+
 022464  000000                                                                             .WORD   0
 022466  005367  177772                                                                     DEC     -6(PC)
 022472  001375                                                                             BNE     .-4
 022474  005367  177756                                                                     DEC     -22(PC)
 022500  001367                                                                             BNE     .-20
 022502                                     CLRVEC  #4                      ;CLEAR VECTOR AT 4
 022502  012700  000004                                                                     MOV     #4,R0
```

E9


```
022506  104436                                                                        TRAP    C$CVEC
022510  105767  161014                    TSTB    TRAPD4                  ;IFB TRAPD4 NE #0 THEN
022514  001424                            BEQ     3$
022516  005265  003366                    INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
022522                                    PRINTF  #NODEV,TSSR(R5)         ;PRINT ERROR
022522  016546  002524                                                                MOV     TSSR(R5),-(SP)
022526  012746  005543                                                                MOV     #NODEV,-(SP)
022532  012746  000002                                                                MOV     #2,-(SP)
022536  010600                                                                        MOV     SP,R0
022540  104417                                                                        TRAP    C$PNTF
022542  062706  000006                                                                ADD     #6,SP
022546  016567  002604  174634            MOV     DEVTBL(R5),DROPN        ;SAVE # OF UNIT TO BE DROPPED.
022554  010500                            MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
022556  006200                            ASR     R0
022560                                    DODU    R0                      ;DROP THE UNIT
022560  104451                                                                        TRAP    C$DODU
                                                                          ; EXEC BGNDU-ENDDU CODE IF IDU = 0
022562                                    DOCLN                           ;DO CLEAN &ABORT
022562  104444                                                                        TRAP    C$DCLN

022564  003127                    4$:     BGT     503674$

022566  004767  165174            3$:     JSR     PC,SETDEF               ;SET UNIT NUMBER
022572  010475  002514                    MOV     R4,@TSDB(R5)
022576                                    DELAY   25
022576  012727  000025                                                                MOV     #25,(PC)+
022602  000000                                                                        .WORD   0
022604  016727  157306                                                                MOV     L$DLY,(PC)+
022610  000000                                                                        .WORD   0
022612  005367  177772                                                                DEC     -6(PC)
022616  001375                                                                        BNE     .-4
022620  005367  177756                                                                DEC     -22(PC)
022624  001367                                                                        BNE     .-20
022626  012775  002340  002514            MOV     #GSCPK,@TSDB(R5)        ;AND GET UNITS STATUS
022634                                    DELAY   25                      ;WAIT
022634  012727  000025                                                                MOV     #25,(PC)+
022640  000000                                                                        .WORD   0
022642  016727  157250                                                                MOV     L$DLY,(PC)+
022646  000000                                                                        .WORD   0
022650  005367  177772                                                                DEC     -6(PC)
022654  001375                                                                        BNE     .-4
022656  005367  177756                                                                DEC     -22(PC)
022662  001367                                                                        BNE     .-20
022664  032775  000200  002524            BIT     #TS.SSR,@TSSR(R5)       ;IF #TS.SSR SETIN @TSSR(R5) THEN
022672  001420                            BEQ     503670$
022674  032775  000100  002524            BIT     #TS.OFL,@TSSR(R5)       ;IF #TS.OFL NOTSETIN @TSSR(R5) THEN
022702  001001                            BNE     503671$
022704  000457                            BR      503664$                 ;EXIT COUNTER WHEN UNIT ON LINE

022706                            503671$:
022706                                    PRINTF #OFLINM,TSNP             ;PRINT UNIT OFF LINE EVERY 10 SEC
022706  016746  160622                                                                MOV     TSNP,-(SP)
022712  012746  005456                                                                MOV     #OFLINM,-(SP)
022716  012746  000002                                                                MOV     #2,-(SP)
022722  010600                                                                        MOV     SP,R0
022724  104417                                                                        TRAP    C$PNTF
022726  062706  000006                                                                ADD     #6,SP
```

```
3324
3325 022732                          50372$:
3326
3327 022732  000412                        BR      50373$
3328 022734                          50370$:
3329 022734                            PRINTF #NRDYM,DEVTBL(R5)
     022734  016546  002604                                          MOV     DEVTBL(R5),-(SP)
     022740  012746  023700                                          MOV     #NRDYM,-(SP)
     022744  012746  000002                                          MOV     #2,-(SP)
     022750  010600                                                  MOV     SP,R0
     022752  104417                                                  TRAP    C$PNTF
     022754  062706  000006                                          ADD     #6,SP
3330
3331 022760                          50373$:
3332 022760  012767  000001  160452        MOV     #1,TIME2                ;INCR TIME2 FROM #1 TO #13 BY #1
3333 022766  000402                        BR      50374$
3334 022770                          50375$:
3335 022770  005267  160444              INC     TIME2
3336 022774                          50374$:
3337 022774  026727  160440  000013        CMP     TIME2,#13
3338 023002  003016                        BGT     50376$
3339 023004                                DELAY   100.            ;WAIT FOR UNIT TO BE SET ON-LINE
     023004  012727  000144                                          MOV     #100.,(PC)+
     023010  000000                                                  .WORD   0
     023012  016727  157100                                          MOV     L$DLY,(PC)+
     023016  000000                                                  .WORD   0
     023020  005367  177772                                          DEC     -6(PC)
     023024  001375                                                  BNE     .-4
     023026  005367  177756                                          DEC     -22(PC)
     023032  001367                                                  BNE     .-20
3340 023034                                BREAK                   ;ALLOW TERMINAL INTERRUPT
     023034  104422                                                  TRAP    C$BRK
3341 023036  000754                        BR      50375$
3342 023040                          50376$:
3343 023040  000167  177214              JMP     50366$
3344 023044                          50367$:
3345 023044                          50364$:
3346 023044                                CLRVEC  #4                      ;CLEAR VECTOR AT 4
     023044  012700  000004                                          MOV     #4,R0
     023050  104436                                                  TRAP    C$CVEC
3347 023052  026727  160360  000025        CMP     TIME1,#25               ;IF OFF LINE FOR 3.5 MINUTES
3348 023060  003404                        BLE     50377$
3349 023062  004767  167646                    JSR PC,MOVMSG               ;GET MESSAGE PACKET
3350 023066  004767  170360                    JSR PC,TCC1                 ;PRINT ERROR AND DROP OFF LINE UNIT
3351
3352 023072                          50377$:
3353                                                                    ;REPEAT UNTIL ON LINE OR TIMED OUT.
3354 023072  004767  174052                JSR PC,NEXTU                ;SET UP FOR NEXT UNIT.
3355
3356 023076  000167  177100              JMP     50362$
3357
3358 023102                          50363$:
3359 023102                          50361$:
3360 023102  105767  160421              TSTB    PWRFLG  ;IFB PWRFLG EQ #0 THEN
3361 023106  001026                      BNE     50400$
3362 023110                                MEMORY DATAWT           ;REQUEST MEMORY FROM SUPER FOR RD/WR BUFFERS.
     023110  104431                                                  TRAP    C$MEM
```

```
MISCELLANEOUS SECTIONS  MACRO M1113  30-NOV-83 10:17                                                    SEQ 110
INITIALIZE SECTION

        023112  010067  160270                                                          MOV     R0,DATAWT
3363    023116  016767  160264  160264          MOV     DATAWT,DATARD   ;SET RD BFR ADDRESS
3364    023124  062767  004000  160256          ADD     #DATCNT,DATARD
3365    023132  027727  160250  004000          CMP     @DATAWT,#DATCNT   ;WHEN NOT ENOUGH FREE MEMO AVAILABLE
3366    023140  002011                          BGE     50401$
3367    023142                                      PRINTF #MEMOM                   ;WARN OPERATOR
        023142  012746  023210                                                          MOV     #MEMOM,-(SP)
        023146  012746  000001                                                          MOV     #1,-(SP)
        023152  010600                                                                  MOV     SP,R0
        023154  104417                                                                  TRAP    C$PNTF
        023156  062706  000004                                                          ADD     #4,SP
3368    023162                                      DOCLN                           ;AND ABORT PASS
        023162  104444                                                                  TRAP    C$DCLN
3369                                                                ;DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO
3370    023164                              50401$:
3371
3372    023164                              50400$:
3373
3374    023164  105067  157024                      CLRB    CHGFLG                  ;CLR CHANGE CMD SEQ TBL FLAG.
3375    023170  012703  003526                      MOV     #ENDFLG,R3      ;LET R3 := #ENDFLG
3376    023174  004767  167464                      JSR     PC,CLRERR               ;CLEAR ALL FLAGS.
3377    023200  105067  160323                      CLRB    PWRFLG                  ;CLEAR THE POWER FAIL FLAG.
3378
3379    023204                                      EXIT    INIT
        023204  104432                                                                  TRAP    C$EXIT
        023206  000104                                                                  .WORD   L10012-.
3380    023210     045     101     106  MEMOM:  .ASCII  /%AFREE MEMO TOO SMALL FOR RD-WR BFRS%N/
        023213     122     105     105
        023216     040     115     105
        023221     115     117     040
        023224     124     117     117
        023227     040     123     115
        023232     101     114     114
        023235     040     106     117
        023240     122     040     122
        023243     104     055     127
        023246     122     040     102
        023251     106     122     123
        023254     045     116
3381    023256     045     101     122             .ASCIZ  /%ARE-LOAD IN LARGER MEMO%N/
        023261     105     055     114
        023264     117     101     104
        023267     040     111     116
        023272     040     114     101
        023275     122     107     105
        023300     122     040     115
        023303     105     115     117
        023306     045     116     000
3382                                            .EVEN
3383
3384    023312                                  ENDINIT
        023312                              L10012:
        023312  104411                                                                  TRAP    C$INIT
3385
3386                                        .SBTTL  AUTO DROP SECTION
3387
3388                                        ;++
```

```
                        ;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
                        ;--

023314                          BGNAUTO
023314                  L$AUTO::

                        JSR PC,FIRSTU                   ;FIND FIRST UNIT
                50402$: ;WHILE DEVTBL(R5) NE #END DO    ;
177777          CMP     DEVTBL(R5),#END
                BEQ     50403$
                CLRB    TRAPD4      ;LET TRAPD4 :B= #0          ;
                  SETVEC #4,#TRAP4,#INTPRI      ;SET VECTOR 4
                                                                MOV     #INTPRI,-(SP)
                                                                MOV     #TRAP4,-(SP)
                                                                MOV     #4,-(SP)
                                                                MOV     #3,-(SP)
                                                                TRAP    C$SVEC
                                                                ADD     #10,SP
                MOV     @TSDB(R5),R2            ;ADDRESS TSO5 INTERFACE
                  CLRVEC #4                     ;CLEAR VECTOR AT 4
                                                                MOV     #4,R0
                                                                TRAP    C$CVEC
                TSTB    TRAPD4      ;IFB TRAPD4 NE #0 THEN
                BEQ     50404$
                INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
                    PRINTF #AUTODM,TSDB(R5)     ;PRINT ERROR
                                                                MOV     TSDB(R5),-(SP)
                                                                MOV     #AUTODM,-(SP)
                                                                MOV     #2,-(SP)
                                                                MOV     SP,R0
                                                                TRAP    C$PNTF
                                                                ADD     #6,SP
                MOV     DEVTBL(R5),DROPN                ;SAVE # OF UNIT TO BE DROPPED.
                MOV     R5,R0                   ;R0=LOGICAL DEVICE NUMBER
                ASR     R0
                DODU    R0      ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU = 0
                                                                TRAP    C$DODU

                BR      50405$
        50404$:
                MOV     #GSCPK,@TSDB(R5)        ;SEND GET STATUS COMMAND
                JSR PC,WSSR                     ;WAIT
                BIT     #TS.SSR,@TSSR(R5)       ;IF #TS.SSR SETIN @TSSR(R5) THEN
                BEQ     50406$
                BIT     #TS.OFL,@TSSR(R5)       ;IF #TS.OFL SETIN @TSSR(R5) THEN
                BEQ     50407$
                INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
                PRINTF #OFLINM,TSNP
                                                                MOV     TSNP,-(SP)
                                                                MOV     #OFLINM,-(SP)
                                                                MOV     #2,-(SP)
                                                                MOV     SP,R0
                                                                TRAP    C$PNTF
                                                                ADD     #6,SP
                JSR PC,DROPUA
```

```
023536                              50407$:
023536  000416                             BR      50410$
023540                              50406$:
023540  005265  003366                     INC     FTLCNT(R5)              ;LET FTLCNT(R5) := FTLCNT(R5) + #1
023544                                             PRINTF #NRDYM,DEVTBL(R5)
023544  016546  002604                                                                          MOV     DEVTBL(R5),-(SP)
023550  012746  023700                                                                          MOV     #NRDYM,-(SP)
023554  012746  000002                                                                          MOV     #2,-(SP)
023560  010600                                                                                  MOV     SP,R0
023562  104417                                                                                  TRAP    C$PNTF
023564  062706  000006                                                                          ADD     #6,SP
023570  004767  173530                             JSR PC,DROPUA
023574                              50410$:
023574                              50405$:
023574  004767  173350                         JSR PC,NEXTU
023600  000647                             BR      50402$
023602                              50403$:
023602                                     ENDAUTO
023602                              L10013:
023602  104461                                                                                  TRAP    C$AUTO
023604     045     101     102      AUTODM: .ASCII  /%ABUS TRAP AT %O6%N/
023607     125     123     040
023612     124     122     101
023615     120     040     101
023620     124     040     045
023623     117     066     045
023626     116
023627     045     101     111              .ASCIZ  /%AINTERFACE BAD OR NOT SET TO ABOVE AD%N/
023632     116     124     105
023635     122     106     101
023640     103     105     040
023643     102     101     104
023646     040     117     122
023651     040     116     117
023654     124     040     123
023657     105     124     040
023662     124     117     040
023665     101     102     117
023670     126     105     040
023673     101     104     045
023676     116     000
023700     045     101     125      NRDYM:  .ASCIZ  /%AUNIT %D1%A NOT RDY%N/
023703     116     111     124
023706     040     045     104
023711     061     045     101
023714     040     116     117
023717     124     040     122
023722     104     131     045
023725     116     000
                                            .EVEN
```

```
3447
3448                                    ;       DEVICE BUS TRAP HANDLER
3449                                    ;       OUTPUT: TRAPD4 BYTE  1: TRAPED AT 4
3450                                    ;                            0: NO TRAP
3451
3452 023730  105267  157574            TRAP4:: INCB    TRAPD4;LET TRAPD4 :8= TRAPD4 + #1
3453 023734  000002                            RTI
3454
3455
3456                                    .SBTTL  CLEANUP CODING SECTION
3457
3458                                    ;++
3459                                    ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
3460                                    ; AT THE END OF EACH PASS.
3461                                    ;--
3462
3463 023736                                     BGNCLN
     023736                             L$CLEAN::
3464
3465 023736  004767  173140                      JSR     PC,FIRSTU               ;FIND FIRST UNIT.
3466 023742                             50411$: ;WHILE DEVTBL(R5) NE #END DO
3467 023742  026527  002604  177777            CMP     DEVTBL(R5),#END
3468 023750  001410                            BEQ     50412$
3469 023752  004767  166722                      JSR PC,WSSR                     ;WAIT FOR UNIT READY OR TIMEOUT.
3470 023756                                     CLRVEC          TSVCT(R5)       ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
     023756  016500  002534                                                             MOV     TSVCT(R5),R0
     023762  104436                                                                     TRAP    C$CVEC
3471 023764  004767  173160                      JSR   PC,NEXTU                  ;FIND NEXT UNIT.
3472
3473 023770  000764                            BR      50411$
3474 023772                             50412$:
3475
3476 023772                                     EXIT    CLN
     023772  104432                                                                 TRAP    C$EXIT
     023774  000002                                                                 .WORD   L10014-.
3477                                            .EVEN
3478
3479 023776                                     ENDCLN
     023776                             L10014:
     023776  104412                                                                 TRAP    C$CLEAN
3480
3481                                    .SBTTL  DROP UNIT SECTION
3482
3483                                    ;++
3484                                    ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3485                                    ; TO NO LONGER BE TESTED.  THAT CODE SHALL BE EXECUTED WHEN DODU
3486                                    ;MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
3487                                    ;--
3488
3489 024000                                     BGNDU
     024000                             L$DU::
3490
3491 024000  010005                            MOV     R0,R5                   ;R5 = LOGICAL DEVICE NUMBER X 2.
3492 024002  006305                            ASL     R5
3493 024004  012765  177774  002604            MOV     #NINUSE,DEVTBL(R5)      ;SET NOT IN USE FLAG FOR THE DEVICE.
3494 024012                                     CLRVEC TSVCT(R5)                ;RELEASE THE INTERRUPT VECTOR.
     024012  016500  002534                                                             MOV     TSVCT(R5),R0
```

```
024016  104436                                                                      TRAP    C$CVEC
024020                          PRINTF  #DROPDM,DROPN          ;PRINT DROP DEVICE MESSAGE
024020  016746  173364                                                              MOV     DROPN,-(SP)
024024  012746  005065                                                              MOV     #DROPDM,-(SP)
024030  012746  000002                                                              MOV     #2,-(SP)
024034  010600                                                                      MOV     SP,R0
024036  104417                                                                      TRAP    C$PNTF
024040  062706  000006                                                              ADD     #6,SP
024044                          EXIT    DU
024044  000167                                                                      .WORD   J$JMP
024046  000000                                                                      .WORD   L10015-2-.
                                .EVEN

024050                          ENDDU
024050                  L10015:
024050  104453                                                                      TRAP    C$DU

                        .SBTTL  ADD UNIT SECTION

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

024052                          BGNAU
024052                  L$AU::
024052  010005                  MOV     R0,R5                  ;R5 = LOGICAL DEVICE NUMBER X 2.
024054  006305                  ASL     R5
024056  010065  002604          MOV     R0,DEVTBL(R5)          ;STORE UNIT # IN DEVICE TABLE.
024062                          GPHARD  R0,R0                  ;GET HARDWARE P TABLE FROM SUPER.
024062  104442                                                                      TRAP    C$GPHRD
024064  011065  002514          MOV     (R0),TSDB(R5)          ;SAVE TSDB ADDRESS.
024070  012065  002524          MOV     (R0)+,TSSR(R5)         ;SAVE TSSR ADDRESS.
024074  062765  000002  002524  ADD     #2,TSSR(R5)
024102  011065  002534          MOV     (R0),TSVCT(R5)         ;SAVE INTERRUPT VECTOR ADDRESS.
024106  011065  003532          MOV     (R0),TSUNT(R5)         ;SAVE NUMBER OF DRIVE
024112  011067  157416          MOV     (R0),TSNP              ;SAVE FOR PRINT OUT'S
024116                          SETVEC TSVCT(R5),TS5INT(R5),#INTPRI
024116  012746  000340                                                              MOV     #INTPRI,-(SP)
024122  016546  002554                                                              MOV     TS5INT(R5),-(SP)
024126  016546  002534                                                              MOV     TSVCT(R5),-(SP)
024132  012746  000003                                                              MOV     #3,-(SP)
024136  104437                                                                      TRAP    C$SVEC
024140  062706  000010                                                              ADD     #10,SP
                                                               ;SET UP INTERUPT PROCESSING CONDITIONS.
024144  005065  003472          CLR     INTFLG(R5)             ;CLEAR INTERRUPT FLAGS.

024150                          EXIT    AU
024150  000167                                                                      .WORD   J$JMP
024152  000000                                                                      .WORD   L10016-2-.

                                .EVEN

024154                          ENDAU
024154                  L10016:
024154  104452                                                                      TRAP    C$AU
```

```
3529
3530
3531
3532                                    .TITLE HARDWARE TESTS
3533
3534                                    .SBTTL  TEST 1:  BASIC FUNCTIONS.
3535
3536                                    ;++
3537                                    ; TEST TO EXECUTE ALL TS05 FUNCTIONS.
3538                                    ;--
3539
3540 024156                                     BGNMOD
3541
3542 024156                                     BGNTST
     024156                             T1::
3543
3544 024156  105067  157333                     CLRB    RANDOM                  ;CLR THE RANDOM OPERATIONS FLAG.
3545 024162  105067  157326                     CLRB    EXPBOT                  ;CLR EXPECT BOT FLAG.
3546
3547 024166                                     BGNSUB                  ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
     024166                             T1.1:
     024166  104402                                                                     TRAP    C$BSUB
3548
3549 024170  004767  172706                     JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
3550 024174  004767  162672                     JSR     PC,SOFINIT              ;INIT DEVICE
3551 024200  103404                             BCS     11$
3552 024202                                     ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     024202  104455                                                                     TRAP    C$ERDF
     024204  000002                                                                     .WORD   2
     024206  004536                                                                     .WORD   NSSRM
     024210  006120                                                                     .WORD   STAERM
3553
3554 024212  004767  163250                11$:  JSR     PC,MDSET                ;GO DO SETUP'S
3555 024216  012702  025074                     MOV     #BFSEQO,R2              ;ADR OF CMD SEQ.
3556 024222  004767  000622                     JSR     PC,BFSEQ                ;SET UP CMD SEQ.
3557 024226  004767  163774                     JSR     PC,EXALL                ;EXECUTE CMD SEQ ON ALL DEVICES.
3558 024232  004767  172644                     JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
3559 024236                             50413$: ;WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
3560 024236  026527  002604  177777           CMP     DEVTBL(R5),#END
3561 024244  001451                             BEQ     50414$
3562 024246  016502  002544                     MOV     MSGPKA(R5),R2           ;GET MSG PACKET ADR,
3563 024252  062702  000012                     ADD     #12,R2     ;LET R2 := R2 + #12          ;GET XSTAT2 ADR,
3564 024256  011265  002564                     MOV     (R2),TS5CL(R5)           ;STORE CODE LEVEL FROM DTR BYTE,
3565 024262  042765  177700  002564           BIC     #177700,TS5CL(R5)
3566 024270  011265  002574                     MOV     (R2),TS5SW(R5)                  ;STORE  SWITCH SETTINGS
3567 024274  042765  177477  002574           BIC     #177477,TS5SW(R5)
3568 024302                                     PRINTF  #CODELM,DEVTBL(R5),TS5CL(R5)
     024302  016546  002564                                                            MOV     TS5CL(R5),-(SP)
     024306  016546  002604                                                            MOV     DEVTBL(R5),-(SP)
     024312  012746  004162                                                            MOV     #CODELM,-(SP)
     024316  012746  000003                                                            MOV     #3,-(SP)
     024322  010600                                                                    MOV     SP,R0
     024324  104417                                                                    TRAP    C$PNTF
     024326  062706  000010                                                            ADD     #10,SP
3569                                                                    ;PRINT THE TS05 MICROCODE LEVEL.
3570 024332                                     PRINTF  #SWSET,DEVTBL(R5),TS5SW(R5)
     024332  016546  002574                                                            MOV     TS5SW(R5),-(SP)
```

```
HARDWARE TESTS  MACRO M1113  30-NOV-83 10:17                                                    SEQ 116
TEST 1:  BASIC FUNCTIONS.

        024336  016546  002604                                                  MOV     DEVTBL(R5),-(SP)
        024342  012746  004231                                                  MOV     #SWSET,-(SP)
        024346  012746  000003                                                  MOV     #3,-(SP)
        024352  010600                                                          MOV     SP,R0
        024354  104417                                                          TRAP    C$PNTF
        024356  062706  000010                                                  ADD     #10,SP
  3571                                                          ;PRINT THE TS05 SWITCH SETTINGS.
  3572 024362                           50415$:
  3573 024362  004767  172562             JSR     PC,NEXTU      ;FIND NEXT UNIT.
  3574
  3575 024366  000723                   BR      50413$
  3576 024370                           50414$:
  3577
  3578 024370                           ENDSUB
       024370                           L10020:
       024370  104403                                                          TRAP    C$ESUB
  3579
  3580 024372                           BGNSUB                  ;SUBTEST 2 - REWIND.
       024372                           T1.2:
       024372  104402                                                          TRAP    C$BSUB
  3581
  3582 024374  012702  025146           MOV     #BFSEQ1,R2      ;ADR OF CMD SEQ.
  3583 024400  004767  000444           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  3584 024404  004767  163616           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  3585 024410  105067  157112           CLRB    STAFLG          ;CLEAR START FLAG
  3586 024414                           ENDSUB
       024414                           L10021:
       024414  104403                                                          TRAP    C$ESUB
  3587
  3588 024416                           BGNSUB                  ;SUBTEST 3 - WRITE/VERIFY.
       024416                           T1.3:
       024416  104402                                                          TRAP    C$BSUB
  3589
  3590 024420  012702  025160           MOV     #BFSEQ2,R2      ;ADR OF CMD SEQ.
  3591 024424  004767  000420           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  3592 024430  004767  163572           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  3593 024434                           ENDSUB
       024434                           L10022:
       024434  104403                                                          TRAP    C$ESUB
  3594
  3595 024436                           BGNSUB                  ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
       024436                           T1.4:
       024436  104402                                                          TRAP    C$BSUB
  3596
  3597 024440  012702  025252           MOV     #BFSEQ3,R2      ;ADR OF CMD SEQ.
  3598 024444  004767  000400           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
  3599 024450  004767  163552           JSR     PC,EXALL        ;EXECUTE CMD SEQ ON ALL DEVICES.
  3600 024454                           ENDSUB
       024454                           L10023:
       024454  104403                                                          TRAP    C$ESUB
  3601
  3602 024456                           BGNSUB                  ;SUBTEST 5 - SPACE FILES.
       024456                           T1.5:
       024456  104402                                                          TRAP    C$BSUB
  3603
  3604 024460  012702  025324           MOV     #BFSEQ4,R2      ;ADR OF CMD SEQ.
  3605 024464  004767  000360           JSR     PC,BFSEQ        ;SET UP CMD SEQ.
```

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3606 024470  004767  163532                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3607 024474                                ENDSUB
     024474                        L10024:
     024474  104403                                                      TRAP    C$ESUB
3608
3609 024476                                BGNSUB                      ;SUBTEST 6 - SPACE RECORDS.
     024476                        T1.6:
     024476  104402                                                      TRAP    C$BSUB
3610
3611 024500  012702  025366                MOV     #BFSEQ5,R2          ;ADR OF CMD SEQ.
3612 024504  004767  000340                JSR     PC,BFSEQ            ;SET UP CMD SEQ.
3613 024510  004767  163512                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3614 024514                                ENDSUB
     024514                        L10025:
     024514  104403                                                      TRAP    C$ESUB
3615
3616 024516                                BGNSUB                      ;SUBTEST 7 - WRITE RETRY.
     024516                        T1.7:
     024516  104402                                                      TRAP    C$BSUB
3617
3618 024520  012702  025440                MOV     #BFSEQ6,R2          ;ADR OF CMD SEQ.
3619 024524  004767  000320                JSR     PC,BFSEQ            ;SET UP CMD SEQ.
3620 024530  004767  163472                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3621 024534                                ENDSUB
     024534                        L10026:
     024534  104403                                                      TRAP    C$ESUB
3622
3623 024536                                BGNSUB                      ;SUBTEST 8 - READ REV RETRY.
     024536                        T1.8:
     024536  104402                                                      TRAP    C$BSUB
3624
3625 024540  012702  025512                MOV     #BFSEQ7,R2          ;ADR OF CMD SEQ.
3626 024544  004767  000300                JSR     PC,BFSEQ            ;SET UP CMD SEQ.
3627 024550  004767  163452                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3628 024554                                ENDSUB
     024554                        L10027:
     024554  104403                                                      TRAP    C$ESUB
3629
3630 024556                                BGNSUB                      ;SUBTEST 9 - READ FWD RETRY.
     024556                        T1.9:
     024556  104402                                                      TRAP    C$BSUB
3631
3632 024560  012702  025544                MOV     #BFSEQ8,R2          ;ADR OF CMD SEQ.
3633 024564  004767  000260                JSR     PC,BFSEQ            ;SET UP CMD SEQ.
3634 024570  004767  163432                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3635 024574                                ENDSUB
     024574                        L10030:
     024574  104403                                                      TRAP    C$ESUB
3636
3637 024576                                BGNSUB                      ;SUBTEST 10- CLEAN.
     024576                        T1.10:
     024576  104402                                                      TRAP    C$BSUB
3638
3639 024600  012702  025576                MOV     #BFSEQ9,R2          ;ADR OF CMD SEQ.
3640 024604  004767  000240                JSR     PC,BFSEQ            ;SET UP CMD SEQ.
3641 024610  004767  163412                JSR     PC,EXALL            ;EXECUTE CMD SEQ ON ALL DEVICES.
3642 024614                                ENDSUB
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                024614                          L10031:
                024614  104403                                                  TRAP    C$ESUB
     3643
     3644       024616                                  BGNSUB                  ;SUBTEST 11 - WTV SWAPPED DATA BYTES.
                024616                          T1.11:
                024616  104402                                                  TRAP    C$BSUB
     3645       024620  012702  025620                  MOV     #BFSE10,R2      ;ADR OF CMD SEQ.
     3646       024624  004767  000220                  JSR     PC,BFSEQ        ;SET UP CMD SEQ.
     3647       024630  004767  163372                  JSR     PC,EXALL        ;WRITE/VERIFY RECORDS 1 AND 2.
     3648       024634  112767  000001  156656          MOVB    #1,SWBFLG       ;ENABLE BYTE SWAPPING.
     3649       024642  004767  163360                  JSR     PC,EXALL        ;WRITE/VERIFY RECORDS 3 AND 4.
     3650       024646  105067  156646                  CLRB    SWBFLG          ;DISABLE BYTE SWAPPING.
     3651       024652                                  ENDSUB
                024652                          L10032:
                024652  104403                                                  TRAP    C$ESUB
     3652       024654  016702  156526                  MOV     DATAWT,R2       ;INIT WRITE BUFFER POINTER.
     3653       024660  062702  000012                  ADD     #10.,R2
     3654       024664                          50416$: ;WHILE R2 NE DATAWT DO  ;UNTIL 10 BYTES HAVE BEEN SWAPPED.
     3655       024664  020267  156516                  CMP     R2,DATAWT
     3656       024670  001402                          BEQ     50417$
     3657       024672  000342                            SWAB  -(R2)           ;SWAP DATA BYTES IN WRITE BUFFER.
     3658
     3659       024674  000773                          BR      50416$
     3660       024676                          50417$:
     3661       024676  105267  156621                  INCB    T1SWB           ;SET T1 SWAP BYTES FLAG FOR "CKDATA" SUBR
     3662
     3663       024702                                  BGNSUB                  ;SUBTEST 12 - READ SWAPPED DATA BYTES.
                024702                          T1.12:
                024702  104402                                                  TRAP    C$BSUB
     3664       024704  012767  104401  156506          MOV     #RDR,CMDWRD     ;CMD IS READ REV.
     3665       024712  004767  171234                  JSR     PC,VFEXC        ;VERIFY ODD LENGTH SWAP (RECORD 4).
     3666       024716  012767  000012  155412          MOV     #12,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 10.
     3667       024724  004767  171222                  JSR     PC,VFEXC        ;VERIFY EVEN LENGTH SWAP (RECORD 3).
     3668       024730  112767  000001  156562          MOVB    #1,SWBFLG       ;ENABLE BYTE SWAPPING.
     3669       024736  012767  000011  155372          MOV     #11,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 9.
     3670       024744  004767  171202                  JSR     PC,VFEXC        ;VERIFY ODD LENGTH SWAP (RECORD 2).
     3671       024750  012767  000012  155360          MOV     #12,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 10.
     3672       024756  004767  171170                  JSR     PC,VFEXC        ;VERIFY EVEN LENGTH SWAP (RECORD 1).
     3673       024762  012767  104001  156430          MOV     #RDF,CMDWRD     ;CMD IS READ FWD.
     3674       024770  004767  171156                  JSR     PC,VFEXC        ;VERIFY EVEN LENGTH SWAP (RECORD 1).
     3675       024774  012767  000011  155334          MOV     #11,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 9.
     3676       025002  004767  171144                  JSR     PC,VFEXC        ;VERIFY ODD LENGTH SWAP (RECORD 2).
     3677       025006  105067  156506                  CLRB    SWBFLG          ;DISABLE BYTE SWAPPING.
     3678       025012  012767  000012  155316          MOV     #12,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 10.
     3679       025020  004767  171126                  JSR     PC,VFEXC        ;VERIFY EVEN LENGTH SWAP (RECORD 3).
     3680       025024  012767  000011  155304          MOV     #11,CMDPKT+CP.CNT ;CHANGE BYTE COUNT TO 9.
     3681       025032  004767  171114                  JSR     PC,VFEXC        ;VERIFY ODD LENGTH SWAP (RECORD 4).
     3682
     3683       025036                                  ENDSUB
                025036                          L10033:
                025036  104403                                                  TRAP    C$ESUB
     3684
     3685       025040  105067  156457          CLRB    T1SWB                   ;CLEAR T1 SWAP BYTES FLAG
     3686
     3687       025044                          EXIT    TST
                025044  104432                                                  TRAP    C$EXIT
                025046  000574                                                  .WORD   L10017-.
```

```
                                ;       SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
                                ;       INPUTS:         R2 = FWA OF COMMAND SEQUENCE.
                                ;       OUTPUTS:
                                ;       REGISTERS:
                                ;       CALLS:
025050  012701  003540          BFSEQ:: MOV     #CMDSEQ,R1              ;INIT SEQ TABLE ADDRESS.
025054                          50420$: ;WHILE (R2) NE #END DO          ;WHILE THERE ARE MORE COMMANDS:
025054  021227  177777                  CMP     (R2),#END
025060  001402                          BEQ     50421$
025062  012221                          MOV     (R2)+,(R1)+             ;MOVE COMMANDS TO SEQ TABLE.
025064  000773                          BR      50420$
025066                          50421$:
025066  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE.
025072  000207                          RTS     PC                      ;RETURN.


                                ;       BASIC FUNCTION COMMAND SEQUENCE

025074  140004                  BFSEQ0: .WORD   SCH                     ;SET CHAR. 200.         (1)
025076  000200                          200
025100  000001                          1
025102  000000                          0
025104  100013                          DRI                     ;DRIVE INIT.            (2)
025106  000001                          1
025110  000001                          1
025112  000000                          0
025114  140004                          SCH                     ;SET CHAR. 20           (3)
025116  000020                          20
025120  000001                          1
025122  000000                          0
025124  100017                          GES                     ;GET STATUS.            (4)
025126  000001                          1
025130  000001                          1
025132  000000                          0
025134  140004                          SCH                     ;SET CHAR. 40.          (5)
025136  000040                          40
025140  000001                          1
025142  000000                          0
025144  177777                  .WORD   END

025146  102010                  BFSEQ1:         RWD             ;REWIND TWICE.          (6)
025150  000001                          1
025152  000002                          2
025154  000000                          0
025156  177777                  .WORD   END

025160  104105                  BFSEQ2:         WTV             ;WRITE/VERIFY PAT 1.    (7)
025162  004000                          DATCNT
025164  000001                          1
025166  000001                          1
025170  104105                          WTV                     ;WTV PAT 2.             (8)
025172  004000                          DATCNT
025174  000001                          1
025176  000002                          2
```

```
3745 025200  104105                        WTV       ;WTV PAT 3.        (9)
3746 025202  004000                        DATCNT
3747 025204  000001                        1
3748 025206  000003                        3
3749 025210  104105                        WTV       ;WTV PAT 4.        (10)
3750 025212  004000                        DATCNT
3751 025214  000001                        1
3752 025216  000004                        4
3753 025220  104105                        WTV       ;WTV PAT 5.        (11)
3754 025222  004000                        DATCNT
3755 025224  000001                        1
3756 025226  000005                        5
3757 025230  104105                        WTV       ;WTV PAT 6.        (12)
3758 025232  004000                        DATCNT
3759 025234  000001                        1
3760 025236  000006                        6
3761 025240  104105                        WTV       ;WTV PAT 0.        (13)
3762 025242  004000                        DATCNT
3763 025244  000001                        1
3764 025246  000000                        0
3765 025250  177777              .WORD     END
3766
3767 025252  100011          BFSEQ3:       WTM       ;WRITE TAPE MARK.  (14)
3768 025254  000001                        1
3769 025256  000001                        1
3770 025260  000000                        0
3771 025262  104005                        WRT       ;WRITE 10 RECORDS. (15)
3772 025264  004000                        DATCNT
3773 025266  000010                        10
3774 025270  000001                        1
3775 025272  100411                        ERS       ;ERASE 10 TIMES.   (16)
3776 025274  000001                        1
3777 025276  000010                        10
3778 025300  000000                        0
3779 025302  100011                        WTM       ;WRITE TAPE MARK.  (17)
3780 025304  000001                        1
3781 025306  000001                        1
3782 025310  000000                        0
3783 025312  101011                        WTR       ;WTM RETRY         (18)
3784 025314  000001                        1
3785 025316  000001                        1
3786 025320  000000                        0
3787 025322  177777              .WORD     END
3788
3789 025324  105410          BFSEQ4:       SFR       ;SPACE 2 FILES REV. (19)
3790 025326  000002                        2
3791 025330  000001                        1
3792 025332  000000                        0
3793 025334  105010                        SFF       ;SPACE 2 FILES FWD. (20)
3794 025336  000002                        2
3795 025340  000001                        1
3796 025342  000000                        0
3797 025344  105410                        SFR       ;SPACE 2 FILES REV. (21)
3798 025346  000001                        1
3799 025350  000002                        2
3800 025352  000000                        0
3801 025354  105010                        SFF       ;SPACE 2 FILES FWD. (22)
```

```
3802 025356  000001                          1
3803 025360  000002                          2
3804 025362  000000                          0
3805 025364  177777                .WORD     END
3806
3807 025366  102010          BFSEQ5:         RWD                 ;REWIND.                (23)
3808 025370  000001                          1
3809 025372  000001                          1
3810 025374  000000                          0
3811 025376  104010                          SRF                 ;SPACE 7 RECORDS FWD.   (24)
3812 025400  000007                          7
3813 025402  000001                          1
3814 025404  000000                          0
3815 025406  104410                          SRR                 ;SPACE 7 RECORDS REV.   (25)
3816 025410  000007                          7
3817 025412  000001                          1
3818 025414  000000                          0
3819 025416  104010                          SRF                 ;SPACE 7 RECORDS FWD.   (26)
3820 025420  000001                          1
3821 025422  000007                          7
3822 025424  000000                          0
3823 025426  104410                          SRR                 ;SPACE 7 RECORDS REV.   (27)
3824 025430  000001                          1
3825 025432  000007                          7
3826 025434  000000                          0
3827 025436  177777                .WORD     END
3828
3829 025440  102010          BFSEQ6:         RWD                 ;REWIND.                (28)
3830 025442  000001                          1
3831 025444  000001                          1
3832 025446  000000                          0
3833 025450  104005                          WRT                 ;WRITE.                 (29)
3834 025452  004000                          DATCNT
3835 025454  000001                          1
3836 025456  000001                          1
3837 025460  105005                          WRR                 ;WRITE RETRY.           (30)
3838 025462  004000                          DATCNT
3839 025464  000001                          1
3840 025466  000001                          1
3841 025470  100011                          WTM                 ;WRITE TAPE MARK.
3842 025472  000001                          1
3843 025474  000001                          1
3844 025476  000000                          0
3845 025500  105410                          SFR                 ;SPACE 1 FILE REV.
3846 025502  000001                          1
3847 025504  000001                          1
3848 025506  000000                          0
3849 025510  177777                .WORD     END
3850
3851 025512  104401          BFSEQ7:         RDR                 ;READ REV.              (31)
3852 025514  004000                          DATCNT
3853 025516  000001                          1
3854 025520  000001                          1
3855 025522  105401                          RNR                 ;READ NEXT REV.         (32)
3856 025524  004000                          DATCNT
3857 025526  000001                          1
3858 025530  000001                          1
```

```
3859 025532  125401                          RNF       ;READ NEXT FWD.          (33)
3860 025534  004000                          DATCNT
3861 025536  000001                          1
3862 025540  000001                          1
3863 025542  177777                  .WORD   END
3864
3865 025544  104001          BFSEQ8:         RDF       ;READ FWD.               (34)
3866 025546  004000                          DATCNT
3867 025550  000001                          1
3868 025552  000001                          1
3869 025554  105001                          RPF       ;READ PREVIOUS FWD.      (35)
3870 025556  004000                          DATCNT
3871 025560  000001                          1
3872 025562  000001                          1
3873 025564  125001                          RPR       ;READ PREVIOUS REV.      (36)
3874 025566  004000                          DATCNT
3875 025570  000001                          1
3876 025572  000001                          1
3877 025574  177777                  .WORD   END
3878
3879 025576  101012          BFSEQ9: .WORD   CLN       ;CLEAN.                  (37)
3880 025600  000001                          1
3881 025602  000001                          1
3882 025604  000000                          0
3883 025606  102010                          RWD       ;REWIND                  (38)
3884 025610  000001                          1
3885 025612  000001                          1
3886 025614  000000                          0
3887 025616  177777                  .WORD   END       ;END OF SEQUENCE.
3888
3889 025620  104105          BFSE10:         WTV       ;WRITE/VERIFY EVEN LENGTH.  (39)
3890 025622  000012                          12
3891 025624  000001                          1
3892 025626  000000                          0
3893 025630  104105                          WTV       ;WRITE/VERIFY ODD LENGTH.   (40)
3894 025632  000011                          11
3895 025634  000001                          1
3896 025636  000000                          0
3897 025640  177777                  .WORD   END
3898                                 .EVEN
3899
3900 025642                          ENDTST
     025642          L10017:
     025642  104401                                                    TRAP    C$ETST
3901
3902                 .SBTTL  TEST 2: DATA RELIABILITY.
3903
3904                 ;++
3905                 ; TEST TO CHECK THE DATA RELIABILITY OF THE TS05.
3906                 ;--
3907 025644          BGNTST
     025644          T2::
3908
3909 025644  112767  000001  155643          MOVB    #1,RANDOM       ;SET THE RANDOM OPERATIONS FLAG.
3910 025652  105067  155636                  CLRB    EXPBOT          ;CLEAR EXPECT BOT FLAG.
3911 025656  005067  155574                  CLR     WTMFLG          ;CLEAR WRITE TAPE MARK FLAG
3912 025662  004767  171214                  JSR     PC,FIRSTU       ;FIND THE FIRST UNIT.
```

```
3913 025666  004767  161200              JSR     PC,SOFINIT              ;INIT DEVICE
3914 025672  103404                      BCS     11$
3915 025674                              ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     025674  104455                                                          TRAP    C$ERDF
     025676  000002                                                          .WORD   2
     025700  004536                                                          .WORD   NSSRM
     025702  006120                                                          .WORD   STAERM
3916
3917 025704  004767  161556        11$:    JSR     PC,MDSET                ;GO DO SETUP'S
3918 025710  012702  004000                MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK,
3919 025714  005302                      DEC     R2
3920 025716  010267  155506              MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
3921 025722  005167  155502              COM     LENMSK
3922 025726  004767  162230              JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
3923 025732  105767  155570              TSTB    STAFLG  ;IFB STAFLG NE #0 THEN          ;IF STARTING THEN:
3924 025736  001417                      BEQ     50424$
3925 025740  004767  162242                JSR   PC,SETRW                ;CMD2=REWIND
3926 025744  105067  155556              CLRB    STAFLG    ;LET STAFLG :B= #0            ;CLR START FLAG.
3927
3928 025750                      50422$:
3929 025750  012721  104105              MOV     #WTV,(R1)+
3930 025754  012721  004000              MOV     #DATCNT,(R1)+
3931 025760  012702  177740              MOV     #RNOPSC,R2
3932 025764  005102                      COM     R2
3933 025766  010221                      MOV     R2,(R1)+
3934 025770  012721  000007              MOV     #RANP,(R1)+
3935
3936 025774                      50423$: BREAK                           ; DO A SUPVSR BREAK FIRST.
     025774  104422                                                          TRAP    C$BRK
3937
3938 025776                      50424$:                                 ;FILL SEQ TBL WITH RANDOM CMDS.
3939 025776  020127  003740              CMP     R1,#SEQEND
3940 026002  002012                      BGE     50425$
3941 026004  066767  155422  155422      ADD     RANB,RANS           ;LET RANS := RANS + RANB
3942 026012  016702  155416              MOV     RANS,R2
3943 026016  042702  177741              BIC     #177741,R2
3944 026022  004772  026160              JSR     PC,@RANCMD(R2)          ;SET UP A RANDOM CMD + BRF.
3945
3946 026026  000763                      BR      50424$
3947 026030                      50425$:
3948 026030  012711  177777              MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
3949 026034  004767  162166                JSR   PC,EXALL                ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.
3950
3951 026040  012701  003540              MOV     #CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER.
3952 026044  005702                      TST     R2                          ;REPEAT UNTIL EOT IS REACHED
3953 026046  001752                      BEQ     50423$
3954 026050  105267  155450              INCB    ALLEOT                  ;FLAG ALL UNITS @ EOT
3955 026054  000240                      NOP
3956 026056  000240                      NOP
3957 026060  000240                      NOP
3958 026062  004767  001546              JSR     PC,T5WEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
3959                                                             ;SO THAT SHORTER READ STOP DISTANCE
3960                                                             ;SHALL POSITION HEAD IN CLEAN IRG GAP
3961                                                     ;READ REV THAT EXTRA REC TO RE-POSITION THE TAPE
3962 026066  004767  000126              JSR     PC,RANRD                ;SET UP READ REV/FWD CMDS.
3963 026072  012767  177740  155444      MOV     #RNOPSC,CMDSEQ+4        ;# OF RECORDS FOR READ REV.
3964 026100  005167  155440              COM     CMDSEQ+4
```

```
 3965 026104  016767  155434  155442          MOV     CMDSEQ+4,CMDSEQ+14      ;# OF RECORDS FOR READ FORWARD.
 3966 026112  012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENSE CODE IN SEQ TABLE.
 3967 026116  004767  162104                  JSR     PC,EXALL                ;GO EXECUTE READ REV/FWD OF LAST N RECORDS.
 3968 026122  105067  155376                  CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
 3969 026126  112767  000001  155363          MOVB    #1,RPTFLG               ;REQUEST PERFORMANCE REPORT DURING REWIND.
 3970 026134  012701  003540                  MOV     #CMDSEQ,R1              ;INIT SEQ TBL POINTER.
 3971 026140  004767  162042                  JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL.
 3972 026144  012711  177777                  MOV     #END,(R1)               ;STORE END IN SEQ TBL.
 3973 026150  004767  162052                  JSR PC,EXALL                    ;EXECUTE REWIND CMD ON ALL UNITS
 3974
 3975 026154                                  EXIT    TST
      026154  104432                                                          TRAP    C$EXIT
      026156  000320                                                          .WORD   L10034-.
 3976
 3977                                 ;       ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
 3978                                 ;       THE DATA RELIABILITY TEST.
 3979
 3980 026160  026332                  RANCMD: RANWR                           ;WRITE
 3981 026162  026356                          RANWV                           ;WRITE.
 3982 026164  026332                          RANWR                           ;WRITE.
 3983 026166  026332                          RANWR                           ;WRITE.
 3984 026170  026332                          RANWR                           ;WRITE.
 3985 026172  026332                          RANWR                           ;WRITE.
 3986 026174  026332                          RANWR                           ;WRITE.
 3987 026176  026332                          RANWR                           ;WRITE.
 3988 026200  026220                          RANRD                           ;READ.
 3989 026202  026220                          RANRD                           ;READ.
 3990 026204  026220                          RANRD                           ;READ.
 3991 026206  026220                          RANRD                           ;READ.
 3992 026210  026220                          RANRD                           ;READ.
 3993 026212  026220                          RANRD                           ;READ.
 3994 026214  026220                          RANRD                           ;READ.
 3995 026216  026220                          RANRD                           ;READ.
 3996
 3997
 3998                                 ;       SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
 3999                                 ;       INPUTS:
 4000                                 ;       OUTPUTS:
 4001                                 ;       REGISTERS:      R2
 4002                                 ;       CALLS:
 4003
 4004 026220  005767  155232          RANRD:: TST     WTMFLG                  ;WAS LAST CMD A WRITE?
 4005 026224  001406                          BEQ     1$                      ;NO,GO AHEAD
 4006 026226  004767  000136                  JSR     PC,RAWTM                ;YES PUT DOWN TAPE MARK
 4007 026232  004767  000160                  JSR     PC,RASFR                ;AND SPACE FILE REV
 4008 026236  005067  155214                  CLR     WTMFLG                  ;THEN CLEAR THE FLAG
 4009 026242  020127  003740          1$:     CMP     R1,#SEQEND
 4010 026246  002030                          BGE     2$
 4011 026250  012721  104401                  MOV     #RDR,(R1)+              ;STORE READ REV CMD.
 4012 026254  012721  004000                  MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
 4013 026260  066767  155150  155144          ADD     RANS,RANB       ;LET RANB := RANB + RANS
 4014 026266  016702  155140                  MOV     RANB,R2         ;LET R2 := RANB CLR.BY #RNOPSC
 4015 026272  042702  177740                  BIC     #RNOPSC,R2
 4016 026276  010221                          MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
 4017 026300  012721  000007                  MOV     #RANP,(R1)+     ;RANDOM PATTERN.
 4018 026304  020127  003740                  CMP     R1,#SEQEND
 4019 026310  002007                          BGE     2$
```

```
4020 026312  012721  104001          MOV     @RDF,(R1)+      ;STORE READ FWD CMD.
4021 026316  012721  004000          MOV     @DATCNT,(R1)+   ;SET BRF TO MAX TO READ RANDOM LENGTHS.
4022 026322  010221                  MOV     R2,(R1)+        ;SET RANDOM # OF OPERATIONS.
4023 026324  012721  000007          MOV     @RANP,(R1)+     ;RANDOM PATTERN.
4024 026330  000207              2$: RTS PC
4025
4026                              ;   SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE,
4027                              ;   THEN A WRITE TAPE MARK AND SPACE FILE REVERSE.
4028                              ;
4029                              ;   INPUTS:
4030                              ;   OUTPUTS:
4031                              ;   REGISTERS:
4032                              ;   CALLS:
4033
4034 026332  012721  104005      RANWR:: MOV     @WRT,(R1)+              ;STORE WRITE CMD.
4035 026336  004767  000102              JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
4036 026342  005767  155110              TST     WTMFLG                  ;LAST CMD A WRT?
4037 026346  001002                      BNE     1$                      ;YES,RETURN
4038 026350  005267  155102              INC     WTMFLG                  ;NO,SET THE FLAG
4039 026354  000207              1$: RTS PC
4040
4041
4042                              ;   SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
4043                              ;   INPUTS:
4044                              ;   OUTPUTS:
4045                              ;   REGISTERS:
4046                              ;   CALLS:
4047
4048 026356  012721  104105      RANWV:: MOV     @WTV,(R1)+              ;STORE WRITE/VERIFY CMD.
4049 026362  004767  000056              JSR PC,RANW                     ;STORE BRF, # OF OPERATIONS, PATTERN.
4050 026366  000207                      RTS     PC
4051
4052
4053                              ;   SUBROUTINE TO SET UP A WRITE TAPE MARK IN THE SEQUENCE TABLE.
4054                              ;   INPUTS:
4055                              ;   OUTPUTS:
4056                              ;   REGISTERS:
4057                              ;   CALLS:
4058
4059 026370  020127  003740      RAWTM:: CMP     R1,@SEQEND
4060 026374  002007                      BGE     1$
4061 026376  012721  100011              MOV     @WTM,(R1)+              ;STORE WRITE TAPE MARK CMD.
4062 026402  012721  000001              MOV     @1,(R1)+                ;BRF
4063 026406  012721  000001              MOV     @1,(R1)+                ;# OF OPERATIONS
4064 026412  005721                      TST     (R1)+                   ;SKIP PATTERNS
4065 026414  000207              1$: RTS PC
4066
4067                              ;   SUBROUTINE TO SET UP A SPACE FILE REVERSE IN THE SEQUENCE TABLE.
4068                              ;   INPUTS:
4069                              ;   OUTPUTS:
4070                              ;   REGISTERS:
4071                              ;   CALLS:
4072
4073 026416  020127  003740      RASFR:: CMP     R1,@SEQEND
4074 026422  002007                      BGE     1$
4075 026424  012721  105410              MOV     @SFR,(R1)+              ;STORE SPACE FILE REVERSE
4076 026430  012721  000001              MOV     @1,(R1)+                ;BRF
```

```
4077 026434  012721  000001              MOV     #1,(R1)+                ;# OF OPERATIONS
4078 026440  005721                      TST     (R1)+                   ;SKIP PATTERNS
4079 026442  000207              1$:     RTS PC
4080
4081
4082                             ;       SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
4083                             ;       SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
4084                             ;       INPUTS:
4085                             ;       OUTPUTS:
4086                             ;       REGISTERS:      R2
4087                             ;       CALLS:
4088
4089 026444  012721  004000      RANW::  MOV     #DATCNT,(R1)+           ;SET BRF TO MAX FOR PATTERN GENERATION.
4090                                                                     ;RANDOM BRF WILL BE GENERATED FOR EACH RECORD.
4091 026450  066767  154760  154754      ADD     RANS,RANB               ;LET RANB := RANB + RANS
4092 026456  016702  154750              MOV     RANB,R2                 ;LET R2 := RANB CLR.BY #RNOPSC
4093 026462  042702  177740              BIC     #RNOPSC,R2
4094 026466  010221                      MOV     R2,(R1)+                ;SET RANDOM # OF OPERATIONS.
4095 026470  012721  000007              MOV     #RANP,(R1)+             ;RANDOM PATTERN.
4096 026474  000207                      RTS PC                          ;RETURN.
4097
4098                                     .EVEN
4099
4100 026476                              ENDTST
     026476                      L10034:
     026476  104401                                                                  TRAP    C$ETST
4101
4102                             .SBTTL  TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
4103
4104                             ;++
4105                             ; TEST TO WRITE RECORDS FROM BOT TO EOT.
4106                             ;--
4107
4108 026500                              BGNTST
     026500                      T3::
4109
4110 026500  112767  000001  155007      MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
4111 026506  105067  155002              CLRB    EXPBOT  ;LET EXPBOT :B= #0              ;CLEAR EXPECT BOT FLAG.
4112
4113 026512  004767  170364              JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
4114 026516  004767  160350              JSR     PC,SOFINIT              ;INIT DEVICE
4115 026522  103404                      BCS     11$
4116 026524                              ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     026524  104455                                                                  TRAP    C$ERDF
     026526  000002                                                                  .WORD   2
     026530  004536                                                                  .WORD   NSSRM
     026532  006120                                                                  .WORD   STAERM
4117
4118 026534  004767  160726      11$:    JSR     PC,MDSET                ;GO DO SETUP'S
4119 026540  012702  004000              MOV     #DATCNT,R2              ;SET UP THE RECORD LENGTH MASK.
4120 026544  005302                      DEC     R2
4121 026546  010267  154656              MOV     R2,LENMSK               ;ALLOW MAXIMUM BUFFER.
4122 026552  005167  154652              COM     LENMSK
4123 026556  004767  161400              JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
4124 026562  004767  161420              JSR PC,SETRW                    ;CMD2=REWIND
4125 026566  105067  154734              CLRB    STAFLG  ;LET STAFLG :B= #0              ;CLEAR START FLAG
4126 026572                      50426$: BREAK                   ; DO A SUPVSR BREAK FIRST.
```

```
     026572  104422                                                                  TRAP    C$BRK

     026574                          50427$:                        ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
     026574  020127  003740                 CMP     R1,#SEQEND
     026600  002003                         BGE     50430$
     026602  004767  177524                 JSR     PC,RANWR                ;STORE A WRITE CMD IN SEQUENCE TABLE.
     026606  000772                         BR      50427$
     026610                          50430$:
     026610  012711  177777                 MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
     026614  004767  161406                   JSR   PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
     026620  012701  003540                 MOV     #CMDSEQ,R1                      ;INIT SEQ TBL POINTER,
     026624  005702                         TST     R2                              ;REPEAT UNTIL EOT IS REACHED
     026626  001761                         BEQ     50426$
     026630  105267  154670                 INCB    ALLEOT                  ;SET ALL UNITS @ EOT FLAG
     026634  000240                         NOP
     026636  000240                         NOP
     026640  000240                         NOP
     026642  004767  000766                 JSR     PC,TSWEOT       ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
                                                                        ;SO THAT SHORTER READ STOP DISTANCE
                                                                        ;SHALL POSITION HEAD IN CLEAN IRG GAP
                                                        ;READ REV THAT EXTRA REC TO RE-POSITION TAPE
     026646  105067  154652                 CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
     026652  004767  161330                 JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL.
     026656  012711  177777                 MOV      #END,(R1)              ;STORE END IN SEQ TBL.
     026662  004767  161340                 JSR PC,EXALL                    ;EXECUTE REWIND CMD ON ALL UNITS


     026666                                 EXIT    TST
     026666  104432                                                                  TRAP    C$EXIT
     026670  000002                                                                  .WORD   L10035-.

                                            .EVEN

     026672                                 ENDTST
     026672                          L10035:
     026672  104401                                                                  TRAP    C$ETST


                                     .SBTTL  TEST 4:  READ COMPATABILITY/READ UTILITY.

                                     ;++
                                     ; TEST TO READ ENTIRE TAPE FORWARD AND REVERSE.
                                     ;--

     026674                                 BGNTST
     026674                          T4::

     026674  112767  000001  154613         MOVB    #1,RANDOM               ;SET THE RANDOM OPERATIONS FLAG.
     026702  112767  000001  154604         MOVB    #1,EXPBOT               ;SET EXPECT BOT FLAG.

     026710  004767  170166                 JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
     026714  004767  160152                 JSR     PC,SOFINIT              ;INIT DEVICE
     026720  103404                         BCS     11$
     026722                                 ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
     026722  104455                                                                  TRAP    C$ERDF
     026724  000002                                                                  .WORD   2
     026726  004536                                                                  .WORD   NSSRM
```

```
                027730  006120                                                          .WORD   STAERM
4175
4176 026732     004767  160530          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
4177 026736     004767  161220                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
4178 026742     004767  161240                  JSR PC,SETRW                    ;CMD2=REWIND.
4179 026746     105067  154554                  CLRB    STAFLG  ;LET STAFLG :B= #0              ;CLEAR START FLAG
4180 026752     012721  104001                  MOV     #RDF,(R1)+              ;CMD3 = READ FORWARD.
4181 026756     012721  004000                  MOV     #DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
4182 026762     012721  077777                  MOV     #77777,(R1)+            ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
4183 026766     012721  000007                  MOV     #RANP,(R1)+             ;PATTERN = RANDOM.
4184 026772     012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
4185 026776     004767  161224                  JSR     PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNITS.
4186 027002     105267  154516                  INCB    ALLEOT                  ;FLAG TO ALLOW ALL UNITS AT EOT TO READ REV
4187 027006     012701  003540                  MOV     #CMDSEQ,R1              ;INIT CMD SEQ TBL POINTER.
4188 027012     012721  104401                  MOV     #RDR,(R1)+              ;CMD1 = READ REVERSE.
4189 027016     012721  004000                  MOV     #DATCNT,(R1)+           ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
4190 027022     012721  077777                  MOV     #77777,(R1)+            ;RECORD COUNT = MAX FOR WHOLE TAPE.
4191 027026     012721  000007                  MOV     #RANP,(R1)+             ;PATTERN = RANDOM.
4192 027032     012711  177777                  MOV     #END,(R1)               ;STORE END OF SEQUENCE CODE IN TABLE.
4193 027036     004767  161164                  JSR     PC,EXALL                ;GO EXECUTE READ REV. OF ENTIRE TAPE.
4194 027042     105067  154456                  CLRB    ALLEOT                  ;CLEAR ALL UNITS @ EOT FLAG
4195
4196 027046                             EXIT    TST
                027046  104432                                                          TRAP    C$EXIT
                027050  000002                                                          .WORD   L10036-.
4197
4198                                     .EVEN
4199
4200 027052                             ENDTST
                027052                  L10036:
                027052  104401                                                          TRAP    C$ETST
4201
4202                                    .SBTTL  TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
4203
4204                                    ;++
4205                                    ; TEST TO EXECUTE  OPERATOR SELECTED COMMAND SEQUENCE.
4206                                    ;--
4207
4208 027054                                     BGNTST
                027054                  T5::
4209
4210 027054     105067  154435                  CLRB    RANDOM                  ;CLEAR RAMDOM MODE FLAG.
4211 027060     112767  000001  154426          MOVB    #1,EXPBOT               ;SET EXPECT BOT FLAG.
4212
4213 027066     004767  170010                  JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
4214 027072     004767  157774                  JSR     PC,SOFINIT              ;INIT DEVICE
4215 027076     103404                          BCS     11$
4216 027100                                     ERRDF   2,NSSRM,STAERM          ;REPORT TS05 NOT READY
                027100  104455                                                          TRAP    C$ERDF
                027102  000002                                                          .WORD   2
                027104  004536                                                          .WORD   NSSRM
                027106  006120                                                          .WORD   STAERM
4217
4218 027110     004767  160352          11$:    JSR     PC,MDSET                ;GO DO SETUP'S
4219 027114     116767  153076  154377          MOVB    PIRE,IRE                ;MOVE INHIBIT RFC ERROR REPORT FLAG.
4220 027122     004767  161034                  JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
4221 027126     016767  153066  154406          MOV     CHAR,CMDSEQ+2           ;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
```

```
4222 027134  012702  002222                    MOV     #CMDD,R2                ;R2 POINTS TO CMD2 IN SOFT P TABLE.
4223 027140  004767  000446                    JSR     PC,PTCMDS               ;MOVE CMD 2 FROM P TBL TO SEQ TBL.
4224 027144  004767  000442                    JSR     PC,PTCMDS               ;MOVE CMD 3 FROM P TBL TO SEQ TBL.
4225 027150  004767  000436                    JSR     PC,PTCMDS               ;MOVE CMD 4 FROM P TBL TO SEQ TBL.
4226 027154  004767  000432                    JSR     PC,PTCMDS               ;MOVE CMD 5 FROM P TBL TO SEQ TBL.
4227 027160  004767  000426                    JSR     PC,PTCMDS               ;MOVE CMD 6 FROM P TBL TO SEQ TBL.
4228 027164  004767  000422                    JSR     PC,PTCMDS               ;MOVE CMD 7 FROM P TBL TO SEQ TBL.
4229 027170  004767  000416                    JSR     PC,PTCMDS               ;MOVE END CMD FROM P TBL TO SEQ TBL.
4230 027174  005067  154242                    CLR     JLOOP                   ;CLEAR JMP CMD LOOP COUNT.
4231 027200  105067  154322                    CLRB    STAFLG                  ;CLEAR START FLAG
4232 027204  012701  003540                    MOV     #CMDSEQ,R1              ;INIT SEQUENCE TABLE POINTER.
4233 027210                            3$:     ;WHILE (R1) NE #END DO          ;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBLE:
4234 027210                            50431$:
4235 027210  021127  177777                    CMP     (R1),#END
4236 027214  001574                            BEQ     50432$
4237 027216  022711  000040                      CMP   #JMP.C,(R1)             ;IS THIS A JUMP CMD?
4238 027222  001024                              BNE   6$                      ;BR IF NOT.
4239 027224  062701  000002                    ADD     #2,R1     ;LET R1 := R1 + #2            ;POINT TO BRF.
4240 027230  012167  154210                      MOV   (R1)+,JLOC              ;SAVE BRF (LOCATION).
4241 027234  022167  154202                      CMP (R1)+,JLOOP               ;HAS LOOP COUNT BE SATISFIED?
4242 027240  001003                              BNE   1$                      ;IF NOT, JMP AGAIN.
4243 027242  062701  000002                    ADD     #2,R1                   ;IF SO, ADJUST SEQ POUNTER
4244 027246  000760                              BR    3$                      ;AND GO TO NEXT COMMAND.
4245 027250  005267  154166              1$:     INC   JLOOP                   ;UPDATE THE LOOP COUNT.
4246 027254  012701  003540                    MOV     #CMDSEQ,R1              ;INIT CMD SEQ TABLE POINTER.
4247 027260  005367  154160              2$:     DEC   JLOC                    ;DECR LOCATION COUNTER.
4248 027264  001751                              BEQ   3$                      ;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
4249 027266  062701  000010                    ADD     #10,R1                  ;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
4250 027272  000772                              BR    2$                      ;DO IT AGAIN.
4251
4252 027274  022711  000020              6$:     CMP   #DLY.C,(R1)             ;DELAY?
4253 027300  001026                              BNE   4$                      ;BR IF NOT.
4254 027302  062701  000004                    ADD     #4,R1                   ;R1 = LOCATION OF N COUNT.
4255 027306  011167  154126                    MOV     (R1),TIME2              ;SAVE N COUNT.
4256 027312                              7$:     DELAY 1                       ;GO TO SUPER-WAIT 1 MSEC.
     027312  012727  000001                                                                MOV     #1,(PC)+
     027316  000000                                                                        .WORD   0
     027320  016727  152572                                                                MOV     L$DLY,(PC)+
     027324  000000                                                                        .WORD   0
     027326  005367  177772                                                                DEC     -6(PC)
     027332  001375                                                                        BNE     .-4
     027334  005367  177756                                                                DEC     -22(PC)
     027340  001367                                                                        BNE     .-20
4257 027342  005367  154072                      DEC   TIME2
4258 027346  001361                              BNE   7$
4259 027350  062701  000004                    ADD     #4,R1     ;LET R1 := R1 + #4            ;POINT TO NEXT CMD.
4260 027354  000715                              BR    3$                      ;GO CHECK NEXT CMD.
4261 027356  004767  161610              4$:     JSR   PC,SETUP                ;GO SETUP THE COMMAND BLOCK.
4262 027362                              50433$:   ;WHILE NCNT LT NCNT1 DO       ;WHILE THERE ARE RECORDS REMAINING:
4263 027362  026767  154024  154024              CMP     NCNT,NCNT1
4264 027370  002103                              BGE     50434$
4265 027372  004767  161466                        JSR PC,CMDAC                ;STORE CMD ASCII IN ERROR MSG.
4266 027376  004767  161122                        JSR PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
4267 027402  026727  154012  100017              CMP     CMDWRD,#GES             ;IF CMD IS GET STATUS THEN:
4268 027410  001002                              BNE     50435$
4269 027412  004767  167774                          JSR PC,PRXST              ;PRINT EXTENDED STATUS REGISTERS.
4270
```

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4271 027416                          50435$:
4272 027416  004767  170056                JSR PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
4273 027422  012702  000001          MOV     #1,R2                       ;SET ALL UNITS AT BOT/EOT.
4274 027426  004767  167450                JSR PC,FIRSTU               ;FIND FIRST UNIT.
4275 027432                          50436$: ;WHILE DEVTBL(R5) NE #END DO        ;WHILE THERE ARE MORE UNITS:
4276 027432  026527  002604  177777  CMP     DEVTBL(R5),#END
4277 027440  001426                  BEQ     50437$
4278 027442  032767  000400  153750  BIT     #MOD.CO,CMDWRD              ;IF CMD IS REVERSE THEN:
4279 027450  001406                  BEQ     50440$
4280 027452  032765  000002  003502  BIT     #XO.BOT,EOTFLG(R5)            ;IF NOT AT BOT THEN:
4281 027460  001001                  BNE     50441$
4282 027462  005002                  CLR     R2                          ;CLEAR EOT/BOT FLAG.
4283
4284 027464                          50441$:
4285 027464  000411                  BR      50442$                              ;ELSE IF CMD IS NOT REVERSE:
4286 027466                          50440$:
4287 027466  032765  000001  003502  BIT     #XO.EOT,EOTFLG(R5)
4288 027474  001404                  BEQ     50443$
4289 027476  032767  000001  153714  BIT     #CMD.CO,CMDWRD
4290 027504  001001                  BNE     50444$
4291 027506                          50443$:                             ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
4292
4293 027506  005002                  CLR     R2                          ;LET R2 := #0               ;CLEAR EOT/BOT FLAG.
4294
4295 027510                          50444$:
4296
4297 027510                          50442$:
4298 027510  004767  167434                JSR PC,NEXTU                  ;FIND NEXT UNIT
4299                                                                      ;
4300 027514  000746                  BR      50436$
4301 027516                          50437$:
4302 027516  020227  000001          CMP     R2,#1                       ;IF ALL UNIT ARE AT EOT/BOT THEN:
4303 027522  001016                  BNE     50445$
4304 027524  016767  153662  153662  MOV     NCNT,NCNT1                  ;FORCE TERMINATION OF COMMAND.
4305 027532  005267  153656          INC     NCNT1
4306 027536  105267  153762          INCB    ALLEOT                       ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VERIFY OF D
4307 027542  026727  153660  000002  CMP     CMDLG,#2                    ;WHEN WRITING IS CURRENT COMMAND
4308 027550  001002                  BNE     50446$
4309 027552  004767  000056                JSR PC,T5WEOT               ;GO WRITE/READ REV ONE RECORD BEYOND EOT
4310
4311 027556                          50446$:
4312
4313 027556  000402                  BR      50447$
4314 027560                          50445$:
4315 027560  105067  153740          CLRB    ALLEOT                      ;WHEN NOT ALL @EOT, CLEAR FLAG
4316
4317 027564                          50447$:
4318 027564  005267  153622          INC     NCNT                        ;UPDATE RECORD COUNT.
4319 027570  016767  153624  153626  MOV     CMDWRD,PCMDWD               ;SAVE PREVIOUS COMMAND WORD.
4320
4321 027576  000671                  BR      50433$
4322 027600                          50434$:
4323 027600  004767  166262            JSR   PC,VFYDAT                   ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
4324                                                                      ;VERIFY THE LAST N RECORDS OF DATA.
4325
4326 027604  000601                  BR      50431$
4327 027606                          50432$:
```

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4328
4329 027606                                EXIT    TST
     027606  104432                                                  TRAP    C$EXIT
     027610  000140                                                  .WORD   L10037-.
4330
4331                                ;       SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
4332                                ;       THE COMMAND SEQUENCE TABLE.
4333                                ;       INPUTS:         R2 = POINTER TO SOFT "P" TABLE
4334                                ;       OUTPUTS:
4335                                ;       REGISTERS:      R3.
4336                                ;       CALLS:
4337
4338 027612  012203                PTCMDS::MOV     (R2)+,R3            ;R3 = COMMAND TABLE INDEX.
4339 027614  005303                        DEC     R3
4340 027616  006303                        ASL     R3
4341 027620  016321  003752                MOV     CMDTBL(R3),(R1)+        ;MOVE COMMAND WORD.
4342 027624  012221                        MOV     (R2)+,(R1)+             ;MOVE # OF BYTES.
4343 027626  012221                        MOV     (R2)+,(R1)+             ;MOVE # OF OPERATIONS.
4344 027630  012221                        MOV     (R2)+,(R1)+             ;MOVE PATTERN CODE.
4345 027632  000207                        RTS PC
4346
4347                                ;       SUBROUTINE TO WRITE THEN READ REVERSE ONE RECORD BEYOND EOT
4348                                ;       INPUTS:
4349                                ;       OUTPUTS:
4350                                ;       REGISTERS:
4351                                ;       CALLS:          CMDAC,EXSUB,CKHAE
4352
4353 027634  000240                TSWEOT:: NOP
4354 027636  000240                        NOP
4355 027640  004767  160660                JSR PC,EXSUB            ;WRITE ONE RECORD BEYOND EOT
4356 027644  004767  167630                JSR PC,CKHAE            ;SO THAT READ SHORTER STOP DISTANCE
4357                                                                ;SHALL POSITION HEAD IN CLEAN IRG GAP
4358 027650  012700  000002                MOV     #2,R0           ;SET UP COUNTER FOR EOT
4359 027654  016767  153540  153542  1$:   MOV     CMDWRD,PCMDWD   ;LET PCMDWD := CMDWRD   ;REPOSITION TAPE
4360 027662  012767  104401  153530        MOV     #RDR,CMDWRD     ;LET CMDWRD := #RDR     ;BEFORE EXTRA RECORD
4361 027670  012767  000004  153530        MOV     #4,CMDLG                        ;BY READING REVERSE
4362 027676  016767  153516  152424        MOV     CMDWRD,CMDPKT   ;LET CMDPKT := CMDWRD CLR.BY #BRF.C
4363 027704  042767  004000  152416        BIC     #BRF.C,CMDPKT
4364 027712  016767  152412  153502        MOV     CMDPKT,CMDSAV   ;LET CMDSAV := CMDPKT ;THAT RECORD TO ALLOW
4365 027720  016767  153464  152404        MOV     DATARD,CMDPKT+CP.ADL    ;NEXT COMMAND IN THE
4366 027726  004767  161132                JSR PC,CMDAC            ;TABLE TO BE EXECUTED
4367 027732  004767  160566                JSR PC,EXSUB
4368 027736  004767  167536                JSR PC,CKHAE
4369 027742  005300                        DEC     R0              ;FOUND EOT YET?
4370 027744  001343                        BNE     1$              ;NO,KEEP GOING
4371 027746  000207                        RTS PC                  ;YES,RETURN
4372
4373                                        .EVEN
4374
4375 027750                                ENDTST
     027750                         L10037:
     027750  104401                                                  TRAP    C$ETST
4376
4377 027752                                ENDMOD
4378
4379                                .TITLE PARAMETER CODING
4380
```

HARDWARE PARAMETER CODING SECTION

```
                                .SBTTL  HARDWARE PARAMETER CODING SECTION

027752                                  BGNMOD

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

027752                                  BGNHRD
027752  000042                                                          .WORD L10040-L$HARD/2
027754                          L$HARD::
027754                                  GPRMA   TS5ADR,0,0,160010,177564,YES
027754  000031                                                          .WORD   T$CODE
027756  030012                                                          .WORD   TS5ADR
027760  160010                                                          .WORD   T$LOLIM
027762  177564                                                          .WORD   T$HILIM
027764                                  GPRMD   TS5VCT,2,0,777,60,776,YES
027764  001032                                                          .WORD   T$CODE
027766  030027                                                          .WORD   TS5VCT
027770  000777                                                          .WORD   777
027772  000060                                                          .WORD   T$LOLIM
027774  000776                                                          .WORD   T$HILIM
027776                                  GPRMD   TS5UNT,4,0,1,0,1,NO
027776  002022                                                          .WORD   T$CODE
030000  030036                                                          .WORD   TS5UNT
030002  000001                                                          .WORD   1
030004  000000                                                          .WORD   T$LOLIM
030006  000001                                                          .WORD   T$HILIM
030010                                  EXIT HRD
030010  024004                                                          .WORD   T$CODE

                                        .NLIST  BEX
030012  124 123 104     TS5ADR: .ASCIZ  /TSDB ADDRESS/
030027  126 105 103     TS5VCT: .ASCIZ  /VECTOR/
030036  123 105 114     TS5UNT: .ASCIZ  /SELECT DRIVE 0-1/
                                        .LIST   BEX
                                        .EVEN

030060                                  ENDHRD
                                                                        .EVEN
030060                          L10040:

                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

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

```
PARAMETER CODING        MACRO M1113  30-NOV-83 10:17                                    SEQ 133
SOFTWARE PARAMETER CODING SECTION

 4419                                   ;--
 4420
 4421 030060                                    BGNSFT
      030060  000302                                                          .WORD L10041-L$SOFT/2
      030062                            L$SOFT::
 4422 030062                                    GPRML   CLRM,0,1,YES
      030062  000130                                                          .WORD   T$CODE
      030064  030666                                                          .WORD   CLRM
      030066  000001                                                          .WORD   1
 4423 030070                                    GPRML   RRVM,0,400,YES
      030070  000130                                                          .WORD   T$CODE
      030072  030705                                                          .WORD   RRVM
      030074  000400                                                          .WORD   400
 4424 030076                                    GPRML   RCVERM,2,400,YES
      030076  001130                                                          .WORD   T$CODE
      030100  031010                                                          .WORD   RCVERM
      030102  000400                                                          .WORD   400
 4425 030104                                    GPRML   HAEM,2,1,YES
      030104  001130                                                          .WORD   T$CODE
      030106  030734                                                          .WORD   HAEM
      030110  000001                                                          .WORD   1
 4426 030112                                    GPRML   IRECM,6,400,YES
      030112  003130                                                          .WORD   T$CODE
      030114  031064                                                          .WORD   IRECM
      030116  000400                                                          .WORD   400
 4427 030120                                    XFERT   NEXTSP
      030120  004024                                                          .WORD   T$CODE
 4428 030122                                    GPRML   BADTM,4,1,YES
      030122  002130                                                          .WORD   T$CODE
      030124  030760                                                          .WORD   BADTM
      030126  000001                                                          .WORD   1
 4429 030130                            NEXTSP: GPRML   DINTM,6,1,YES
      030130  003130                                                          .WORD   T$CODE
      030132  031041                                                          .WORD   DINTM
      030134  000001                                                          .WORD   1
 4430 030136                                    GPRML   IREM,12,1,YES
      030136  005130                                                          .WORD   T$CODE
      030140  031131                                                          .WORD   IREM
      030142  000001                                                          .WORD   1
 4431 030144                                    GPRML   CHGM,10,1,YES
      030144  004130                                                          .WORD   T$CODE
      030146  031105                                                          .WORD   CHGM
      030150  000001                                                          .WORD   1
 4432 030152                                    XFERF   ENDSP1
      030152  127044                                                          .WORD   T$CODE
 4433 030154                                    GPRMD   CHARM,14,0,377,0,777,YES
      030154  006032                                                          .WORD   T$CODE
      030156  031162                                                          .WORD   CHARM
      030160  000377                                                          .WORD   377
      030162  000000                                                          .WORD   T$LOLIM
      030164  000777                                                          .WORD   T$HILIM
 4434 030166                                    GPRMD   CMD2M,16,D,37,1,33,YES
      030166  007052                                                          .WORD   T$CODE
      030170  031207                                                          .WORD   CMD2M
      030172  000037                                                          .WORD   37
      030174  000001                                                          .WORD   T$LOLIM
      030176  000033                                                          .WORD   T$HILIM
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SOFTWARE PARAMETER CODING SECTION

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4435 030200                          GPRMD   BPCRM,20,D,-1,1,DATCNT,YES
     030200  010052                                      .WORD   T$CODE
     030202  031215                                      .WORD   BPCRM
     030204  177777                                      .WORD   -1
     030206  000001                                      .WORD   T$LOLIM
     030210  004000                                      .WORD   T$HILIM
4436 030212                          GPRMD   NUMBM,22,D,-1,1,77777,YES
     030212  011052                                      .WORD   T$CODE
     030214  031227                                      .WORD   NUMBM
     030216  177777                                      .WORD   -1
     030220  000001                                      .WORD   T$LOLIM
     030222  077777                                      .WORD   T$HILIM
4437 030224                          GPRMD   PATTM,24,D,17,0,10,YES
     030224  012052                                      .WORD   T$CODE
     030226  031247                                      .WORD   PATTM
     030230  000017                                      .WORD   17
     030232  000000                                      .WORD   T$LOLIM
     030234  000010                                      .WORD   T$HILIM
4438 030236                          GPRMD   CMD3M,26,D,37,1,33,YES
     030236  013052                                      .WORD   T$CODE
     030240  031356                                      .WORD   CMD3M
     030242  000037                                      .WORD   37
     030244  000001                                      .WORD   T$LOLIM
     030246  000033                                      .WORD   T$HILIM
4439 030250                          GPRMD   BPCRM,30,D,-1,1,DATCNT,YES
     030250  014052                                      .WORD   T$CODE
     030252  031215                                      .WORD   BPCRM
     030254  177777                                      .WORD   -1
     030256  000001                                      .WORD   T$LOLIM
     030260  004000                                      .WORD   T$HILIM
4440 030262                          GPRMD   NUMBM,32,D,-1,1,77777,YES
     030262  015052                                      .WORD   T$CODE
     030264  031227                                      .WORD   NUMBM
     030266  177777                                      .WORD   -1
     030270  000001                                      .WORD   T$LOLIM
     030272  077777                                      .WORD   T$HILIM
4441 030274                          GPRMD   PATTM,34,D,17,0,10,YES
     030274  016052                                      .WORD   T$CODE
     030276  031247                                      .WORD   PATTM
     030300  000017                                      .WORD   17
     030302  000000                                      .WORD   T$LOLIM
     030304  000010                                      .WORD   T$HILIM
4442 030306                          GPRMD   CMD4M,36,D,37,1,33,YES
     030306  017052                                      .WORD   T$CODE
     030310  031364                                      .WORD   CMD4M
     030312  000037                                      .WORD   37
     030314  000001                                      .WORD   T$LOLIM
     030316  000033                                      .WORD   T$HILIM
4443 030320                          GPRMD   BPCRM,40,D,-1,1,DATCNT,YES
     030320  020052                                      .WORD   T$CODE
     030322  031215                                      .WORD   BPCRM
     030324  177777                                      .WORD   -1
     030326  000001                                      .WORD   T$LOLIM
     030330  004000                                      .WORD   T$HILIM
4444 030332                          GPRMD   NUMBM,42,D,-1,1,77777,YES
     030332  021052                                      .WORD   T$CODE
     030334  031227                                      .WORD   NUMBM
```