```
                .REM    \

                        IDENTIFICATION
                        ..... .. ...

PRODUCT CODE:   AC-E454D-MC

PRODUCT NAME:   CZTSHDO TS11 DATA RELIAB

PRODUCT DATE:   15 MARCH 1984

MAINTAINER:     DIAGNOSTIC ENGINEERING

AUTHOR:         J. HITT
```

USER DOCUMENTATION

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```

GLOSSARY

ACT	AUTOMATED COMPUTER TEST SYSTEM
APT	AUTOMATED PRODUCT TEST SYSTEM
BYTE/RECORD/FILE COUNT BRF	IS STORED IN THE 4TH WORD OF THE COMMAND PACKET AND IT'S USE BY THE TS04 DEPENDS ON THE TYPE OF COMMAND.
CMD	TS04 COMMAND (SEE 2.3.14.1 FOR LIST OF COMMANDS)
COMMAND PACKET CMDPKT	FOUR WORD PACKET IN THE CPU MEMORY WHICH CONTAINS ALL INFORMATION NEEDED BY THE TS04 TO EXECUTE A COMMAND.
EXTENDED STATUS	FOUR WORDS OF TS04 STATUS WHICH ARE TRANSFERRED AS PART OF THE MESSAGE PACKET AT THE COMPLETION OF A COMMAND.
MESSAGE PACKET	SEVEN WORD PACKET IN THE CPU MEMORY INTO WHICH THE TS04 STORES STATUS AT THE COMPLETION OF A COMMAND.
PC	PROGRAM COUNTER
PSW	PROCESSOR STATUS WORD
RESIDUAL FRAME COUNT RFC	THIS COUNT IS PART OF THE MESSAGE PACKET AND CONTAINS THE NUMBER OF BYTES/RECORDS /FILES REMAINING TO BE PROCESSED AT THE COMPLETION OF A COMMAND.
SPECIAL CONDITION SPEC COND	TSS4 BIT15. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT.
TERMINATION CLASS CODE	THREE BIT CODE IN THE TSSR WHICH INDI-

	TCC	CATES THE TYPE OF COMMAND TERMINATION.
	TSBA	TAPE SYSTEM BUS ADDRESS REGISTER.
	TSDB	TAPE SYSTEM DATA BUFFER REGISTER.
	TSSR	TAPE SYSTEM STATUS REGISTER.
	XST0	EXTENDED STATUS REGISTER 0
	XST1	EXTENDED STATUS REGISTER 1
	XST2	EXTENDED STATUS REGISTER 2
	XST3	EXTENDED STATUS REGISTER 3
	XXDP+	XXDP+ IS A "CATCH-ALL" NAME FOR A GROUP OF PDP-1 DIAGNOSTIC PACKAGES AVAILABLE ON MULTIMEDIA.

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, A COMPATABILITY TEST, OR TO EXECUTE A SEQUENCE OF OPERATOR SELECTED COMMANDS.

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
                                ----------

                                   ----------------
                               0   !              !
                                   !    VECTOR    !
                                   !     AREA     !
                                   !              !
                             400   !--------------!
                                   !              !
                                   !    STACK     !
                                   !              !
                            2000   !--------------!
                                   !              !
                                   !  DIAGNOSTIC  !
                                   !              !
                           41000   !--------------!
                                   !              !
                                   !  DIAGNOSTIC  !
                                   !  SUPERVISOR  !
                                   !              !
                           72000   !--------------!
                                   !              !
                                   !    XXDP+     !
                                   !              !
                           77777   ----------------


                                   FREE MEMO 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 UP TO 4 UNITS SIMULTANEOUSLY. THE 4 UNITS ARE ASSIGNED LOGICAL UNIT NUMBERS 0 - 3 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 - OPERATOR SELECTED SEQUENCE UTILITY.

1.1.4.2 ERROR RECOVERY

ERROR RECOVERY IS PERFORMED ON READ, WRITE AND WRITE TAPE MARK ERRORS UNLESS RECOVERY IS INHIBITED BY THE OPERATOR.
THE READ FORWARD/READ REVERSE RETRY LIMIT IS 16 (8 IN THE SAME DIRECTION AND 8 IN THE OPPOSITE DIRECTION). FOR MORE INFORMATION ON ERROR RECOVER PROCEDURES, SEE SECTION 3.0 (ERROR REPORTING).

1.1.4.3 WRITE ERROR RECOVERY

THERE ARE 2 DISTINCT, SELECTABLE WRITE-ERROR-RECOVERY ALGORITHMS:

1. MEDIA/OPERATIONAL SELECTIVE ALGORITHM
2. OPERATIONAL ALGORITHM

BY DEFAULT THE DIAGNOSTIC SELECTS THE FIRST ALGORITHM TO DISCERN 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 ?

WHEN 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

THE ALGORITHM DISCERNS MEDIA RELATED WRITE ERRORS FROM OPERATIONAL ONES.

ALGORITHM

A WRITE RETRY SUBROUTINE IS CALLED BY THE RECOVERABLE ERROR SUBROUTINE ENTERED UPON DETECTIION OF A WRITE RECOVERABLE ERROR.
THE WRITE RETRY SUBROUTINE REWRITES RECORD IN SAME SPOT ON TAPE;
REPEAT 4 TIMES.
IF ALL 4 REPEATS ARE GOOD, RECORD IS CONSIDERED AS RECOVERED AND A RECOVERABLE WRITE ERROR IS LOGGED AT THAT RECORD NUMBER.
IF ANY OF THE 4 REPEAT FAILS, ERASE BAD RECORD, LOGG SUSPECTED

```
                BAD SPOT AT THAT RECORD NUMBER, RETRY AGAIN 3 INCHES FURTHER DOWN TAPE.
                RETRY 4 TIMES, UP TO 4 REPEATS EACH.
                IF RECORD CANNOT BE WRITTEN WITHOUT RECOVERABLE ERROR  AFTER 4 RETRIES,
                ERASE RECORD, 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 TAPE PASS.
                WHEN 20 BAD SPOTS HAVE BEEN LOGGED, ON SAME RECORD NUMBER OR NOT,
                TAPE IS CONSIDERED DEFECTIVE:  A BAD TAPE OVERFLOW MESSAGE IS PRINTED
                AND UNIT IS REWOUND, THEN DROPPED.

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

                ALL BADLY WRITTEN RECORDS FLAGGED WITH RECOVERABLE ERRORS ARE ERASED
                UNTIL RECOVERED, INCLUDING THE RECORD AT THE 20TH BAD SPOT.
                SO THAT ALL RECORDS LEFT ON TAPE ARE GOOD WRITTEN RECORDS.
                BAD SPOTS ARE ERASED, WITH ERASE GAPS FROM 3 TO 12 INCHES  PER RETRY GRO
                UP TO 20 FEET OF ERASE GAP COULD RESULT WHEN RETRYING TO RECOVER
                A SINGLE RECORD,IF NO BAD SPOT WERE PREVIOUSLY DETECTED.
                THAT LONG STRETCH OF  BAD TAPE WOULD THEN BE FLAGGED WITH 20
                BAD SPOTS AT SAME RECORD NUMBER AND THE TAPE CONSIDERED DEFECTIVE.

                BAD SPOTS REPORTS

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

                THE STATISTICAL REPORT PRINTED AT THE END OF TEST 2 OR UPON A "PRINT" RE
                CONTAINS A SUMMARY OF THE BAD SPOTS LOGGED ON THE CURRENT TAPE PASS.
                IN THAT REPORT, ALL COUNTS ARE CUMULATIVE FROM PASS TO PASS, EXCEPT FOR
                THE NUMBER OF BAD SPOTS; IT RELATES TO A "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.
                A PASS IS DEFINED BY THE SUPERVISOR AS A RUN THROUGH ALL THE TESTS REQUE
                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.
                PER TAPE PASS, THE NUMBER OF WRITE RETRIES EQUALS THE SUM OF THE
                NUMBER OF RECOVERABLE WRITE ERRORS AND BAD SPOTS, MOST OF THE TIME.

                TO CLEAR CUMULATIVE COUNTS, ANSWER 'Y' TO:  CLEAR COUNTERS (L) Y ?.
                BAD TAPE SPOTS COUNT IS CLEARED WHEN WRITING 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 FORM TAPE PASS TO TAPE PASS
                        FOR THE BAD SPOTS ID TO REMAIN CONSISTENT IN THOSE TAPE PASSES.

                        EXAMPLE OF A TAPE PASS PRINTS:

                        CZTSH 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
                        000350  000002  100400  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


                        CZTSH 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
                        000350  000002  100010  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
        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 TS11 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 TO DETECT 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 DELAYS 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 FORM 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 PROCESSOR WITH 16K OR MORE OF MEMORY
                                        CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
                                        PROGRAM LOAD DEVICE


                                1.2.2   SOFTWARE REQUIREMENTS
                                        - - - - - - - - - - - - -

                                        DIAGNOSTIC SUPERVISOR
```

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL MD-11-CHQUS
DIAGNOSTIC SUPERVISOR PROGRAM LISTING
PDP-11 DIAGNOSTIC SUPERVISOR INTERFACE SPECIFICATION.
PDP-11 DIAGNOSTIC SUPERVISOR PROGRAMMER'S GUIDE.
TS11/TS04 PROGRAMMING SPECIFICATION.
TS11/TS04 ENGINEERING SPECIFICATION.
TS11/TS04 COMMAND PACKET SPECIFICATION.

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ORDER OF HOST CPU DIAGNOSTIC USAGE:

1) CONTROL LOGIC PROGRAM - ALL TESTS.

2) DATA RELIABILITY PROGRAM:

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

1.5 ASSUMPTIONS

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

1.6 DIAGNOSTIC HISTORY

REVISION A - OCT 1978
- ORIGINAL RELEASE

REVISION B - FEB 1979
- CORRECTED END OF TAPE PROBLEMS IN TESTS 3-5.
- CHANGED DEFAULT VECTOR ADDRESS FROM 150 TO 224.
- DECREASED MAXIMUM RECORD LENGTH FROM 4096 TO 2048 BYTES.

REVISION B - AUG 1979

-DO NOT PRINT RECOVERABLE ERRORS UNLESS REQUESTED BY OPERATOR
-WARN OPERATOR OF UNIT(S) BEING NOT READY OR OFF-LINE.
 DROP UNIT(S) LEFT NOT READY OR OFF-LINE FOR 3.5 MINUTES.
-IMPROVE BEHAVIOR AT EOT
 -IN TEST 2, FREEZE UNITS REACHING EOT UNTIL OTHERS
  CATCH-UP INSTEAD OF ALLOWING THEM TO SHUTTLE AT EOT
 -WHEN ALL UNITS REACH EOT, WRITE ONE RECORD BEYOND EOT.
  READ REV THAT EXTRA RECORD TO POSITION TAPE
  SO THAT THE NEXT COMMAND REQUESTED CAN BE EXECUTED.
  THAT EXTRA RECORD SHALL LEAVE A CLEAN IRG GAP AND A VALID
  RECORD TO READ WHEN SHORTER READ STOP DISTANCE MIGHT CAUSE
  UNIT TO FLAG EOT ON THAT EXTRA RECORD INSTEAD OF THE
  PREVIOUS ONE. THIS SHOULD ELIMINATE MANY READ ERRORS AT
  EOT AND TAPES RUNNING OFF THE WHEELS.
-WRITE RECORD COUNT ON TAPE.
 PRINT RECORD COUNT READ FROM TAPE IN READ ERROR PRINTS TO
 INDICATE IF POSITION WAS LOST.

* CAUTION *

 INTERPRET THAT "RECORD READ" COUNT WITH CAUTION.
 IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOST
 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
 IS RESET TO ZERO ALTHOUGH TAPE WAS NOT REWOUND. THIS IS
 NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE
 ON WHAT RECORD COUNT OF WHAT UNIT THE DIAGNOSTIC WAS HALTED
 BEFORE RESTARTING OR CONTINUING.
 IT IS SUGGESTED THAT A "PRINT" BE REQUESTED WHEN HALTING DI
 TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

-VERIFY RECORD OF 4000 BYTES INSTEAD OF 22 BYTES.
-WHEN COMPARING DATA, CHECK AND PRINT IF NO DATA WAS READ
 OR RECORD WAS LONGER THAN EXPECTED.
-FREEZE TSSR REG WHEN A COMMAND IS COMPLETED TO AVOID DIFFERE
 BETWEEN TSSR AND TCC FETCHED AT DIFFERENT TIMES.
-WHEN DROPPING A UNIT, FLAG SECOND PRINT OF EXTENDED STATUS
 THE RESULT OF A GET STATUS COMMAND.
 WAIT FOR SSR UP BEFORE PRINTING THAT STATUS.
-ADJUST "PASS" COUNT OF DIAG TO MATCH "EOP" PASS COUNT OF SUP
-INCREASE NUMBER OF SELECTABLE COMMANDS IN TEST 5 FROM
 4 TO 7. DEFAULT COMMAND 6 IS NOW REWIND.
-CONVERT DIAG TO REV C OF SUPERVISOR.

```
                                        ADD SEVERAL SECTIONS:
                                          PROTECT TABLE
                                          AUTO-DROP CODE
                                          HARD CODED PARAMETER TABLE
                                REVISION C - OCT 79
                                           - ADD MEDIA/OPERATIONAL SELECTIVE WRITE-ERROR-RECOVERY ALGORI
                                             TO DETECT BAD SPOTS ON TAPE.
                                REVISION D - MARCH 84
                                           - FIX ERROR ROUTINES SO THAT DATA COMPARE ERRORS IN TEST 2
                                           - DO NOT CAUSE OTHER PROBLEMS.
```

2.0 OPERATING INSTRUCTIONS

FOR OPERATING INSTRUCTIONS, PLEASE SEE CHAPTER 5 OF XXDP+ OPERATOR"S MANUAL.

2.1 HARDWARE PARAMETERS

ON A "N" RESPONSE TO "CHANGE HW?", THE DIAG SHALL RUN ASSUMING ONE UNIT AT TSSR = 172522 WITH A VECTOR = 224.

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

TSSR ADDRESS (172522) ?

VECTOR (224) ?

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

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

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

IF THE "ADR" FLAG IS NOT SET, THE READY AND OFF-LINE STATUS OF THE UNITS ARE CHECKED. A MESSAGE SHALL BE PRINTED EVERY SC OFTEN TO WARN THE OPERATOR OF UNITS BEING NOT READY OR OFF-LINE. THESE UNITS SHALL BE DROPPED AFTER A REASONABLE AMOUNT OF TIME (3 MIN ON A 11/70).

2.2 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXABILITY IN THE WAY THE PROGRAM BEHAVES.

CLEAR COUNTERS (L) Y ?

RESET RANDOM VARIABLES (L) N ?

PRINT RECOVERABLE ERRORS (L) N ?

HALT AFTER EACH CMD (L) N ?

INHIBIT RECOVERY (L) N ?

BAD TAPE SPOT DETECTION (L) Y ?

DISABLE INTERRUPTS (L) N ?

INHIBIT RFC ERROR REPORTS (L) N ?

CHANGE CMD SEQUENCE (L) N ?

NOTE: THIS QUESTION SHOULD BE ANSWERED (N) UNLESS AN OPERATOR SELECTED SEQUENCE IS TO BE EXECUTED. IF THIS QUESTION WAS ANSWERED (N), NO MORE QUESTIONS WILL BE ASKED. IF THIS QUESTION WAS ANSWERED Y, THE FOLLOWING QUESTIONS MUST BE ANSWERED OR DEFAULTED WITH A <CR> ONLY:

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

```
708
709
710
711
712
713
714
715
716
717
718
719
720
```

```
CMD/8 (D) 27. ?                    (1-27)   (DECIMAL)
BRF COUNT (D) 2048 ?               (1-2K)   (DECIMAL)
# OF OPERATIONS (D) 32000 ?       (1-32K)  (DECIMAL)
PATTERN (D) 7 ?                    (0-8)    (DECIMAL)

NOTE:   THE PROGRAM AUTOMATICALLY INSERTS AN CHARACTERISTIC 40
        AS THE FIRST COMMAND IN THE SEQUENCE TABLE.  IF A
        DIFFERENT CHARACTERISTIC IS DESIRED, THE OPERATOR SHOULD
        ENTER THAT CHARACTERISTIC CODE.  A TOTAL OF 7 COMMANDS
        MAY BE ENTERED IN ADDITION TO THE SET CHARACTERISTICS
        COMMAND.  IF THE OPERATOR WISHES TO USE LESS THAN 7
        COMMANDS, AN END COMMAND MUST BE ENTERED AND THEN A
        CONTROL Z (↑Z) CAN BE ENTERED TO TERMINATE SOFTWARE DIAL
```

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 CHEC 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 TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
24 =	DIA	DIAGNOSTICS. SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION. ODT MUST BE USED TO LOAD DIAGNOSTIC DA INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
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 FI
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 COMPL
6	ALTERNATING BYTES OF 000 AND 377.
7	RANDOM DATA PATTERN.
8	NO PATTERN GENERATION.

2.3 EXAMPLES OF SOFTWARE DIALOGUE

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 ?           N<CR>
PRINT RECOVERABLE ERRORS  (L) N ?        Y<CR>
HALT AFTER EACH CMD (L) N ?              N<CR>
INHIBIT RECOVERY (L) N ?                 N<CR>
BAD TAPE SPOT DETECTION (L) Y ?          Y<CR>
DISABLE INTERRUPTS (L) N ?               N<CR>
INHIBIT RFC ERROR REPORT (L) N ?         N<CR>
CHANGE CMD SEQUENCE (L) N ?              N<CR>
```

797
798
799 2.3.2 TO SET UP A SCOPE LOOP FOR A FAILURE IN BASIC FUNCTIONS.
800
801 A) RECEIVE PROMPT (DR>)
802 B) ENTER STA/TES:1/FLA:LOE:IER:ISR:IDU<CR>
803 C) ANSWER HARDWARE QUESTIONS.
804 D) PROCEED WITH THE FOLLOWING DIALOGUE:
805
806 CHANGE SW (L) ? Y<CR>
807 CLEAR COUNTERS (L) N ? Y<CR>
808 RESET RANDOM VARIABLES (L) N ? N<CR>
809 PRINT RECOVERABLE ERRORS (L) N ? N<CR>
810 HALT AFTER EACH CMD (L) N ? N<CR>
811 INHIBIT RECOVERY (L) N ? N<CR>
812 BAD TAPE SPOT DETECTION (L) Y ? N<CR>
813 DISABLE INTERRUPTS (L) N ? N<CR>
814 INHIBIT RFC ERROR REPORT (L) N ? Y<CR>
815 CHANGE CMD SEQUENCE (L) N ? N<CR>
816
817
818 2.3.3 TO SET UP A SCOPE LOOP FOR A FAILURE IN DATA RELIABILITY
819
820 A) RECEIVE PROMPT (DR>)
821 B) ENTER STA/TES:5/FLA:IER:ISR:IDU/EOP:1000<CR>
822 C) ANSWER HARDWARE QUESTIONS.
823 D) PROCEED WITH THE FOLLOWING DIALOGUE:
824
825 CHANGE SW (L) ? Y<CR>
826 CLEAR COUNTERS (L) N ? Y<CR>
827 RESET RANDOM VARIABLES (L) N ? N<CR>
828 PRINT RECOVERABLE ERRORS (L) N ? N<CR>
829 HALT AFTER EACH CMD (L) N ? N<CR>
830 INHIBIT RECOVERY (L) N ? N<CR>
831 BAD TAPE SPOT DETECTION (L) Y ? N<CR>
832 DISABLE INTERRUPTS (L) N ? Y<CR>
833 INHIBIT RFC ERROR REPORT (L) N ? Y<CR>
834 CHANGE CMD SEQUENCE (L) N ? Y<CR>
835 CHARACTERISTICS CODE (O) 40 ? 40<CR>
836 CMD/2 (D) 5 ? 13<CR> (REWIND) (COULD
837 BRF COUNT (D) 2048 ? 1<CR>
838 # OF OPERATIONS (D) 10 ? 1<CR>
839 PATTERN (D) 7 ? 1<CR>
840 CMD/3 (D) 5 ? 4<CR> (WRITE) (COULD B
841 BRF (D) 2048 ? 1000<CR>
842 # OF OPERATIONS (D) 10 ? 10000<CR>
843 PATTERN (D) 7 ? 1<CR>
CMD/4 (D) 5 ? 27<CR> (END) (COULD B
BRF (D) 2048 ? <^Z>

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/34
MOS MEMORY
LA36
TS11/TS04

2.4.2 TEST EXECUTION TIMES

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 - OPERATOR SELECTED SEQUENCE - DEPENDS ON SEQUENCE SELECTED.

NOTE: ALL EXECUTION TIMES ARE SHOWN FOR ONE UNIT OEPRATION.
APPROXIMATELY 10% WILL BE ADDED TO ALL EXECUTION TIMES
FOR EACH ADDITIONAL UNIT.

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:

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

* CAUTION *

INTERPRET THAT "RECORD READ" COUNT WITH CAUTION.
IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOST
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
IS RESET TO ZERO ALTHOUGH TAPE WAS NOT REWOUND. THIS IS
NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE
ON WHAT RECORD COUNT OF WHAT UNIT THE DIAGNOSTIC WAS HALTED
BEFORE RESTARTING OR CONTINUING.
IT IS SUGGESTED THAT A "PRINT" BE REQUESTED WHEN HALTING DI
TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

EXAMPLE OF AN ERROR REPORT:

```
CZTSH SFT ERR 00009  TST 002  SUB 000  PC: 01060b
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
                                        000350  000002  100004  000000
```

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 - TSO4 NOT READY:

BEFORE ANY COMMAND IS ISSUED TO THE TSO4, THE SUBSYSTEM READY BIT IN THE TSS4 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 TSOB IS LOADED, THE TSO4 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 07 - 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 08 - 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 09 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 014 BELOW.

3.1.5.6 ERROR 010 - 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 014 BELOW.

3.1.5.7 ERROR 011 - 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 012 - TERMINATION CLASS CODE 7, FATAL SUBSYSTEM ERROR

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

3.1.6 ERROR #13 - RFC NON-ZERO ERROR:

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

3.1.7 ERROR #14 - RETRY LIMIT EXCEEDED:

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

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

3.1.8 ERROR #15 - TOO MANY INTERRUPTS:

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

3.1.9 ERROR #16 - CAPSTAN RUNAWAY:

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

3.1.10 ERROR #17 - DATA COMPARE ERROR:

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

3.2 ERROR HALTS

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

```
1088                                    4.0 PERFORMANCE REPORT
1089                                        ------------------
1090
1091                                        UNIT X   PASS:XXXXX  RECORD:XXXXX
1092                                        BYTES WRITTEN  XXX,XXX,XXX,XXX
1093                                        BYTES READ REV XXX,XXX,XXX,XXX
1094                                        BYTES READ FWD XXX,XXX,XXX,XXX
1095                                                              WRT       RDR      RDF
1096                                        RECOVERABLE ERRORS    XXXXX     XXXXX    XXXXX
1097                                        UNRECOVERABLE ERRORS  XXXXX     XXXXX    XXXXX
1098
1099                                        SPEC COND   HARD   FATAL   COMPARE
1100                                           XXXXX   XXXXX   XXXXX   XXXXX
1101
1102
1103
1104
1105
1106                                    5.0 TEST SUMMARIES
1107                                        --------------
1108
1109                                    5.1     TEST 1 -        BASIC FUNCTIONS.
1110
1111                                                            EXECUTES AND VERIFIES CORRECT COMPLETION OF ALL TS04 FUN
1112
1113                                                            SUBTEST 1   - SET CHAR, DRIVE INIT, GET STATUS.
1114                                                                        * SET CHARACTERISTIC 200
1115                                                                        * DRIVE INITIATE.
1116                                                                        * SET CHARACTERISTIC  20.
1117                                                                        * GET STATUS
1118                                                                        * SET CHARACTERISTIC  40.
1119                                                                        * PRINT TS04 MICROCODE LEVEL (PASS 1 ONL
1120
1121                                                            SUBTEST 2   - REWIND.
1122                                                                        * REWIND.
1123                                                                        * REWIND AT BOT.
1124
1125                                                            SUBTEST 3   - WRITE/VERIFY.
1126                                                                        * WRITE/VERIFY PATTERN 1.
1127                                                                        * WRITE/VERIFY PATTERN 2.
1128                                                                        * WRITE/VERIFY PATTERN 3.
1129                                                                        * WRITE/VERIFY PATTERN 4.
1130                                                                        * WRITE/VERIFY PATTERN 5.
1131                                                                        * WRITE/VERIFY PATTERN 6.
1132                                                                        * WRITE/VERIFY PATTERN 0.
1133
1134                                                            SUBTEST 4   - WRITE TAPE MARK, ERASE.
1135                                                                        * WRITE TAPE MARK.
1136                                                                        * WRITE 10 RECORDS
1137                                                                        * ERASE 10 TIMES
1138                                                                        * WRITE TAPE MARK.
1139                                                                        * WRITE TAPE MARK RETRY.
1140
1141                                                            SUBTEST 5   - SPACE FILES.
1142                                                                        * SPACE 2 FILES REVERSE.
1143                                                                        * SPACE 2 FILES FORWARD.
```

```
1144                                                    • SPACE 2 FILES REVERSE.
1145                                                    • SPACE 2 FILES FORWARD.
1146
1147                                            SUBTEST 6  - SPACE RECORDS.
1148                                                    • REWIND.
1149                                                    • SPACE 7 RECORDS FORWARD.
1150                                                    • SPACE 7 RECORDS REVERSE.
1151                                                    • SPACE 7 RECORDS FORWARD.
1152                                                    • SPACE 7 RECORDS REVERSE.
1153
1154                                            SUBTEST 7  - WRITE RETRY.
1155                                                    • REWIND.
1156                                                    • WRITE DATA.
1157                                                    • WRITE RETRY.
1158
1159                                            SUBTEST 8  - READ REV RETRY.
1160                                                    • READ REVERSE.
1161                                                    • READ NEXT REV. SE.
1162                                                    • READ NEXT FORWARD.
1163
1164                                            SUBTEST 9  - READ FWD RETRY.
1165                                                    • READ FORWARD.
1166                                                    • READ PREVIOUS FORWARD.
1167                                                    • READ PREVIOUS REVERSE.
1168
1169                                            SUBTEST 10 - CLEAN.
1170                                                    • CLEAN.
1171                                                    • REWIND.
1172
1173                                            SUBTEST 11 - WRITE/VERIFY SWAPPED DATA BYTES.
1174                                                    • WRITE/VERIFY EVEN LENGTH (RECORD 1).
1175                                                    • WRITE/VERIFY ODD LENGTH (RECORD 2).
1176                                                    • SET DATA BYTE SWAP.
1177                                                    • WRITE/VERIFY EVEN LENGTH (RECORD 3).
1178                                                    • WRITE/VERIFY ODD LENGTH (RECORD 4).
1179                                                    • CLEAR DATA BYTE SWAP.
1180
1181                                            SUBTEST 12 - READ SWAPPED DATA BYTES.
1182                                                    • READ REV RECORD 4.
1183                                                    • READ REV RECORD 3.
1184                                                    • SET DATA BYTE SWAP.
1185                                                    • READ REV RECORD 2.
1186                                                    • READ REV RECORD 1.
1187                                                    • READ FWD RECORD 1.
1188                                                    • READ FWD RECORD 2.
1189                                                    • CLEAR DATA BYTE SWAP.
1190                                                    • READ FWD RECORD 3.
1191                                                    • READ FWD RECORD 4.
```

```
1192                                    5.2     TEST 2 -        DATA RELIABILITY.
1193
1194                                                              1. THE TAPE IS INITIATED WITH THE FOLLOWING COMMANDS:
1195                                                                    SET CHARACTERISTIC 40
1196                                                                    REWIND
1197                                                                    WRITE/VERIFY 3% RECORDS OF RANDOM LENGTH AND DAT
1198                                                              2. WRITE AND READ COMMANDS ARE SELECTED AT RANDOM AND
1199                                                                 EXECUTED A RANDOM NUMBER OF TIMES WITH RANDOM
1200                                                                 LENGTHS AND RANDOM PATTERN UNTIL END OF TAPE IS REA
1201                                                              3. AT THE END OF EACH PASS, A REWIND COMMAND IS ISSUED
1202                                                                 A PERFORMANCE REPORT IS PRINTED.
1203
1204                                                                    NOTE:   IF A RESTART COMMAND IS USED TO INITIATE
1205                                                                            TEST 1, THE INITIAL REWIND COMMAND IS NC
1206
1207
1208                                    5.3     TEST 3 -        WRITE COMPATABILITY/WRITE UTILITY.
1209
1210                                                            REWINDS AND WRITES RECORDS OF RANDOM LENGTHS
1211                                                            AND RANDOM DATA FROM BOT TO EOT.
1212
1213
1214                                    5.4     TEST 4 -        READ COMPATABILITY/READ UTILITY.
1215
1216                                                            REWINDS AND READS ENTIRE TAPE, FORWARD AND REVERSE.
1217
1218
1219                                    5.5     TEST 5 -        EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
1220
1221                                                            THE SEQUENCE OF COMMANDS ENTERED BY THE OPERATOR
1222                                                            IS EXECUTED.  IF NO COMMANDS WERE ENTERED, A
1223                                                            DEFAULT SEQUENCE OF REWIND/WRITE/READ REV/READ FWD/REWIN
1224                                                            OF ENTIRE TAPE IS EXECUTED WITH RANDOM PATTERN
1225                                                            AND RECORD LENGTH OF 2048 BYTES.
```

6.0 DEVICE INFORMATION TABLES

6.1 GENERAL

THE TS04 TAPE SUBSYSTEM CONSISTS OF A TS11 UNIBUS TO SERIAL BUS CONTROLLER CONNECTED TO A TS04 DRIVE. FROM A SOFTWARE VIEWPOINT THIS CONFIGURATION IS UNIQUE (FOR A UNIBUS 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 TS3A (TAPE SYSTEM STATUS REGISTER AND TAPE SYSTEM BUS ADDRESS REGISTER).

C. COMMANDS ARE NOT WPITTEN TO THE DRIVE; RATHER, COMMAND POINTERS ARE WRITTEN WHICH POINT TO COMMAND PACKETS SOMEWHERE IN CPU MEMORY. THE COMMAND POINTER IS USED BY THE TS04 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 TS04 TO TRANSFER EXTENDED STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FOUR EXTENDED STATUS REGISTERS. SEE 6.3.

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 UNIBUS INTERFACE SPECIFICATIONS

TS11/ TS04	INT. VECTOR	UNIBUS ADDRESS	REGISTER
FIRST	224	772520	TSBA/TSDB
		772522	TSSR
SECOND	154	772524	TSBA/TSDB
		772526	TSSR
THIRD	160	772530	TSBA/TSDB
		772532	TSSR
FOURTH	164	772534	TSBA/TSDB
		772536	TSSR

6.3 BIT DEFINITIONS FOR TS11/TS04 REGISTERS

6.3.1 TS11/TS04 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01
TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A0
TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P1
TSSR	SC	UPE	SPE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC
XST0	TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BO
XST1	DLT		COR	CRS	TIG	DBF NZO	SCK		IPR	SYN DRP	IPO ITM	IED LCO	POS NZN	POL LRC	UN CR
XST2	OPM	SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT
XST3	MICRO DIAGNOSTIC ERROR CODE							LMX	OPI		REV	CRF	DCK	NOI	LX

TERMINATION CLASS CODES (TSSR TC0-TC2):

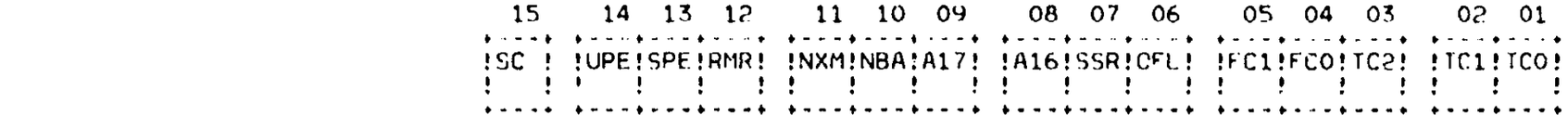
0 = NORMAL TERMINATION
1 = ATTENTION CONDITION
2 = TAPE STATUS ALERT
3 = FUNCTION REJECT
4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD
DOWN TAPE FROM START OF FUNCTION
5 = RECOVERABLE ERROR - TAPE NOT MOVED
6 = UNRECOVERABLE ERROR TAPE POSITION LOST
7 = FATAL CONTROLLER ERROR

FATAL CLASS CODES (TSSR FC0-FC1):

0 = MICRO DIAGNOSTIC FAILURE (DISPLAYED IN TS04 OPERATOR PANEL AND
1 = I/O SEQUENCER CROM PARITY ERROR.
2 = MICROPROCESSOR CROM PARITY ERROR.
SILO PARITY ERROR.
SERIAL BUS PARITY ERROR DETECTED AT TS11 (SPE).
SERIAL BUS PARITY ERROR DETECTED AT TS04 (BPE).
FATAL ERROR HALTS 1750 1777 IN TS04 PROGRAM COUNTER DISPLAY.
3 = LOSS OF AC POWER HAS BEEN DETECTED.

6.3.2 TS11 STATUS REGISTER (TSSR)

UNIBUS ADDRESS + 2 - READ ONLY



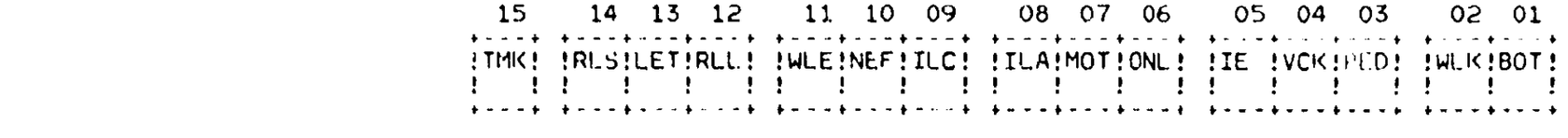
BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE WRITING, ETC. MAY ALSO BE SET BY THE ERROR BITS CONTAINED IN THE TSSR REGISTER: UPE, SPE, RMR, AND NXM. THE TERMINATION CLASS BITS ARE SOMET OTHER THAN 0 (UNLESS RMR IS THE ONLY ERROR - SEE RM
14	UPE	4/5	UNIBUS PARITY ERROR. SET BY THE TS11 WHEN IT DETECTS A PARITY ERROR ON THE UNIBUS DATA WHEN TRANSFERRING TO OR FROM THE CPU'S MEMORY.
13	SPE	7	SERIAL BUS PARITY ERROR. THIS BIT IS SET BY THE TS11 WHEN IT DETECTS A SERIAL BUS PARITY ERROR ON DATA RECEIVED FROM THE TS04.
12	RMR	S	REGISTER MODIFICATION REFUSED. SET BY THE TS11 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 TERMINATIO CLASS (IN FACT, THE TS04 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 TS11 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 TS04 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.
	08	A16	S	BUS ADDRESS BIT 16. SEE A17 (BIT 09).
	07	SSR	S	SUB-SYSTEM READY. WHEN SET, INDICATES THAT THE TS11/TSO4 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 TSO4 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 TSO4. 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.

UNIBUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

6.3.3 EXTENDED STATUS REGISTER 0 (XSTAT0)

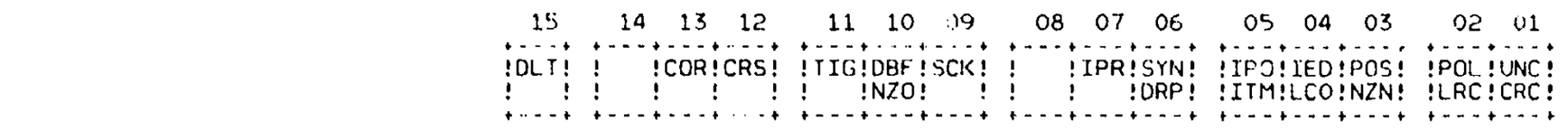


BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.
13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: - THE COMMAND SPECIFIED REVERSE TAPE DIRECTION BUT THE TAPE WAS ALREADY POSITIONED AT BOT. - THE ISSUING OF ANY COMMAND, EXCEPT REWIND,

M3

				UNLOAD, OR A COMMAND WITH THE CLEAR VOLUME CHECK (CVC) BIT SET, WHEN THE VOLUME CHECK BIT IS SET.
				- ANY COMMAND, EXCEPT GET STATUS OR DRIVE INITIALIZE, WHEN THE TS04 IS OFF-LINE.
				- ANY WRITE COMMAND WHEN THE TAPE DOES NOT CONTAIN A WRITE ENABLE RING (WRITE LOCK STATUS - WLS).
	09	ILC	3	ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED AND EITHER ITS COMMAND FIELD OR ITS COMMAND MODE FIELD CONTAINS CODES WHICH ARE NOT SUPPORTED BY THE TS04.
	08	ILA	3	ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN AN EVEN ADDRESS IS REQUIRED.)
	07	MOT	S	TAPE IS MOVING.
	06	ONL	S	ON LINE. WHEN SET, INDICATES THAT THE TS04 IS ON-LINE AND OPERABLE.
	05	IE	S	INTERRUPT ENABLE. REFLECTS THE STATE OF THE INTERRUPT ENABLE BIT SUPPLIED ON THE LAST COMMAND.
	04	VCK	S	VOLUME CHECK. WHEN SET, INDICATES THAT THE DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED OFF-LINE. CLEARED BY THE CLEAR VOLUME CHECK (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT CAN CAUSE A TERMINATION CLASS OF 3.
	03	PED	S	PHASE ENCODED DRIVE. WHEN SET, INDICATES THAT THE TS04 IS CAPABLE OF READING AND WRITING ONLY 1600 BPI PHASE ENCODED DATA. WHEN RESET, INDICATES THAT THE TS04 HAS ONLY 800 BPI NRZI DATA CAPABILITIES.
	02	WLK	S,3	WRITE LOCKED. WHEN SET, INDICATES THAT THE MOUNTED REEL OF TAPE DOES NOT HAVE A WRITE-ENABLE RING INSTALLED. THE TAPE IS, THEREFORE, WRITE PROTECTED.
	01	BOT	S,3	BEGINNING OF TAPE. WHEN SET, INDICATES THAT THE TAPE IS POSITIONED AT THE LOAD POINT AS DENOTED BY THE BOT REFLECTIVE STRIP ON THE TAPE.
	00	EOT	S,2	END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE IS POSITIONED AT OR BEYOND THE END OF TAPE REFLECTIVE STRIP. DOES NOT RESET UNTIL THE TAPE PASSES OVER THE REFLECTIVE STRIP IN THE REVERSE DIRECTION UNDER PROGRAM CONTROL.

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE I/O SILO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE UNIBUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TS04.
14	-	-	NOT USED.
13	COR	S	CORRECTABLE DATA. IN PHASE ENCODED MODE, A CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12	CRS	4	CREASE DETECTED. FOR NRZI, ALL DATA TRACKS DROPPED OUT FOR MORE THAN THREE CHARACTER TIMES BUT FOR LESS THAN .1 INCHES OF TAPE. FOR PE, EIGHT OUT OF NINE DATA TRACKS WENT DEAD FOR LESS THAN .1 INCHES BEFORE A VALID POSTAMBLE WAS DETECTED
11	TIG	4	TRASH IN THE GAP. NON-ERASED DATA WAS DETECTED IN A GAP DURING A READ, WRITE, WRITE TAPE MARK, OR ERASE COMMAND.
10	DBF	4	DESKEW BUFFER FAIL. ONE OF THE DESKEW BUFFERS FAILED TO ASSERT "OUTPUT READY" WITHIN 20 MICROSECONDS AFTER BEING ENABLED. THE DEAD TRACK BITS WILL INDICATE ON WHICH TRACKS THIS FAILURE OCCURRED. THIS ERROR IS PROBABLY A RESULT OF A BROKEN FORMATTER.
	NZO	4	NRZ FIFO OVERRUN.
09	SCK	4	SPEED CHECK. TAPE SPEED WAS OFF BY MORE THAN 5% DURING A WRITE DATA OPERATION. NOTE THAT SPEED AVERAGED OVER 8 TICKS AND THE AVERAGE MUST BE OFF 5% TO CAUSE THIS ERROR.
08			NOT USED.
07	IPR	S,4	INVALID PREAMBLE. SET ON A PE DRIVE IF THE PREAMBLE APPEARS TO BE SHORTER THAN 36 CHARACTERS OR LONGER THAN 44 CHARACTERS. ALSO

```
                                                        SET IF THE PREAMBLE IS INCORRECTLY ENCODED
                                                        BEYOND THE FIFTEENTH CHARACTER IN READ OR THE
                                                        TENTH CHARCIER IN READ-AFTER-WRITE.

                                06      SYN     4       SYNCH FAILURE.  SET ON A PE DRIVE IF THE
                                                        FORMATTER WAS UNABLE TO ACHIEVE SYNCHRONIZATION
                                                        IN THE PREAMBLE.

                                        DRP     4       NRZ RECORD DROPPED A CHARACTER (THE NEXT CHARACTER
                                                        WAS TO BE CONSIDERED CRC).

                                05      IPO     S,4     INVALID POSTAMBLE.  SET ON A PE DRIVE DURING
                                                        READ OR WRITE IF ANY OF THE FIRST 39 CHARACTERS
                                                        OF THE POSTAMBLE ARE NOT READ CORRECTLY.

                                        ITM     S,4     ILLEGAL TAPE MARK FOR NRZ.

                                04      IED     4       INVALID END DATA.  FOR PE, EIGHT OUT OF NINE
                                                        TRACKS WENT DEAD BEFORE THE POSTAMBLE WAS DETECTED.

                                        LRO     4       FOR NRZI, DATA WAS NOT DETECTED IN EITHER THE
                                                        LRCC OR CRCC WINDOWS. (LRC WAS ZERO)

                                03      POS     S,4     POSTAMBLE SHORT.  SET ON PE DRIVES DURING A
                                                        READ OR WRITE WHEN LESS THAN 38 ALL-ZEROES
                                                        CHARACTERS ARE READ FOLLOWING THE ALL-ONES
                                                        CHARACTER.

                                        NZN     S,4     NRZ NOISE RECORD (FEWER THAN 13(10) FRAMES).

                                02      POL     4       POSTAMBLE LONG.  SET ON PE DRIVES DURING READ
                                                        OR WRITE OPERATIONS WHEN THE POSTAMBLE EXCEEDS
                                                        42 CHARACTERS.

                                        LRC     4       LRC ERROR.  SET ON NRZI DRIVES WHEN THE LRCC
                                                        CHARACTER WAS FOUND IN ERROR.

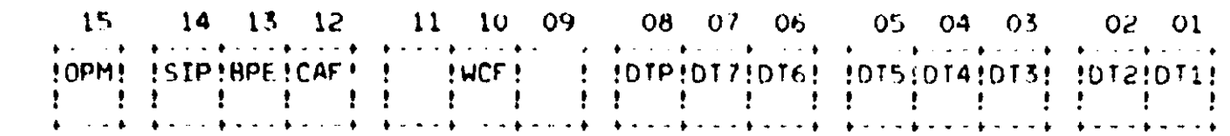
                                01      UNC     4       UNCORRECTABLE DATA.  SET ON PE DRIVES WHEN A
                                                        PARITY ERROR OCCURRED WITHOUT A CORRESPONDING
                                                        DEAD TRACK INDICATION.

                                        CRC     4       CRC ERROR.  SET ON NRZI DRIVES WHEN THE CRC
                                                        CHARACTER WAS FOUND TO BE IN ERROR.

                                00      MTF     4       MULTI-TRACK ERROR.  SET ON PE DRIVES WHEN MORE
                                                        THAN ONE DEAD TRACK OCCURRED IN THE PREAMBLE OR
                                                        IN THE DATA FIELD.

                                        VPE     4       VERTICAL PARITY ERROR.  SET ON NRZI DRIVES WHEN
                                                        A CHARACTER DID NOT CONTAIN AN ODD NUMBER OF
                                                        ONE BITS.
```

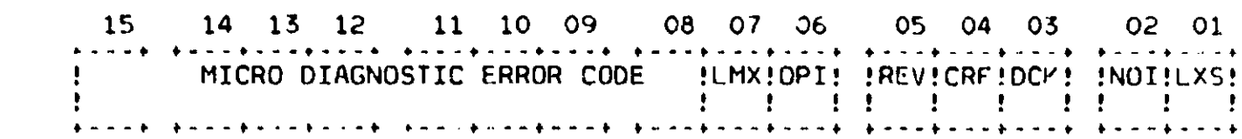
6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)



BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	SIP	7,F2	SILO PARITY ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13	BPE	7,F2	SERIAL BUS PARITY ERROR AT DRIVE. SET BY THE TS04 WHEN A PARITY ERROR IS DETECTED ON DATA TRANSMITTED FROM THE TS11 TO THE TS04. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
12	CAF	7	CAPSTAN ACCELERATION FAIL. AFTER ACCELERATING TAPE FOR .2 INCHES, THE TAPE SPEED WAS CHECKED AND FOUND TO BE OUT OF TOLERANCE BY MORE THAN 10%.
11			NOT USED.
10	WCF	7	THE WRITE BOARD IS NOT EMPTYING THE I/O SILO AT THE PROPER RATE. THIS ERROR CAN BE THE RESULT OF THE WRITE BOARD CLOCK NOT BEING TURNED ON (BROKEN HARDWARE).
09			NOT USED.
08	DTP	S	DEAD TRACK PARITY. THE BITS DTP THROUGH DT0 INDICATE WHICH TRACK(S) WENT DEAD, IF ANY, DURING THE LAST DATA TRANSFER OPERATION. IF DESKEW BUFFER FAIL (DBF) IS SET, THESE BITS INDICATE WHICH CHANNEL FAILED.
07	DT7	S	DEAD TRACK 7. SEE DTP.
06	DT6	S	DEAD TRACK 6. SEE DTP.
05	DT5	S	DEAD TRACK 5. SEE DTP.
04	DT4	S	DEAD TRACK 4. SEE DTP.
03	DT3	S	DEAD TRACK 3. SEE DTP.

```
1735
1736                                    02   DT2    S       DEAD TRACK 2.  SEE DTP.
1737
1738                                    01   DT1    S       DEAD TRACK 1.  SEE DTP.
1739
1740                                    00   DT0    S       DEAD TRACK 0.  SEE DTP.
1741
1742                                NOTE:  ON A SET CHARACTERISTICS COMMAND, THE UCODE LEVEL  IS  RETURNED
1743                                       IN DT7 THRU DT0.  ON A GET STATUS COMMAND, THE RESIDUAL CAPSTAN
1744                                       TICK COUNT (INTERNALLY R7) IS RETURNED IN DT7 THRU DT0.
```

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



BIT	NAME	TCC	DEFINITION
15 TO 08			MICRO DIAGNOSTIC ERROR CODE. (SEE LIST OF CODES BELOW). ALL ERROR CODES IN THE TABLE WILL BE DISPLAYED ON THE TS04 CONTROL PANEL BUT ONLY CODES HIGHER THAN 110 WILL BE AVAILABLE TO CPU DIAGNOSTICS FOR PRINTOUT IN THE MICRO DIAGNOSTIC ERROR CODE FIELD OF XSTAT3. THIS ERROR CODE FIELD IS VALID ONLY WHEN THE TERMINATION CLASS CODE IN THE TSSR EQUALS 7 AND THE FATAL CLASS CODE IN THE TSSR EQUALS 0, INDICATING AN INTERNAL DIAGNOSTIC FAILURE.
07	NTL	6	LIMIT EXCEEDED. SET WHEN THE TAPE TENSION ARMS HAVE EXCEEDED THEIR ALLOWABLE TRAVEL AND HAVE CAUSED THE ACTIVITATION OF THE LIMIT SWITCHES. NO TENSION EXISTS ON THE MOUNTED TAPE.
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	CRF	7	CAPSTAN RESPONSE FAILURE. A MOTION COMMAND WAS GIVEN TO THE CAPSTAN BUT WE DID NOT GET A TICK BACK WITHIN A REASONABLE AMOUNT OF TIME.
03	DCK	S,6	DENSITY CHECK. SET ON PE DRIVES WHEN A PE IDENTIFICATION BURST WAS NOT DETECTED WHEN MOVING OFF OF BOT. SET ON NRZI DRIVES WHEN A NON-NRZI IDENTIFICATION BURST WAS FOUND WHEN MOVING OFF OF BOT.
02	NOI	6	NOISE RECORD. SET DURING A READ OR SPACE OPERATION WHEN A BURST OF FLUX CHANGES, WHICH DO NOT QUALIFY AS A RECORD (BUT TOO MANY TO IGNORE), ARE DETECTED: NRZI: AT LEAST TWO CHARACTERS IN A ROW BUT LESS THAN TWELVE, FOLLOWED BY A CHARACTER IN EITHER THE CRCC OR LRCC WINDOWS.

PE: AT LEAST 24 CHARACTERS IN A ROW THAT DO NOT QUALIFY AS A TAPE MARK OR A DATA PREAMBLE.

01	LXS	S	LIMIT EXCEEDED STATICALLY. THIS BIT IS SET ANY TIME THE LIMIT SWITCHES ARE EXCEEDED. THIS BIT CAN ONLY BE CLEARED BY MANUALLY LOADING THE TAPE.
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.

MICRO DIAGNOSTIC ERROR CODES

FOLLOWING IS A LIST OF THE ERRORS WHICH ARE DISPLAYED IN THE MICRO DIAGNOSTIC ERROR CODE (XSTAT3 BITS 15 - 08) AND ALSO IN THE LIGHTS ON THE TS04 CONTROL PANEL, DUE TO FAILURES ON THE CAPSTAN BOARD, I/O BOARDS, WRITE BOARD, READ BOARD, OR FORMATTER BOARD. THE MICRO WILL BE IN A TIGHT LOOP IN THE DISPM PROGRAM, WAITING FOR OPERATOR OR CPU INTERVENTION WHILE THE ERROR IS BEING DISPLAYED IN THE CONSOLE LIGHTS. IT IS APPARENT THAT AN ERROR IS BEING DISPLAYED IF THE "UOK" LIGHT IS NOT LIGHTED, THE PROCESSOR IS NOT STOPPED, AND AN OCTAL NUMBER (100-377) IS BEING DISPLAYED IN THE LIGHTS. TO SCOPE LOOP THESE TESTS, ENTER MAINTENANCE MODE (ON-LINE SWITCH TO "OFF" POSITION, MAINTENANCE SWITCH UP, PRESS RESET), ENTER THE OFF-LINE TEST NUMBER (SEE SCOPE LOOP COLUMN BELOW) IN THE OPERATOR CONSOLE LIGHTS (ENTER ONES WITH LEFT-MOST SWITCH, ENTER ZEROES WITH RIGHT-MOST SWITCH), AND PRESS ON-LINE BUTTON. TEST WILL LOOP UNTIL ON-LINE SWITCH IS RETURNED TO OFF-LINE POSITION. ERRORS WILL BE DISPLAYED CONTINUOUSLY.

ERROR (DISPLAY)	PROGRAM	ERROR DESCRIPTION	LIKELY MODULE	SCOPE LOOP
337	OPERATIONAL CODE	CAPSTAN RUNAWAY ERROR (H3.RNY). CAPSTAN DIDN'T STOP WITHIN ACCEPTABLE WINDOW AFTER LAST COMMAND.		
100	IOTSM	BASIC I/O MICRO FAILURE (PARITY ERROR, IOATN, HANDSHAKING, AND DATA WINDOW TEST BETWEEN THE I/O AND MAIN MICROS. NOTE: CAN ALSO BE CAUSED BY THE SERIAL BUS .SHIN (SHIFT IN) STUCK ASSERTED.	M8967	14
101	IOTSM	ERROR IN I/O CONTROL REGISTER TEST	M8966 M8967	15

102	IOTSM	FAILURE OF FRAME COUNTER TEST	M8966	15
103	IOTSM	FAILURE OF I/O SILO NON-PARITY ERROR DATA TEST OR THE WRITE FLAG.	M8966 M8963	16
104	IOTSM	FAILURE OF I/O SILO PARITY ERROR TEST OR DATA LATE TEST.	M8966	17
105	IOTSM	FAILURE OF SHIFT LOOP WITH ZEROES.	M8965	20
106	IOTSM	FAILURE OF SHIFT LOOP WITH ONES.	M8965	21
107	IOTSM	FAILURE OF SHIFT LENGTH MUX.	M8965	22
110	IOTSM	FAILURE TO RECEIVE CORRECT OP-CODE FROM TS11 WHEN WE SENT DATA OVER THE SERIAL BUS.	M8965 TS11 MOTHER BD SBUS CABLE	47
111	CATSM	FAILURE OF 1 KHZ CLOCK TEST. TSTS TAC SYNC FLOP AND ATTN. TOO.	G159 CBUS CABLE M8963	2
112	CATSM	LIGHT REGISTER CHANGED WHEN MOTION REGISTER WAS CLEARED.	G159	3,4
113	CATSM	FWD OR MVG BITS WRONG AFTER 1 TICK OF SIMULATED COMMAND AND TACH PULSES.	G159	3,4
114	CATSM	FAILURE OF SIMULATED CAPSTAN SPEED TEST. THE CAPSTAN SPEED COUNTER WAS OUT OF RANGE WHEN TAPE MOTION AT SPEED WAS SIMULATED.	G159	3,4
115	CATSM	FAILURE OF SIMULATED SLOW CAPSTAN TEST. SPEED COUNTER DID NOT LATCH UP WITH MAX COUNT WHEN SLOW TACH TICKS WERE SIMULATED.	G159	3,4
116	CATSM	FAILURE OF SIMULATED CAPSTAN DECEL TEST. COUNTER NOT ZERO FOR FORWARD OR 377 FOR REVERSE WHILE DECELERATING. OR MVG BIT NOT 1.	G159	3,4
117	CATSM	FAILURE OF MOVING FLOP TO GO TO ZERO AFTER STOPPING (DIRECTION REVERSAL FOR ONE TACH TICK).	G159	3,4
120	PETSM	FAILURE OF WRITE BOARD TO TURN ON AND EMPTY THE SILO, OR DATA LATE BIT DOESN'T WORK.	M8929 M8966	23
121	PETSM	FAILURE OF WRITE BOARD TO EMPTY SILO AT CORRECT SPEED.	M8929	23

124	PETSM	FORMATTER FLAG DOESN'T WORK ON THE M8922.	M8922	24
125	PETSM	FORMATTER SILO FILLING AND DATA ERROR	M8922 M8923 M8924	24
126	PETSM	PEAK SHIFT TEST ERROR	M8922 M8923 M8924	25
127	PETSM	FORMATTER TABLE LOOKUP ROM CHECKSUM TEST ERROR	M8922 M8923 M8924	26

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                                        .TITLE PROGRAM HEADER AND TABLES
                                        .SBTTL  PROGRAM HEADER

                                                .ENABL  ABS,AMA
                    002000              .       .       2000
002000                                          BGNMOD

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

                                                POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,BGNSETUP


                                                HEADER  CZTSH,D,0,5000,1,@INTPRI
002000                                  L$NAME::                ;DIAGNOSTIC NAME
002000  103                                                                     .ASCII /C/
002001  132                                                                     .ASCII /Z/
002002  124                                                                     .ASCII /T/
002003  123                                                                     .ASCII /S/
002004  110                                                                     .ASCII /H/
002005  000                                                                     .BYTE   0
002006  000                                                                     .BYTE   0
002007  000                                                                     .BYTE   0
002010                                  L$REV::                 ;REVISION LEVEL
002010  104                                                                     .ASCII  /D/
002011                                  L$DEPO::                ;0
002011  060                                                                     .ASCII  /0/
002012                                  L$UNIT::                ;NUMBER OF UNITS
002012  000001                                                                  .WORD   T$PTHV
002014                                  L$TIML::                ;LONGEST TEST TIME
002014  005000                                                                  .WORD   5000
002016                                  L$HPCP::                ;POINTER TO H.W. QUES.
002016  025266                                                                  .WORD   L$HARD
002020                                  L$SPCP::                ;POINTER TO S.W. QUES.
002020  025340                                                                  .WORD   L$SOFT
002022                                  L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002174                                                                  .WORD   L$HW
002024                                  L$SPTP::                ;PTR. TO S.W. PTABLE
002024  002202                                                                  .WORD   L$SW
002026                                  L$LADP::                ;DIAG. END ADDRESS
002026  026746                                                                  .WORD   L$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$DTP::                 ;PTR. TO DISPATCH TABLE
002040  002124                                                                  .WORD   L$DISPAT
002042                                  L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000340                                                                  .WORD   @INTPRI
002044                                  L$ENV1::                ;FLAGS DESCRIBE HOW IT WAS SETUP
```

```
002044  000000                                                        .WORD   0
002046                  L$EXP1::            ;EXPANSION WORD
002046  000000                                                        .WORD   0
002050                  L$MREV::            ;SVC REV AND EDIT #
002050     003                                                        .BYTE   C$REVISI
002051     003                                                        .BYTE   C$EDIT
002052                  L$EF::              ;DIAG. EVENT FLAGS
002052  000000                                                        .WORD   0
002054  000000                                                        .WORD   0
002056                  L$SPC::
002056  000000                                                        .WORD   0
002060                  L$DEVP::            ; POINTER TO DEVICE TYPE LIST
002060  002164                                                        .WORD   L$DVTYP
002062                  L$REPP::            ;PTR. TO REPORT CODE
002062  016150                                                        .WORD   L$RPT
002064                  L$EXP4::
002064  000000                                                        .WORD   0
002066                  L$EXP5::
002066  000000                                                        .WORD   0
002070                  L$AUT::             ;PTR. TO ADD UNIT CODE
002070  021770                                                        .WORD   L$AU
002072                  L$DUT::             ;PTR. TO DROP UNIT CODE
002072  021716                                                        .WORD   L$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$ICP::             ;PTR. TO INIT CODE
002104  017704                                                        .WORD   L$INIT
002106                  L$CCP::             ;PTR. TO CLEAN-UP CODE
002106  021654                                                        .WORD   L$CLEAN
002110                  L$ACP::             ;PTR. TO AUTO CODE
002110  021232                                                        .WORD   L$AUTO
002112                  L$PRT::             ;PTR. TO PROTECT TABLE
002112  017676                                                        .WORD   L$PROT
002114                  L$TEST::            ;TEST NUMBER
002114  000000                                                        .WORD   0
002116                  L$DLY::             ;DELAY COUNT
002116  000000                                                        .WORD   0
002120                  L$HIME::            ;PTR. TO HIGH MEM
002120  000000                                                        .WORD   0
```

```
                        .SBTTL  DISPATCH TABLE

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

                              DISPATCH 5
002122  000005                                                         .WORD   5
002124                  L$DISPATCH::
002124  022064                                                         .WORD   T1
002126  023452                                                         .WORD   T2
002130  024126                                                         .WORD   T3
002132  024272                                                         .WORD   T4
002134  024424                                                         .WORD   T5

                        .SBTTL  DESCRIPTIVE TEXT

                        ;++
                        ;2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVI
                        ;--

002136                        DESCRIPT        <DATA RELIABILITY TEST>
002136                  L$DESC::
002136  040504  040524  051040                                         .ASCIZ  /DATA RE
002144  046105  040511  044502
002152  044514  054524  052040
002160  051505  000124
                                                                       .EVEN
002164                              DEVTYP          <TS11>
002164                  L$DVTYP::
002164  051524  030461      000                                        .ASCIZ  /TS11/
002172                                                                 .EVEN
```

```
                                        .SBTTL  DEFAULT HARDWARE P-TABLE

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

002172                                          BGNHW   DFPTBL
002172  000002                                                                  .WORD   L10000-L
002174                                  L$PW::
002174                                  DFPTBL::

002174  172522                          172522          ;TSSR ADDRESS.
002176  000224                          224             ;VECTOR ADDRESS.

002200                                          ENDHW
002200                                  L10000:
```

```
                                .SBTTL  SOFTWARE P-TABLE

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

002200                                  BGNSW   SFPTBL
002200  000043                                                         .WORD   L10001-L
002202                          L$SW::
002202                          SFPTBL::

002202  001                     CLRFLG:: .BYTE  1               ;CLEAR COUNTERS FLAG.
002203  000                     RRANV::  .BYTE  0               ;RESET RANDOM VARIABLES EACH PASS FLAG.
002204  000                     HAE::    .BYTE  0               ;HALT AFTER EACH COMMAND FLAG.
002205  000                     ERCVER:: .BYTE  0               ;ENABLE RECOVERABLE ERROR PRINTS FLAG.
002206  001                     BADTSW:: .BYTE  1               ;BAD TAPE SWITCH TO REWRITE ON SAME SPOT & DETEC
002207  000                              .BYTE  0               ;SPARE
002210  000                     DINT::   .BYTE  0               ;DISABLE INTERRUPTS FLAG.
002211  000                     IREC::   .BYTE  0               ;INHIBIT ERROR RECOVERY FLAG.
002212  000                     CHGFLG:: .BYTE  0               ;CHANGE CMD SEQ TABLE FLAG.
002213  000                              .BYTE  0               ;SPARE.
002214  000                     PIRE::   .BYTE  0               ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
002215  000                              .BYTE  0               ;SPARE.
002216  000040                  CHAR::   CH.EAI                 ;CHARACTERISTICS CODE (DEFAULT = 40).
```

```
2109  002220  000015                CMDD::  .WORD   13.             ;COMMAND 2 (DEFAULT = REWIND).
2110  002222  000001                        .WORD   1               ;BYTE COUNT
2111  002224  000001                        .WORD   1               ;NUMBER OF OPERATIONS
2112  002226  000007                        .WORD   RANP            ;PATTERN
2113  002230  000004                        .WORD   4               ;COMMAND 3  (DEFAULT = WRITE)
2114  002232  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2115  002234  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
2116  002236  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2117  002240  000003                        .WORD   3               ;COMMAND 4 (DEFAULT = READ REV).
2118  002242  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2119  002244  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
2120  002246  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2121  002250  000002                        .WORD   2               ;COMMAND 5 (DEFAULT = READ FWD).
2122  002252  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2123  002254  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
2124  002256  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2125  002260  000015                        .WORD   13.             ;COMMAND 6 (DEFAULT = REWIND).
2126  002262  000001                        .WORD   1               ;BYTE COUNT
2127  002264  000001                        .WORD   1               ;NUMBER OF OPERATIONS
2128  002266  000007                        .WORD   RANP            ;PATTERN
2129  002270  000033                        .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
2130  002272  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2131  002274  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
2132  002276  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2133  002300  000033                        .WORD   27.             ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
2134  002302  004000                        .WORD   DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2135  002304  076400                        .WORD   32000.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
2136  002306  000007                        .WORD   RANP            ;PATTERN (DEFAULT = RANDOM).
2137
2138  002310                                ENDSW
2139  002310                        L10001:
2140
2141  002310                                ENDMOD
```

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

002310                                          BGNMOD

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

002310                                          EQUALS
                                        ;
                                        ; BIT DEFINITIONS
                                        ;
            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
```

```
2198    000300                  PRIO6== 300
2199    000240                  PRIO5== 240
2200    000200                  PRIO4== 200
2201    000140                  PRIO3== 140
2202    000100                  PRIO2=  100
2203    000040                  PRIO1== 40
2204    000000                  PRIO0== 0
2205                            ;
2206                            ;OPERATOR FLAG BITS
2207                            ;
2208    000004                  EVL==     4
2209    000010                  LOT==    10
2210    000020                  ADR==    20
2211    000040                  IDU==    40
2212    000100                  ISR==   100
2213    000200                  UAM==   200
2214    000400                  BOE==   400
2215    001000                  PNT==  1000
2216    002000                  PRI==  2000
2217    004000                  IXL==  4000
2218    010000                  IBE== 10000
2219    020000                  IER== 20000
2220    040000                  LOE== 40000
2221    100000                  HOE== 100000
2222
2223
2224                            ; REGISTER USAGE.
2225                            ;
2226                            ;       R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
2227                            ;       R1 - COMMAND SEQUENCE TABLE POINTER.
2228                            ;       R2 - GENERAL PURPOSE REGISTER.
2229                            ;       R3 - GENERAL PURPOSE REGISTER.
2230                            ;       R4 - GENERAL PURPOSE REGISTER.
2231                            ;       R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
2232                            ;       R6 - STACK POINTER.
2233                            ;       R7 - PROGRAM COUNTER.
2234
2235                            ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSDR REGISTERS.
2236
2237    100000                  TS.SC==100000           ;SPECIAL CONDITION BIT.
2238    040000                  TS.UPE==40000           ;UNIBUS PARITY ERROR
2239    020000                  TS.SPE==20000           ;SERIAL BUS PARITY ERROR.
2240    010000                  TS.RMR==10000           ;REGISTER MODIFICATION REFUSED.
2241    004000                  TS.NXM==4000            ;NON-EXISTENT MEMORY.
2242    002000                  TS.NBA==2000            ;NEED BUFFER ADDRESS.
2243    001000                  TS.A17==1000            ;BUS ADDRESS BIT 17.
2244    000400                  TS.A16==400             ;BUS ADDRESS BIT 16.
2245    000200                  TS.SSR==200             ;UNIT READY BIT.
2246    000100                  TS.OFL==100             ;OFF LINE.
2247    177717                  TSC.FCC==177717         ;FATAL CLASS CODE MASK.
2248    177761                  TSC.TCC==177761         ;TERMINATION CLASS CODE MASK.
```

```
2249                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
2250
2251    100000                          ACK.C==100000           ;ACKNOWLEDGE BIT
2252    040000                          CVC.C==40000            ;CLEAR VOLUME CHECK.
2253    020000                          OPP.C==20000            ;OPPOSITE BIT
2254    010000                          SWB.C==10000            ;SWAP BYTE BIT
2255    004000                          MOD.C3==4000            ;MODE BIT 3
2256    004000                          BRF.C==4000             ;BYTE/RECORD/FILE COUNT FLAG BIT.  NOT USED
2257                                                            ;BY TS04 BUT USED INTERNALLY BY THIS PROGRAM ONL
2258    002000                          MOD.C2==2000            ;MODE BIT 2
2259    001000                          MOD.C1==1000            ;MODE BIT 1
2260    000400                          MOD.C0==400             ;MODE BIT 0
2261    000200                          IE.C==200               ;INTERRUPT ENABLE
2262    000100                          FMT.C1==100             ;FORMAT BIT 1
2263    000100                          VFY.C==100              ;WRITE VERIFY FLAG BIT.  INTERNAL USE ONLY.
2264                                                            ;NOT USED BY TS04.
2265    000040                          FMT.C0==40              ;FORMAT BIT 0.
2266    000040                          JMP.C==40               ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
2267                                                            ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
2268                                                            ;TABLE.  INTERNAL USE ONLY.
2269    000020                          CMD.C4==20              ;COMMAND BIT 4
2270    000020                          DLY.C==20               ;INSERT DELAY.  INTERNAL USE ONLY.
2271    000010                          CMD.C3==10              ;COMMAND BIT 3
2272    000004                          CMD.C2==4               ;COMMAND BIT 2
2273    000002                          CMD.C1==2               ;COMMAND BIT 1
2274    000001                          CMD.C0==1               ;COMMAND BIT 0
2275
2276                                    ;       BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
2277
2278    000200                          CH.ESS==200             ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EO
2279    000040                          CH.EAI==40              ;ENABLE ATTENTION INTERRUPTS.
2280    000020                          CH.ERI==20              ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
2281    000040                          DFTSCH==CH.EAI          ;DEFAULT CHARACTERISTICS CODE.
2282
2283                                    ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
2284                                    ;IN THE MESSAGE BUFFER.
2285
2286    000004                          MS.RFC==4               ;RESIDUAL FRAME COUNT.
2287    000006                          MS.XS0==6               ;EXT STATUS REG 0
2288    000010                          MS.XS1==10              ;EXT STATUS REG 1
2289    000012                          MS.XS2==12              ;EXT STATUS REG 2
2290    000014                          MS.XS3==14              ;EXT STATUS REG 3
2291
2292                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.
2293
2294    100000                          X0.TMK==100000          ;TAPE MARK.
2295    040000                          X0.RLS==40000           ;RECORD LENGTH SHORT.
2296    020000                          X0.LET==20000           ;LOGICAL EOT.
2297    010000                          X0.RLL==10000           ;RECORD LENGTH LONG.
2298    000100                          X0.ONL==100             ;ON LINE BIT.
2299    000002                          X0.BOT==2               ;BOT BIT.
2300    000001                          X0.EOT==1               ;EOT BIT.
2301
2302                                    ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2.
2303
2304    100000                          X2.OPM==100000          ;OPERATION IN PROGRESS, TAPE MOVING
```

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

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

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

000000                  CP.CMD==0                       ;CMDPKT+0==TS04 COMMAND.
000002                  CP.ADL==2                       ;CMDPKT+2==BUFFER ADDRESS LOW.
000004                  CP.ADH==4                       ;CMDPKT+4==BUFFER ADDRESS HIGH.
000006                  CP.CNT==6                       ;CKDPKT+6==BYTE/FILE/RECORD COUNT

                        ;       MISCELLANEOUS DEFINITIONS.

000340                  INTPRI==PRI07                   ;PRIORITY TO BE USED IN INTERRUPT STATE.
002452                  TSBA==TSDB                      ;DATA BUFFER ADDRESS REGISTER.
000010                  SCHCNT==10                      ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
                                                        ;BUFFER LENGTH. (EVEN #)
000016                  MSGCNT==16                      ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
003334                  DIABLK==DATAWT                  ;WRITE BUFFER ALSO USED FOR DIAG CMD.
000020                  DIACNT==20                      ;DIAGNOSTIC COMMAND BUFFER EXTENT.
004000                  DATCNT==2048.                   ;MAXIMUM RECORD LENGTH IN BYTES.
                                                        ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSUR
                                                        ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPE
000550                  CNTLEN==CNTEND-CNTBGN           ;LENGTH OF STATISTICAL COUNTER AREA.
177740                  RNOPSC==177740                  ;RANDOM # OF OPERATIONS MASK.
000007                  RANP==7                         ;CODE TO SELECT RANDOM PATTERN.
000020                  RRECL==16.                      ;READ RECOVERY ATTEMPT LIMIT.
000020                  WRECL==16.                      ;WRITE RECOVERY ATTEMPT LIMIT.
153624                  RANBC==153624                   ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
032561                  RANSC==32561                    ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
177774                  NINUSE==177774                  ;NOT IN USE CODE FOR DEVICE STATE TABLE.
177740                  NCMD.C==ACK.C!CVC.C!OPP.C!SWB.C!MOD.C3!MOD.C2!MOD.C1!MOD.C0!IE.C!FMT.C1!FMT.C0
                                                        ;NOT "COMMAND" BITS.

                        ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TS04 COMMAND.

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

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

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

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

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

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

```
2361
2362          104410                    SRR**   ACK.C!BRF.C!MOD.C0!CMD.C3
2363                                                          ;SPACE RECORD REVERSE
2364
2365          105401                    RNR**   ACK.C!BRF.C!MOD.C1!MOD.C0!CMD.C0
2366                                          ;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVE
2367
2368          125401                    RNF**   ACK.C!BRF.C!OPP.C!MOD.C1!MOD.C0!CMD.C0
2369                                          ;READ REV RETRY2 - REREAD NEXT FORWARD, IE.READ FORWARD, SPACE R
2370
2371          105001                    RPF**   ACK.C!BRF.C!MOD.C1!CMD.C0
2372                                          ;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, R
2373
2374          125001                    RPR**   ACK.C!BRF.C!OPP.C!MOD.C1!CMD.C0
2375                                          ;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SP
2376
2377          105005                    WRR**   ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.C0
2378                                                          ;WRITE RETRY
2379
2380          102010                    RWD**   ACK.C!MOD.C2!CMD.C3
2381                                                          ;REWIND COMMAND
2382
2383          100012                    MBR**   ACK.C!CMD.C3!CMD.C1
2384                                                          ;MESSAGE BUFFER RELEASE
2385
2386          100011                    WTM**   ACK.C!CMD.C3!CMD.C0
2387                                                          ;WRITE TAPE MARK.
```

```
2388
2389          101011                  WTR**   ACK.C!MOD.C1!CMD.C3!CMD.C0
2390                                                  ;WRITE TAPE MARK RETRY.
2391
2392          105010                  SFF**   ACK.C!BRF.C!MOD.C1!CMD.C3
2393                                                  ;SPACE FILE FORWARD
2394
2395          105410                  SFR**   ACK.C!BRF.C!MOD.C0!MOD.C1!CMD.C3
2396                                                  ;SPACE FILE REVERSE
2397
2398          100017                  GES**   ACK.C!CMD.C0!CMD.C1!CMD.C2!CMD.C3
2399                                                  ;GET EXTENDED STATUS
2400
2401          100411                  ERS**   ACK.C!MOD.C0!CMD.C3!CMD.C0
2402                                                  ;ERASE 3 INCHES OF TAPE
2403
2404          100412                  UNL**   ACK.C!MOD.C0!CMD.C3!CMD.C1
2405                                                  ;UNLOAD COMMAND
2406
2407          101012                  CLN**   ACK.C!MOD.C1!CMD.C3!CMD.C1
2408                                                  ;ERASE TAPE.
2409
2410          140004                  SCH**   ACK.C!CVC.C!CMD.C2      ;SET DEVICE CHARACTERISTICS.
2411
2412          100006                  DIA**   ACK.C!CMD.C2!CMD.C1      ;DIAGNOSTICS.
2413
2414          000040                  JMP**   JMP.C                     ;JUMP TO "N"TH COMMAND
2415
2416          000020                  DLY**   DLY.C                     ;DELAY "N" MS.
2417
2418          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.

                                .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002310  000000                  CMDPKT:: 0                      ;1ST WORD IS TS04 COMMAND.
002312  000000                          0                       ;2ND WORD IS THE BUFFER LOW ADDRESS.
002314  000000                          0                       ;3RD WORD IS THE BUFFER HIGH ADDRESS.
002316  000000                          0                       ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.


                                ;       GET STATUS COMMAND PACKET.

002320                          .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002320  100017                  GSCPK:: .WORD   GES


                                ;       MESSAGE BUFFER RELEASE COMMAND PACKET.

002324                          .       =       .+3&177774      ;MUST BE ON MOD 4 BOUNDRY.
002324  100012                  BRCPK:: .WORD   MBR


                                ;       REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)

002330                          .       =       .+3&177774      ;MUST BE ON A MODULE 4 BOUNDARY.
002330  102010                  RWCPK:: .WORD   RWD
002332  000001                          .WORD   1


                                ;       WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.

002334  000007                  MSGPKT:: .BLKW  7               ;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
```

```
2466                                    ;       MESSAGE PACKETS.
2467
2468  002352  000007                    MSGPK0:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #0
2469  002370  000007                    MSGPK1:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #1
2470  002406  000007                    MSGPK2:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #2
2471  002424  000007                    MSGPK3:: .BLKW  7               ;MESSAGE PACKET FOR DEVICE #3
2472
2473                                    ;       SET CHARACTERISTIC BLOCK.
2474
2475  002442  002352                    SCHBK:: MSGPK0                  ;1ST WORD:: MSGPKT ADDR LO(SET UP BY EXCUTE ROUT
2476  002444  000000                            0                       ;2ND WORD:: MSGPKT ADDR HI.
2477  002446  000016                            MSGCNT                  ;3RD WORD:: MSG BUFFER LENGTH (BYTES)
2478  002450  000040                            CH.EAI                  ;4TH WORD:: CHARACTERISTICS WORD(SET BY SETUP RO
2479
2480                                    ;       TS04 REGISTER ADDRESSES.
2481
2482  002452  000004                    TSDB:: .BLKW    4               ;TS04 DATA BUFFER ADDRESSES.
2483  002462  000004                    TSSR:: .BLKW    4               ;TS04 STATUS REGISTER ADDRESSES.
2484  002472  000004                    TSVCT:: .BLKW   4               ;TS04 VECTOR ADDRESSES.
2485
2486                                    ;       ADDRESSES OF MESSAGE PACKETS.
2487
2488  002502  002352                    MSGPKA:: MSGPK0                 ;DEVICE 0.
2489  002504  002370                            MSGPK1                  ;DEVICE 1.
2490  002506  002406                            MSGPK2                  ;DEVICE 2.
2491  002510  002424                            MSGPK3                  ;DEVICE 3.
2492
2493                                    ;       ADDRESSES OF INTERRUPT HANDLING ROUTINES.
2494
2495  002512  006316                    TS4INT:: TS4IN0                 ;DEVICE 0.
2496  002514  006324                            TS4IN1                  ;DEVICE 1.
2497  002516  006332                            TS4IN2                  ;DEVICE 2.
2498  002520  006340                            TS4IN3                  ;DEVICE 3.
2499
2500                                    ;       TS04 CODE LEVELS, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST
2501
2502  002522  000000                    TS4CL:: 0                       ;DEVICE 0
2503  002524  000000                            0                       ;DEVICE 1
2504  002526  000000                            0                       ;DEVICE 2
2505  002530  000000                            0                       ;DEVICE 3
2506
2507                                    ;       UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
2508                                    ;       WHEN DEVICE IS NOT IN USE, IT,S LOCATION WILL =  3.
2509                                    ;       R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
2510
```

```
2511  002532  177774                    DEVTBL:: .WORD  NINUSE
2512  002534  177774                             .WORD  NINUSE
2513  002536  177774                             .WORD  NINUSE
2514  002540  177774                             .WORD  NINUSE
2515  002542  177777                             .WORD  END
2516
2517
2518                                    ;        BAD TAPE TABLE POINTER; USED BY WRITE RETRY ROUTINE
2519                                    ;        "WRTY" TO LOG BAD TAPE SPOTS ON UNITS UNDER TEST
2520
2521  002544  002774                    BTADDR:: BT0
2522  002546  003046                             BT1
2523  002550  003120                             BT2
2524  002552  003172                             BT3
```

```
                                        002554
002554  000020
002614  000020
002654  000020
002714  000004
002724  000004
002734  000004
002744  000004
002754  000004
002764  000004
002774  000025
003046  000025
003120  000025
003172  000025
003244  000004
003254  000004
003264  000004
003274  000004
003304  000004
003314  000004
                                        003324
003324  000004
```

```
;       COUNTER AREA.

CNTBGN=.
WRBC::  .BLKW   20              ;BYTES WRITTEN.
RRBC::  .BLKW   20              ;BYTES READ REV.
RFBC::  .BLKW   20              ;BYTES READ FWD.
WRREC:: .BLKW   4               ;RECOVERABLE WRITE ERRORS.
WRUNR:: .BLKW   4               ;UNRECOVERABLE WRITE ERRORS.
RRREC:: .BLKW   4               ;RECOVERABLE READ REV ERRORS.
RRUNR:: .BLKW   4               ;UNRECOVERABLE READ REV ERRORS.
RFREC:: .BLKW   4               ;RECOVERABLE READ FWDERRORS.
RFUNR:: .BLKW   4               ;UNRECOVERABLE READ FWD ERRORS.
BT0::   .BLKW   21.             ;UNIT 0 BAT TAPE SPOTS LOG
BT1::   .BLKW   21.             ;UNIT 1 BAT TAPE SPOTS LOG
BT2::   .BLKW   21.             ;UNIT 2 BAT TAPE SPOTS LOG
BT3::   .BLKW   21.             ;UNIT 3 BAT TAPE SPOTS LOG
WRTYCT:: .BLKW  4               ;WRITE RETRY COUNTER
PASCNT:: .BLKW  4               ;PASS COUNT.
SCCNT:: .BLKW   4               ;SPECIAL CONDITION COUNT.
VFYCNT:: .BLKW  4               ;COUNT OF TS04 DATA COMPARE ERRORS.
HRDCNT:: .BLKW  4               ;COUNT OF HARD ERRORS.
FTLCNT:: .BLKW  4               ;COUNT OF FATAL ERRORS.
CNTEND=.                        ;END OF STATICTICAL COUNTERS.
RECCNT:: .BLKW  4               ;NUMBER OF RECORDS FROM BOT: CLEARED  ON REWIND
                                ;AND WHEN RESTARTING OR CONTINUING TEST 2.


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

```
003334  000000
003336  000000
003340  000000
003342  000000
003344  000000
003346  177777
003350  177777
003352  177777
003354  000000
003356  000000
003360  153624
003362  032561
003364  000000
003366  000000
003370  000000
003372  000000
003374  000000
003376  000000
003400  000000
003402  000000
```

```
DATAWT:: .WORD  0               ;WRITE BUFFER ADDRESS.
DATARD:: .WORD  0               ;READ BUFFER ADDRESS.
NCNT::  .WORD   0               ;STORAGE FOR VALUE OF N.
NCNT1:: .WORD   0               ;TEMP STORAGE FOR VALUE OF N.
BRFCNT:: .WORD  0               ;STORAGE FOR BPCR VALUE.
CMDWRD:: .WORD  END             ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
CMDSAV:: .WORD  END             ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVER
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.
RSSAVE:: .WORD  0               ;LOCATION FOR SAVING CURRENT DEVICE POINTER.
TSSREG:: .WORD  0               ;CURRENT STATUS REGISTER.
```

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

                        003404  BGNFLG=.
003404  000000                  RETRYC:: .WORD  0               ;# OF RECOVERY ATTEMPTS EXECUTED.
003406     000                  RPTCNT:: .BYTE  0       ;WRITE REPEAT ON SAME SPOT CNTR; 4 PER WRITE RETRY
003407     000                  WRTYFG:: .BYTE  0               ;WRITE RETRY ON SAME SPOT IN PROGRESS FLAG
003410     000                  WRTYER:: .BYTE  0               ;WRITE RETRY ON SAME SPOT ERROR FLAG
003411     000                  RECLOG:: .BYTE  0               ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
003412     000                  ERLOG:: .BYTE   0               ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS
003413     000                  RWERR:: .BYTE   0               ;READ/WRITE ERROR HAS OCCURED.
003414     000                  UNREC:: .BYTE   0               ;UNRECOVERABLE ERROR HAS OCCURED.
003415     000                  ERRREC:: .BYTE  0               ;ERROR RECOVERY MODE.
                                        .EVEN
                        003416  ENDERF=.

                                ;       ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.

003416  000004                  INTFLG:: .BLKW  4               ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
003426  000004                  EOTFLG:: .BLKW  4               ;EOT/BOT FLAGS FOR EACH DEVICE (XSTAT0).
003436  000000                  BTPT::   .WORD  0               ;BAD TAPE SPOT POINTER TO BT0-BT3 VIA BTADDR
003440     000                  EXPBOT:: .BYTE  0               ;BOT IS EXPECTED, DO NOT ABORT ON BOT/FUNC RTI.
003441     000                  RANDOM:: .BYTE  0               ;RANDOM EVERYTHING FLAG.
003442     000                  VFYFLG:: .BYTE  0               ;SET DURING WRITE/VERIFY COMMAND.
003443     000                  RPTFLG:: .BYTE  0               ;PERFORMANCE REPORT HAS BEEN REQUESTED.
003444     000                  SWBFLG:: .BYTE  0               ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZE
003445     000                  IRE::    .BYTE  0               ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
003446     000                  DROPED:: .BYTE  0               ;CURRENT UNIT HAS BEEN DROPPED
003447     000                  T1SWB::  .BYTE  0               ;TEST1 SWAP BYTES FLAG
003450     000                  ALLEOT:: .BYTE  0               ;ALL UNITS @ EOT FLAG
003451     000                  ERSFLG:: .BYTE  0               ;ERASE FLAG:  DO ERASE AFTER A SPACE REV TO DELE
                                                                ;BADLY WRITTEN RECORD.  1 TO 4 ERASES LEAVING
                                                                ;A 3 TO 12 INCH GAP MAY RESULT.
                                        .EVEN
                        003452  ENDFLG=.

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

003452     000                  STAFLG:: .BYTE  0               ;START FLAG - SET BY INIT CODE IF STARTING.
003453     000                  PWRFLG:: .BYTE  0               ;POWER FAILURE FLAG - SET ONLY DURING INIT.
003454     000                  TRAPD4:: .BYTE  0               ;TRAPED AT 4 FLAG
003455     000                  MISCFG:: .BYTE  0               ;MISCELLANEOUS FLAG

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

003456  000000                  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.

003460  140004          CMDSEQ:: .WORD  SCH             ;SET CHARACTERISTICS.
003462  000040                   .WORD  CH.EAI
003464  000001                   .WORD  1
003466  000000                   .WORD  0
003470  102010          CMDSE2:: .WORD  RWD             ;REWIND.
003472  000001                   .WORD  1               ;BYTE COUNT.
003474  000001                   .WORD  1               ;ONCE.
003476  000007                   .WORD  RANP            ;PATTERN.
003500  104005                   .WORD  WRT             ;WRITE.
003502  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003504  076400                   .WORD  32000.          ;32,000 RECORDS.
003506  000007                   .WORD  RANP            ;RANDOM PATTERN.
003510  104401                   .WORD  RDR             ;READ REV.
003512  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003514  076400                   .WORD  32000.          ;32,000 RECORDS
003516  000007                   .WORD  RANP            ;RANDOM PATTERN.
003520  104001                   .WORD  RDF             ;READ FWD.
003522  004000                   .WORD  DATCNT          ;MAX BUFFER LENGTH.
003524  076400                   .WORD  32000.          ;32,000 RECORDS.
003526  000007                   .WORD  RANP            ;RANDOM PATTERN.
003530  102010                   .WORD  RWD             ;REWIND.
003532  000001                   .WORD  1               ;BYTE COUNT.
003534  000001                   .WORD  1               ;ONCE.
003536  000007                   .WORD  RANP            ;PATTERN.
003540  000004                   .BLKW  4               ;EXTENSTION TO HOLD 1 MORE CMD.
003550  177777          SEQEND:: .WORD  END             ;SOFT END OF SEQUENCE TABLE.
003552  177777                   .WORD  END
003554  177777                   .WORD  END
003556  177777                   .WORD  END
003560  177777                   .WORD  END             ;HARD END OF SEQUENCE TABLE.
```

```
2657                                        ;THE FOLLOWING IS THE TS04 COMMAND TABLE
2658
2659  003562  100013          CMDTBL:: .WORD  DRI          ;DRIVE INIT.
2660  003564  104001                   .WORD  RDF          ;READ FORWARD.
2661  003566  104401                   .WORD  RDR          ;READ REVERSE.
2662  003570  104005                   .WORD  WRT          ;WRITE
2663  003572  104105                   .WORD  WTV          ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND
2664                                                       ;CHECK DATA ON ALL RECORDS, RDF AND
2665                                                       ;CHECK DATA ON ALL RECORDS.)
2666  003574  104010                   .WORD  SRF          ;SPACE "N" RECORDS FORWARD.
2667  003576  104410                   .WORD  SRR          ;SPACE "N" RECORDS REVERSE.
2668  003600  105401                   .WORD  RNR          ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERS
2669  003602  125401                   .WORD  RNF          ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE RE
2670  003604  105001                   .WORD  RPF          ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, REA
2671  003606  125001                   .WORD  RPR          ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPAC
2672  003610  105005                   .WORD  WRR          ;WRITE RETRY.
2673  003612  102010                   .WORD  RWD          ;REWIND.
2674  003614  100012                   .WORD  MBR          ;MESSAGE BUFFER RELEASE
2675  003616  100011                   .WORD  WTM          ;WRITE TAPE MARK
2676  003620  101011                   .WORD  WTR          ;WRITE TAPE MARK RETRY.
2677  003622  105010                   .WORD  SFF          ;SPACE "N" FILES FORWARD.
2678  003624  105410                   .WORD  SFR          ;SPACE "N" FILES REVERSE.
2679  003626  100017                   .WORD  GES          ;GET EXTENDED STATUS.
2680  003630  100411                   .WORD  ERS          ;ERASE 3 INCHES OF TAPE.
2681  003632  100412                   .WORD  UNL          ;REWIND AND UNLOAD.
2682  003634  101012                   .WORD  CLN          ;CLEAR TAPE.
2683  003636  140004                   .WORD  SCH          ;SET CHARACTERISTICS.
2684  003640  100006                   .WORD  DIA          ;DIAGNOSTIC COMMAND.
2685  003642  000040                   .WORD  JMP          ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
2686  003644  000020                   .WORD  DLY          ;DELAY "N" MS.
2687  003646  177777                   .WORD  END          ;END OF COMMAND TABLE
2688
```

```
2689                                    ;       THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.
2690
2691  003650  051104     111      CMDASC:: .ASCII /DRI/          ;DRIVE INIT.
2692  003653     122  043104              .ASCII  /RDF/          ;READ FORWARD.
2693  003656  042122     122              .ASCII  /RDR/          ;READ REVERSE.
2694  003661     127  052122              .ASCII  /WRT/          ;WRITE
2695  003664  052127     126              .ASCII  /WTV/          ;WRITE/VERIFY.  (WRITE ALL RECORDS, RDR AND CHEC
2696                                                             ;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECOR
2697  003667     123  043122              .ASCII  /SRF/          ;SPACE "N" RECORDS FORWARD.
2698  003672  051123     122              .ASCII  /SRR/          ;SPACE "N"  RECORDS REVERSE.
2699  003675     122  051116              .ASCII  /RNR/          ;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE
2700  003700  047122     106              .ASCII  /RNF/          ;READ NEXT FORWARD. I.E., READ FORWARD, SPACE RE
2701  003703     122  043120              .ASCII  /RPF/          ;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ
2702  003706  050122     122              .ASCII  /RPR/          ;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE
2703  003711     127  051122              .ASCII  /WRR/          ;WRITE RETRY.
2704  003714  053522     104              .ASCII  /RWD/          ;REWIND.
2705  003717     115  051102              .ASCII  /MBR/          ;MESSAGE BUFFER RELEASE
2706  003722  052127     115              .ASCII  /WTM/          ;WRITE TAPE MARK
2707  003725     127  051124              .ASCII  /WTR/          ;WRITE TAPE MARK RETRY.
2708  003730  043123     106              .ASCII  /SFF/          ;SPACE "N" FILES FORWARD.
2709  003733     123  051106              .ASCII  /SFR/          ;SPACE "N" FILES REVERSE.
2710  003736  042507     123              .ASCII  /GES/          ;GET EXTENDED STATUS.
2711  003741     105  051522              .ASCII  /ERS/          ;ERASE 3 INCHES OF TAPE.
2712  003744  047125     114              .ASCII  /UNL/          ;REWIND AND UNLOAD.
2713  003747     103  047114              .ASCII  /CLN/          ;CLEAN TAPE.
2714  003752  041523     110              .ASCII  /SCH/          ;SET CHARACTERISTICS.  WHERE BRF=200, 40, 20, 0.
2715                                                             ;SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DES
2716  003755     104  040511              .ASCII  /DIA/          ;DIAGNOSTICS.  SEE TS11/TS04 PROGRAMMING SPECIFI
2717                                                             ;FOR DESCRIPTION.  ODT MUST BE USED TO LOAD DIAG
2718                                                             ;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED
2719  003760  046512     120              .ASCII  /JMP/          ;JUMP TO THE NTH COMMAND IN THE COMMAND
2720                                                             ;SEQUENCE TABLE, WHERE N IS DEFINED IN
2721                                                             ;THE # OF OPERATIONS.
2722  003763     104  054514              .ASCII  /DLY/          ;DELAY "N" MS, WHERE N IS DEFINED IN
2723                                                             ;THE # OF OPERATIONS.
2724  003766  047105     104              .ASCII  /END/          ;END OF COMMAND SEQUENCE.
2725          003772                      .EVEN
2726
2727
2728
```

```
                        .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

003772  047045  040445  047125  CODELM:: .ASCIZ /¤N¤AUNIT ¤D1¤A TS11 CODE LEVEL P¤03¤N¤N/
                                .EVEN
004042  054130  020130  046503  HALTM:: .ASCIZ  /XXX CMD - TYPE <CR> TO CONTINUE/
004102  046503  020104  040520  CMDPKM:: .ASCIZ /CMD PACKET ADR NOT ON MODULO 4 BOUNDARY; RELOAD!/
        004164
                                .EVEN
004164  040504  040524  041440  WTVERM:: .ASCIZ /DATA COMPARE ERROR/
004207     116  020117  051524  TOERM:: .ASCIZ  /NO TS11 RESPONSE/
004230  047125  042504  044506  SCERM:: .ASCIZ  /UNDEFINED SPEC COND/
004254  043122  020103  047516  RFCERM:: .ASCIZ /RFC NON ZERO/
004271     124  030523  020061  NSSRM:: .ASCIZ  /TS11 NOT READY/
004310  042522  051124  020131  RLEXM:: .ASCIZ  /RETRY LIMIT EXCEEDED/
004335     125  044516  020124  ATTNM:: .ASCIZ  /UNIT OFF LINE/
004353     106  047125  052103  FUNRM:: .ASCIZ  /FUNCTION REJECT/
004373     106  052101  046101  FATSM:: .ASCIZ  /FATAL SUBSYSTEM ERROR/
004421     116  020117  047111  NOINTM:: .ASCIZ /NO INTERRUPT/
004436  040524  042520  051440  TSAM::  .ASCIZ  /TAPE STATUS ALERT/
004460  047524  020117  040515  TOOMM:: .ASCIZ  /TOO MANY INTERRUPTS/
004504  040503  051520  040524  RNYM::  .ASCIZ  /CAPSTAN RUNAWAY GET STATUS RESULTS:/
004550  042522  047503  042526  RERM::  .ASCIZ  /RECOVERABLE ERROR/
004572  047125  042522  047503  URERM:: .ASCIZ  /UNRECOVERABLE ERROR/
004616  047045  040445  051104  DROPDM:: .ASCIZ /¤N¤ADROPPED UNIT ¤D1¤N/
004645     045  022516  040501  AUDRPM:: .ASCIZ /¤N¤AALL UNITS DROPPED¤N¤N/
004677     045  022516  041101  DTAER2:: .ASCIZ "¤N¤ABYTE:¤D4¤S2¤AWAS:¤B8¤S2¤AS/B:¤B8¤N"
004746  042045  022464  020101  DTAER3:: .ASCIZ "¤D4¤A BYTES IN ERROR OUT OF ¤D4¤N"
005010  040445  047516  042040  DTAER4:: .ASCIZ /¤ANO DATA READ¤N/
005031     045  051101  041505  DTAER5:: .ASCIZ /¤ARECORD TOO LONG; >¤D4¤A BYTES¤N/
005073     045  051101  041505  NURTY1:: .ASCIZ /¤ARECOVERED ON RETRY #¤D2¤N
005127     045  052501  044516  OFLINM:: .ASCIZ /¤AUNIT ¤D1¤A OFF LINE¤N/
005157     045  043501  052105  GETSTM:: .ASCIZ /¤AGET STATUS CMD RESULTS:¤N/
005213     045  000116          CRLF::  .ASCIZ  /¤N/
005216  047045  051445  000067  CRLFSP:: .ASCIZ /¤N¤S7/
                                .LIST   BEX
2743                            .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..
                        ;--


005224                          BGNMSG  DTAERM
005224                  DTAERM::
005224                          PRINTB  #STAER1,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
005224  016546  003324                                                  MOV     RECCNT(R
005230  016546  003254                                                  MOV     PASCNT(R
005234  016546  002532                                                  MOV     DEVTBL(R
005240  012746  005704                                                  MOV     #STAER1,
005244  012746  000004                                                  MOV     #4,-(SP)
005250  010600                                                          MOV     SP,R0
005252  104414                                                          TRAP    C$PNTB
005254  062706  000012                                                  ADD     #12,SP
005260                          PRINTB  #STAER7
005260  012746  005776                                                  MOV     #STAER7,
005264  012746  000001                                                  MOV     #1,-(SP)
005270  010600                                                          MOV     SP,R0
005272  104414                                                          TRAP    C$PNTB
005274  062706  000004                                                  ADD     #4,SP
005300                          LET RECRED :* R2                ;SAVE R2
005300  010237  006312                                                  MOV     R2,RECRE
005304                          LET TIME1 :* R3                 ;SAVE R3
005304  010337  003364                                                  MOV     R3,TIME1
005310                          LET TIME2 :* R4                 ;SAVE R4
005310  010437  003366                                                  MOV     R4,TIME2
005314  004737  006346          JSR PC,RECTAP                   ;RETRIEVE RECORD READ
005320                          LET R2 :* RECRED                ;RESTORE R2
005320  013702  006312                                                  MOV     RECRED,R
005324                          LET RECRED :* R3                ;SAVE RECORD READ
005324  010337  006312                                                  MOV     R3,RECRE
005330                          LET R3 :* TIME1                 ;RESTORE R3
005330  013703  003364                                                  MOV     TIME1,R3
005334                          LET R4 :* TIME2                 ;RESTORE R4
005334  013704  003366                                                  MOV     TIME2,R4
005340                          PRINTB  #STAER6,RECRED          ;PRINT RECORD READ
005340  013746  006312                                                  MOV     RECRED,-
005344  012746  006026                                                  MOV     #STAER6,
005350  012746  000002                                                  MOV     #2,-(SP)
005354  010600                                                          MOV     SP,R0
005356  104414                                                          TRAP    C$PNTB
005360  062706  000006                                                  ADD     #6,SP
005364                          EXIT    MSG
005364  000167                                                          .WORD   L$JMP
005366  000000                                                          .WORD   L10002-2
                                .EVEN

                                ENDMSG
005370                  L10002:
005370  104423                                                          TRAP    C$MSG
```

```
2800
2801  005372                                    BGNMSG  STAERM
2802  005372                                STAERM::
2803  005372                                    PRINTB  #STAER1,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
2804  005372  016546  003324                                                          MOV     RECCNT(R
2805  005376  016546  003254                                                          MOV     PASCNT(R
2806  005402  016546  002532                                                          MOV     DEVTBL(R
2807  005406  012746  005704                                                          MOV     #STAER1,
2808  005412  012746  000004                                                          MOV     #4,-(SP)
2809  005416  010600                                                                  MOV     SP,R0
2810  005420  104414                                                                  TRAP    C$PNTB
2811  005422  062706  000012                                                          ADD     #12,SP
2812  005426                                    PRINTB  #STAER7
2813  005426  012746  005776                                                          MOV     #STAER7,
2814  005432  012746  000001                                                          MOV     #1,-(SP)
2815  005436  010600                                                                  MOV     SP,R0
2816  005440  104414                                                                  TRAP    C$PNTB
2817  005442  062706  000004                                                          ADD     #4,SP
2818  005446                                    LET R2 := CMDPKT CLR.BY #177740
2819  005446  013702  002310                                                          MOV     CMDPKT,R
2820  005452  042702  177740                                                          BIC     #177740,
2821  005456                                    LET R2 := R2 - #1
2822  005456  005302                                                                  DEC     R2
2823  005460                                    IF R2 EQ #0 THEN              ;IF CMD IS A READ
2824  005460  005702                                                                  TST     R2
2825  005462  001016                                                                  BNE     50000$
2826  005464  004737  006346                     JSR PC,RECTAP               ;THEN RETRIEVE
2827  005470                                    LET RECRED := R3              ;AND
2828  005470  010337  006312                                                          MOV     R3,RECRE
2829  005474                                    PRINTB #STAER6,RECRED         ;TYPE RECORD READ
2830  005474  013746  006312                                                          MOV     RECRED,-
2831  005500  012746  006026                                                          MOV     #STAER6,
2832  005504  012746  000002                                                          MOV     #2,-(SP)
2833  005510  010600                                                                  MOV     SP,R0
2834  005512  104414                                                                  TRAP    C$PNTB
2835  005514  062706  000006                                                          ADD     #6,SP
2836  005520                                    ENDIF
2837  005520                                                                50000$:
2838  005520                                    PRINTX  #STAER2
2839  005520  012746  005062                                                          MOV     #STAER2,
2840  005524  012746  000001                                                          MOV     #1,-(SP)
2841  005530  010600                                                                  MOV     SP,R0
2842  005532  104415                                                                  TRAP    C$PNTX
2843  005534  062706  000004                                                          ADD     #4,SP
2844  005540                                    PRINTX  #STAER3,CMDPKT,@TSDB(R5),MSGPKT+MS.RFC,TSSREG,CTCC
2845  005540  013746  003376                                                          MOV     CTCC,-(S
2846  005544  013746  003402                                                          MOV     TSSREG,-
2847  005550  013746  002340                                                          MOV     MSGPKT+M
2848  005554  017546  002452                                                          MOV     @TSDB(R5
2849  005560  013746  002310                                                          MOV     CMDPKT,-
2850  005564  012746  006141                                                          MOV     #STAER3,
2851  005570  012746  000006                                                          MOV     #6,-(SP)
2852  005574  010600                                                                  MOV     SP,R0
2853  005576  104415                                                                  TRAP    C$PNTX
2854  005600  062706  000016                                                          ADD     #16,SP
2855  005604                                    PRINTX  #STAER4,CMDPKT+2,CMDPKT+4,CMDPKT+6
```

```
2856  005604  C13746  002316                                                  MOV     CMDPKT+6
2857  005610  013746  002314                                                  MOV     CMDPKT+4
2858  005614  013746  002312                                                  MOV     CMDPKT+2
2859  005620  012746  006177                                                  MOV     #STAER4,
2860  005624  012746  000004                                                  MOV     #4,-(SP)
2861  005630  010600                                                          MOV     SP,R0
2862  005632  104415                                                          TRAP    C$PNTX
2863  005634  062706  000012                                                  ADD     #12,SP
2864  005640                                PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
2865  005640  013746  002350                                                  MOV     MSGPKT+M
2866  005644  013746  002346                                                  MOV     MSGPKT+M
2867  005650  013746  002344                                                  MOV     MSGPKT+M
2868  005654  013746  002342                                                  MOV     MSGPKT+M
2869  005660  012746  006217                                                  MOV     #STAER5,
2870  005664  012746  000005                                                  MOV     #5,-(SP)
2871  005670  010600                                                          MOV     SP,R0
2872  005672  104415                                                          TRAP    C$PNTX
2873  005674  062706  000014                                                  ADD     #14,SP
2874  005700                                EXIT    MSG
2875  005700  000167                                                          .WORD   J$JMP
2876  005702  000410                                                          .WORD   L10003-2
2877
2878                                        .NLIST  BEX
      005704  040445  054130  020130  STAER1: .ASCIZ  /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
                                        .EVEN
      005776  040445  051120  053105  STAER7: .ASCIZ  /%APREVIOUS CMD WAS  XXX/
      006026  051445  030461  040445  STAER6: .ASCIZ  /%S11%A* RECORD READ:%D5%A */
      006062  047045  040445  046503  STAER2: .ASCIZ  /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/
      006141     045  033117  051445  STAER3: .ASCIZ  /%06%S2%06%S2%06%S2%06%S2%D1%N/
      006177     045  033117  047045  STAER4: .ASCII  /%06%N/
      006204  047445  022466     116          .ASCII  /%06%N/
      006211     045  033117  047045          .ASCIZ  /%06%N/
      006217     045  054101  052123  STAER5: .ASCII  /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%N/
      006262  047445  022466  031123          .ASCIZ  /%06%S2%06%S2%06%S2%06%N/
                                        .LIST   BEX
2879                                    .EVEN
2880  006312  000000                RECRED: .WORD   0                       ;RECORD READ FROM TAPE
2881
2882  006314                                ENDMSG
2883  006314                        L10003:
2884  006314  104423                                                          TRAP    C$MSG
```

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

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

                                ;       MODULES TO HANDLE TS04 INTERRUPTS.

006316                                  BGNSRV  TS4IN0                  ;DEVICE 0.
006316                          TS4IN0::
006316                                  LET INTFLG := INTFLG + #1        ;SET INTERRUPT OCCURRED FLAG.
006316  005237  003416                                                    INC     INTFLG
006322                                  ENDSRV
006322                          L10004:
006322  000002                                                          RTI

006324                                  BGNSRV  TS4IN1                  ;DEVICE 1.
006324                          TS4IN1::
006324                                  LET INTFLG+2 := INTFLG+2 + #1    ;SET INTERRUPT OCCURRED FLAG.
006324  005237  003420                                                    INC     INTFLG+2
006330                                  ENDSRV
006330                          L10005:
006330  000002                                                          RTI

006332                                  BGNSRV  TS4IN2                  ;DEVICE 2.
006332                          TS4IN2::
006332                                  LET INTFLG+4 := INTFLG+4 + #1    ;SET INTERRUPT OCCURRED FLAG.
006332  005237  003422                                                    INC     INTFLG+4
006336                                  ENDSRV
006336                          L10006:
006336  000002                                                          RTI

006340                                  BGNSRV  TS41N3                  ;DEVICE 3.
006340                          TS4IN3::
006340                                  LET INTFLG+6 := INTFLG+6 + #1    ;SET INTERRUPT OCCURRED FLAG.
006340  005237  003424                                                    INC     INTFLG+6
006344                                  ENDSRV
006344                          L10007:
006344  000002                                                          RTI
```

```
2925                                    ;       SUBROUTINE TO RETRIEVE RECORD COUNT READ FROM TAPE FOR ERROR
2926                                    ;       PRINTS.
2927                                    ;       INPUTS:
2928                                    ;       OUTPUTS:  R3 = RECORD COUNT READ
2929                                    ;       REGISTERS:  R2, R3, R4
2930                                    ;       CALLS:
2931
2932  006346                            RECTAP::IF #MOD.C0 SETIN CMDWRD THEN    ;READ REV FETCH
2933  006346  032737  000400  003346                                                    BIT     #MOD.C0,
2934  006354  001430                                                                   BEQ     50001$
2935  006356                              LET R2 := MSGPKT+MS.RFC + DATARD ;FIND LAST READ AD.
2936  006356  013702  002340                                                          MOV     MSGPKT+M
2937  006362  063702  003336                                                          ADD     DATARD,R
2938  006366                              IF #BIT00 SETIN R2 THEN       ;ODD AD., REASSEMBLE
2939  006366  032702  000001                                                          BIT     #BIT00,R
2940  006372  001417                                                                  BEQ     50002$
2941  006374                                LET R2 := R2 + #1           ;REC COUNT STARTING
2942  006374  005202                                                                  INC     R2
2943  006376                                LET R3 :B= (R2) CLR.BY #177400  ;WITH UPPER BYTE FETCH
2944  006376  111203                                                                  MOVB    (R2),R3
2945  006400  142703  177400                                                         BICB    #177400,
2946  006404                                LET R3 := SWAP R3           ;
2947  006404  000303                                                                  SWAB    R3
2948  006406                                LET R2 := R2 - #1           ;LOWER BYTE AD.
2949  006406  005302                                                                  DEC     R2
2950  006410                                IFB SWBFLG NE #0 THEN
2951  006410  105737  003444                                                         TSTB    SWBFLG
2952  006414  001401                                                                  BEQ     50003$
2953  006416                                  LET R2 := R2 - #1         ;LOWER BYTE AD. ON SWAP
2954  006416  005302                                                                  DEC     R2
2955  006420                                ENDIF
2956  006420                                                                  50003$:
2957  006420                                LET R4 :B= (R2) CLR.BY #177400 ;FETCH LOWER BYTE
2958  006420  111204                                                                  MOVB    (R2),R4
2959  006422  142704  177400                                                         BICB    #177400,
2960  006426                                LET R3 := R3 OR R4          ;MERGE BYTES
2961  006426  050403                                                                  BIS     R4,R3
2962  006430                              ELSE
2963  006430  000401                                                                  BR      50004$
2964  006432                                                                  50002$:
2965  006432                                LET R3 := (R2)              ;EVEN AD. FETCH
2966  006432  011203                                                                  MOV     (R2),R3
2967  006434                              ENDIF
2968  006434                                                                  50004$:
2969  006434                            ELSE
2970  006434  000402                                                                  BR      50005$
2971  006436                                                                  50001$:
2972  006436                              LET R3 := @DATARD           ;READ FWD FETCH
2973  006436  017703  174674                                                         MOV     @DATARD,
2974  006442                            ENDIF
2975  006442                                                                  50005$:
2976
2977  006442  000207                    RTS     PC
```

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

006444                  SETCH:: LET R1 := #CMDSEQ               ;INIT COMMAND SEQUENCE TABLE POINTER.
006444  012701  003460                                                  MOV     #CMDSEQ,
006450  012721  140004          MOV     #SCH,(R1)+              ;THIS CODE SETS UP A SET CHARACTERISTIC
006454  012721  000040          MOV     #DFTSCH,(R1)+           ;COMMAND AS THE FIRST COMMAND IN THE
006460  012721  000001          MOV     #1,(R1)+                ;SEQUENCE TABLE.
006464  005721                  TST     (R1)+                   ;SKIP PATTERN LOCATION.
006466  000207                  RTS PC


                        ;       SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
                        ;       INPUTS:
                        ;       OUTPUTS:
                        ;       REGISTERS:
                        ;       CALLS:

006470                  SETRW:: LET (R1)+ := #RWD               ;CMD = REWIND.
006470  012721  102010                                                  MOV     #RWD,(R1
006474                          LET (R1)+ := #1                 ;BRF.
006474  012721  000001                                                  MOV     #1,(R1)+
006500                          LET (R1)+ := #1                 ;# OF OPERATIONS.
006500  012721  000001                                                  MOV     #1,(R1)+
006504  005721                  TST (R1)+                       ;SKIP PATTERN.
006506  000207                  RTS     PC                      ;RETURN
```

```
3010                                    ;       SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
3011                                    ;       DEVICES.
3012                                    ;       INPUTS:
3013                                    ;       OUTPUTS:        R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
3014                                    ;       REGISTERS:
3015                                    ;       CALLS:          CMDAC,SETUP,EXSUB,CKHAE,NEXTU,FIRSTU,VFYDAT.
3016
3017  006510                            EXALL:: LET R1 := #CMDSEQ               ;INIT SEQUENCE TABLE POINTER.
3018  006510  012701  003460                                                            MOV     #CMDSEQ,
3019  006514                                    WHILE (R1) NE #END DO             ;WHILE THERE ARE CMDS IN THE SEQUENCE TA
3020  006514                                                                                50006$:
3021  006514  021127  177777                                                            CMP     (R1),#EN
3022  006520  001537                                                                    BEQ     50007$
3023  006522  004737  007452                      JSR   PC,SETUP                ;GO SETUP THE COMMAND BLOCK.
3024  006526                                      WHILE NCNT LT NCNT1 DO        ;WHILE THERE ARE RECORDS REMAINING:
3025  006526                                                                                50010$:
3026  006526  023737  003340  003342                                                      CMP     NCNT,NCN
3027  006534  002116                                                                    BGE     50011$
3028  006536  004737  007344                        JSR PC,CMDAC                ;STORE CMD ASCII IN ERROR MESSAGE.
3029  006542                                        IFB RANDOM NE #0 THEN       ;IF IN RANDOM MODE:
3030  006542  105737  003441                                                            TSTB    RANDOM
3031  006546  001435                                                                    BEQ     50012$
3032  006550                                          IF CMDWRD EQ #WRT THEN    ;IF CMD IS A WRITE THEN:
3033  006550  023727  003346  104005                                                      CMP     CMDWRD,#
3034  006556  001031                                                                    BNE     50013$
3035  006560                                            IFB VFYFLG EQ #0 THEN   ;IF DATA IS NOT TO BE VERIFIED THEN:
3036  006560  105737  003442                                                            TSTB    VFYFLG
3037  006564  001026                                                                    BNE     50014$
3038  006566                                              LET RANB := RANB + RANS  ;GENERATE
3039  006566  063737  003362  003360                                                      ADD     RANS,RAN
3040  006574                                              LET RANS := RANS + RANB  ;RANDOM
3041  006574  063737  003360  003362                                                      ADD     RANB,RAN
3042  006602                                              LET BRFCNT := RANS       ;LENGTH
3043  006602  013737  003362  003344                                                      MOV     RANS,BRF
3044  006610                                              LET BRFCNT := BRFCNT CLR,BY LENMSK  ;MASK RANDOM LENGTH.
3045  006610  043737  003356  003344                                                      BIC     LENMSK,B
3046  006616                                              IF BRFCNT LT #18. THEN        ;DO NOT ALLOW BYTE COUNT OF LESS
3047  006616  023727  003344  000022                                                      CMP     BRFCNT,#
3048  006624  002003                                                                    BGE     50015$
3049  006626                                                LET BRFCNT := #18.  ;CHANGE COUNT OF 0-17 TO 18.
3050  006626  012737  000022  003344                                                      MOV     #18.,BRF
3051  006634                                              ENDIF
3052  006634                                                                                50015$:
3053  006634                                              LET CMDPKT+CP.CNT := BRFCNT  ;MOVE BRF TO CMD PACKET.
3054  006634  013737  003344  002316                                                      MOV     BRFCNT,C
3055  006642                                            ENDIF
3056  006642                                                                                50014$:
3057  006642                                          ENDIF
3058  006642                                                                                50013$:
3059  006642                                        ENDIF
3060  006642                                                                                50012$:
3061  006642  004737  007004                        JSR PC,EXSUB                ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATU
3062  006646  004737  016060                        JSR PC,CKHAE                ;CHECK HALT AFTER EACH CMD FLAG.
3063  006652                                        LET R2 := #1                ;SET ALL UNITS AT BOT/EOT.
3064  006652  012702  000001                                                            MOV     #1,R2
3065  006656  004737  015452                        JSR PC,FIRSTU               ;FIND FIRST UNIT.
```

```
3066  006662                                        WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS:
3067  006662                                                                                50016$:
3068  006662  026527  002532  177777                                                        CMP     DEVTBL(R
3069  006670  001426                                                                      BEQ     50017$
3070  006672                                          IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
3071  006672  032737  000400  003346                                                      BIT     #MOD.CO,
3072  006700  001406                                                                      BEQ     50020$
3073  006702                                            IF #X0.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT THEN:
3074  006702  032765  000002  003426                                                      BIT     #X0.BOT,
3075  006710  001001                                                                      BNE     50021$
3076  006712                                              LET R2 := #0                  ;CLEAR EOT/BOT FLAG.
3077  006712  005002                                                                      CLR     R2
3078  006714                                            ENDIF
3079  006714                                                                                50021$:
3080  006714                                          ELSE                        ;ELSE IF CMD IS NOT REVERSE:
3081  006714  000411                                                                      BR      50022$
3082  006716                                                                                50020$:
3083  006716                                            IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
3084  006716  032765  000001  003426                                                      BIT     #X0.EOT,
3085  006724  001404                                                                      BEQ     50023$
3086  006726  032737  000001  003346                                                      BIT     #CMD.CO,
3087  006734  001001                                                                      BNE     50024$
3088  006736                                                                                50023$:
3089                                                                                  ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
3090  006736                                              LET R2 := #0                  ;CLEAR EOT/BOT FLAG.
3091  006736  005002                                                                      CLR     R2
3092  006740                                            ENDIF
3093  006740                                                                                50024$:
3094  006740                                          ENDIF
3095  006740                                                                                50022$:
3096  006740  004737  015520                           JSR PC,NEXTU                  ;FIND NEXT UNIT
3097  006744                                          ENDDO                           ;
3098  006744  000746                                                                      BR      50016$
3099  006746                                                                                50017$:
3100  006746                                          IF R2 EQ #1 THEN              ;IF ALL UNIT ARE AT EOT/BOT THEN:
3101  006746  020227  000001                                                            CMP     R2,#1
3102  006752  001001                                                                      BNE     50025$
3103  006754  000412                                   BR        EXARTN              ;RETURN WITH R2 = #1.
3104  006756                                          ENDIF
3105  006756                                                                                50025$:
3106  006756                                          LET NCNT := NCNT + #1         ;UPDATE RECORD COUNT.
3107  006756  005237  003340                                                            INC     NCNT
3108  006762                                          LET PCMDWD := CMDWRD          ;SAVE PREVIOUS COMMAND WORD.
3109  006762  013737  003346  003352                                                    MOV     CMDWRD,P
3110  006770                                        ENDDO
3111  006770  000656                                                                      BR      50010$
3112  006772                                                                                50011$:
3113  006772  004737  014402                         JSR   PC,VFYDAT               ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
3114                                                                                  ;VERIFY THE LAST N RECORDS OF DATA.
3115  006776                                        ENDDO
3116  006776  000646                                                                      BR      50006$
3117  007000                                                                                50007$:
3118  007000                                          LET R2 := #0                  ;SET NORMAL RETURN INDICATOR.
3119  007000  005002                                                                      CLR     R2
3120  007002  000207                         EXARTN: RTS PC                        ;RETURN.
3121
```

```
3122
3123
3124                                    ;       SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
3125                                    ;       ALL INTERRUPTS, AND CHECK ALL STATUS.
3126                                    ;       INPUTS:
3127                                    ;       OUTPUTS:
3128                                    ;       REGISTERS:
3129                                    ;       CALLS:          EXCUTE,GOWAIT,NEXTU,FIRSTU.
3130
3131  007004  004737  015452            EXSUB::     JSR PC,FIRSTU               ;SET UP FOR FIRST UNIT.
3132  007010                              WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3133  007010                                                                      50026$:
3134  007010  026527  002532  177777                                                  CMP     DEVTBL(R
3135  007016  001465                                                                BEQ     50027$
3136  007020                                IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
3137  007020  032737  000400  003346                                                BIT     #MOD.CO,
3138  007026  001421                                                                BEQ     50030$
3139  007030                                  IF #XO.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT
3140  007030  032765  000002  003426                                                BIT     #XO.BOT,
3141  007036  001014                                                                BNE     50031$
3142  007040                                    IF #XO.EOT SETIN EOTFLG(R5) THEN  ;BUT IF AT EOT
3143  007040  032765  000001  003426                                                BIT     #XO.EOT,
3144  007046  001406                                                                BEQ     50032$
3145  007050                                      IFB ALLEOT NE #0 THEN       ;AND ALL OTHERS AT EOT
3146  007050  105737  003450                                                      TSTB    ALLEOT
3147  007054  001402                                                                BEQ     50033$
3148  007056  004737  010326                       JSR PC,EXCUTE               ;THEN EXECUTE REV CMD
3149  007062                                      ENDIF                         ;IF NOT ALL AT EOT, FREEZE UNIT(
3150  007062                                                                      50033$:
3151  007062                                    ELSE                            ;IF NOT AT BOT AND
3152  007062  000402                                                                BR      50034$
3153  007064                                                                      50032$:
3154  007064  004737  010326                     JSR PC,EXCUTE                 ;NOT AT EOT, EXEC REV CM
3155  007070                                    ENDIF
3156  007070                                                                      50034$:
3157  007070                                  ENDIF
3158  007070                                                                      50031$:
3159  007070                              ELSE                        ;ELSE IF CMD IS NOT REVERSE:
3160  007070  000435                                                                BR      50035$
3161  007072                                                                      50030$:
3162  007072                                IF CMDLG EQ #2 AND #XO.BOT SETIN EOTFLG(R5) THEN
3163  007072  023727  003354  000002                                                CMP     CMDLG,#2
3164  007100  001011                                                                BNE     50036$
3165  007102  032765  000002  003426                                                BIT     #XO.BOT,
3166  007110  001405                                                                BEQ     50036$
3167                                                      ;CLEAR BAD SPOT COUNTS WHEN WRITING FROM
3168  007112                                  LET BTPT := BTADDR(R5)
3169  007112  016537  002544  003436                                                MOV     BTADDR(R
3170  007120
3171  007120  005077  174312                     LET @BTPT := #0
3172  007124                                                                        CLR     @BTPT
3173  007124                                  ENDIF
3174  007124                                                                      50036$:
3175  007124  032765  000001  003426            IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
3176  007132  001404                                                                BIT     #XO.EOT,
3177  007134  032737  000001  003346                                                BEQ     50037$
                                                                                    BIT     #CMD.CO,
```

```
007142  001003                                                                                          BNE     50040$
007144                                                                                          50037$:
                                                                        ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
007144  004737  010326                                  JSR PC,EXCUTE     ;ISSUE CMD TO TS04
007150                                                ELSE
007150  000405                                                                                          BR      50041$
007152                                                                                          50040$:
007152                                                  IFB ALLEOT NE #0 THEN
007152  105737  003450                                                                                  TSTB    ALLEOT
007156  001402                                                                                          BEQ     50042$
007160  004737  010326                                    JSR PC,EXCUTE
007164                                                  ENDIF
007164                                                                                          50042$:
007164                                                ENDIF
007164                                                                                          50041$:
007164                                              ENDIF
007164                                                                                          50035$:
007164  004737  015520                              JSR         PC,NEXTU        ;FIND NEXT UNIT IN TEST CYCLE.
007170                                            ENDDO
007170  000707                                                                                          BR      50026$
007172                                                                                          50027$:
007172                                            IFB RPTFLG NE #0 THEN       ;IF REPORT HAS BEEN REQUESTED THEN:
007172  105737  003443                                                                                  TSTB    RPTFLG
007176  001403                                                                                          BEQ     50043$
007200                                              LET RPTFLG :B= #0         ;CLR THE FLAG.
007200  105037  003443                                                                                  CLRB    RPTFLG
007204                                              DORPT                     ;PRINT THE PERFORMANCE REPORT.
007204  104424                                                                                          TRAP    C$DRPT
007206                                            ENDIF                       ;
007206                                                                                          50043$:
007206  004737  015452                            JSR PC,FIRSTU               ;SET UP FOR FIRST UNIT.
007212                                            WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
007212                                                                                          50044$:
007212  026527  002532  177777                                                                          CMP     DEVTBL(R
007220  001450                                                                                          BEQ     50045$
007222                                              IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
007222  032737  000400  003346                                                                          BIT     #MOD.CO,
007230  001421                                                                                          BEQ     50046$
007232                                                IF #XO.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT
007232  032765  000002  003426                                                                          BIT     #XO.BOT,
007240  001014                                                                                          BNE     50047$
007242                                                  IF #XO.EOT SETIN EOTFLG(R5) THEN       ;BUT IF AT EOT
007242  032765  000001  003426                                                                          BIT     #XO.EOT,
007250  001406                                                                                          BEQ     50050$
007252                                                    IFB ALLEOT NE #0 THEN              ;AND ALL OTHERS AT EOT
007252  105737  003450                                                                                  TSTB    ALLEOT
007256  001402                                                                                          BEQ     50051$
007260  004737  010636                                      JSR PC,GOWAIT                    ;THEN WAIT FOR CMD END
007264                                                    ENDIF                              ;IF NOT ALL AT EOT, DO N
007264                                                                                          50051$:
007264                                                  ELSE                                 ;NOT AT BOT, AND NOT AT
007264  000402                                                                                          BR      50052$
007266                                                                                          50050$:
007266  004737  010636                                    JSR PC,GOWAIT                                 ;WAIT FOR INT,CH
007272                                                  ENDIF
007272                                                                                          50052$:
```

```
007272                                   ENDIF
007272                                                                          50047$:
007272                                 ELSE                          ;ELSE IF CMD IS FORWARD:
007272  000420                                                                          BR      50053$
007274                                                                          50046$:
007274                                   IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
007274  032765  000001  003426                                                          BIT     #XO.EOT,
007302  001404                                                                          BEQ     50054$
007304  032737  000001  003346                                                          BIT     #CMD.CO,
007312  001003                                                                          BNE     50055$
007314                                                                          50054$.
                                                             ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
007314  004737  010636                     JSR PC,GOWAIT       ;WAIT FOR INT,CHECK STATUS.
007320                                   ELSE
007320  000405                                                                          BR      50056$
007322                                                                          50055$:
007322                                     IFB ALLEOT NE #0 THEN
007322  105737  003450                                                                  TSTB    ALLEOT
007326  001402                                                                          BEQ     50057$
007330  004737  010636                       JSR PC,GOWAIT
007334                                     ENDIF
007334                                                                          50057$:
007334                                   ENDIF
007334                                                                          50056$:
007334                                 ENDIF
007334                                                                          50053$:
007334  004737  015520                 JSR       PC,NEXTU      ;FIND NEXT UNIT IN TEST CYCLE.
007340                                ENDDO
007340  000724                                                                          BR      50044$
007342                                                                          50045$:
007342  000207                        RTS PC                   ;RETURN.
```

```
                                ;       THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
                                ;       COMMAND IN THE STANDARD ERROR MESSAGE.  ON ENTRY LOCATION CMDWRD
                                ;       CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R3, R4.
                                ;       CALLS:          GCMDA

007344                          CMDAC:: LET R4 := CMDWRD                ;R4 = CMD BINARY.
007344  013704  003346                                                          MOV     CMDWRD,R
007350  004737  007416                  JSR     PC,GCMDA                ;GET CMD ASCII.
007354  112337  005706                  MOVB    (R3)+,STAER1+2          ;MOVE CMD ASCII
007360  112337  005707                  MOVB    (R3)+,STAER1+3          ;
007364  111337  005710                  MOVB    (R3),STAER1+4           ;INTO MSG.
007370                                  LET R4 := PCMDWD                ;R4 = PREVIOUS CMD BINARY.
007370  013704  003352                                                          MOV     PCMDWD,R
007374  004737  007416                  JSR     PC,GCMDA                ;GET CMD ASCII.
007400                                  LET STAER7+24 :B= (R3)+         ;MOVE CMD ASCII
007400  112337  006022                                                          MOVB    (R3)+,ST
007404                                  LET STAER7+25 :B= (R3)+         ;
007404  112337  006023                                                          MOVB    (R3)+,ST
007410                                  LET STAER7+26 :B= (R3)          ;INTO MSG.
007410  111337  006024                                                          MOVB    (R3),STA
007414  000207                          RTS     PC                      ;RETURN, GO EXECUTE NEXT FUNCTION.


                                ;       SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
                                ;       ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
                                ;       INPUTS:         R4 = PRESENT COMMAND WORD.
                                ;       OUTPUTS:        R3 = ADDRESS OF PRESENT COMMAND ASCII.
                                ;       REGISTERS:
                                ;       CALLS:

007416                          GCMDA:: LET R3 := #0                    ;INIT CMD TBL POINTER.
007416  005003                                                          CLR     R3
007420                                  WHILE CMDTBL(R3) NE R4 DO       ;UNTIL CURRENT CMD IS FOUND:
007420                                                                  50060$:
007420  026304  003562                                                  CMP     CMDTBL(R
007424  001403                                                          BEQ     50061$
007426                                    LET R3 := R3 + #2             ;SEARCH CMD TABLE.
007426  062703  000002                                                  ADD     #2,R3
007432                                  ENDDO
007432  000772                                                          BR      50060$
007434                                                                  50061$:
007434                                  LET R4 := R3
007434  010304                                                          MOV     R3,R4
007436                                  LET R3 := R3 SHIFT -1           ;POINT TO ASCII FOR THAT COMMAND
007436  006203                                                          ASR     R3
007440  000240                          NOP
007442  060403                          ADD     R4,R3
007444  062703  003650                  ADD     #CMDASC,R3
007450  000207                          RTS     PC                      ;RETURN.
```

```
3318                                    ;       THIS SUBROUTINE LOADS THE TS04 COMMAND PACKET FROM ONE
3319                                    ;       ENTRY IN THE SEQUENCE TABLE.
3320                                    ;       INPUTS:
3321                                    ;       OUTPUTS:
3322                                    ;       REGISTERS:      R2, R3.
3323                                    ;       CALLS:          GENPAT.
3324
3325  007452                            SETUP:: LET CMDLG := #0                 ;CLR CMD LOGGING CODE(DISABLES LOGGING)
3326  007452  005037  003354                                                                  CLR     CMDLG
3327  007456  012137  002310                   MOV     (R1)+,CMDPKT            ;LOAD THE COMMAND WORD.
3328  007462  011137  002316                   MOV     (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
3329  007466  011137  003344                   MOV     (R1),BRFCNT             ;SAVE BRF FOR THIS COMMAND.
3330  007472  013702  002310                   MOV     CMDPKT,R2               ;GET CMD.
3331  007476  042702  177740                   BIC     #NCMD.C,R2              ;CLR ALL BUT CMD BITS.
3332  007502  010203                           MOV     R2,R3                   ;SAVE IT TWICE.
3333  007504  162703  000010                   SUB     #CMD.C3,R3              ;POSITION COMMAND?
3334  007510  001003                           BNE     2$                      ;BR IF NOT.
3335  007512  011137  002312                   MOV     (R1),CMDPKT+2           ;MOVE BPCR IN 2ND PKT WORD FOR POSITION
3336  007516  000461                           BR      3$
3337  007520                            2$:     IF CMDPKT EQ #WTM THEN          ;IF CMD IS A WRITE TAPE MARK THEN:
3338  007520  023727  002310  100011                                                          CMP     CMDPKT,#
3339  007526  001003                                                                         BNE     50062$
3340  007530                                    LET CMDLG := #2                   ;WTM LOGGING CODE IS 2.
3341  007530  012737  000002  003354                                                          MOV     #2,CMDLG
3342  007536                                    ENDIF
3343  007536                                                                                50062$:
3344  007536  010203                           MOV     R2,R3
3345  007540  162703  000001                   SUB     #CMD.C0,R3              ;IS IT A READ?
3346  007544  001017                           BNE     1$                      ;BR IF NOT.
3347  007546  013737  003356  002312           MOV     DATARD,CMDPKT+CP.ADL    ;IF SO, LOAD THE BUFFER ADDR.
3348  007554                                    IF #MOD.C0 SETIN CMDPKT THEN    ;IF CMD IS A READ REV THEN:
3349  007554  032737  000400  002310                                                          BIT     #MOD.C0,
3350  007562  001404                                                                         BEQ     50063$
3351  007564                                    LET CMDLG := #4                   ;LOGGING CODE IS 4.
3352  007564  012737  000004  003354                                                          MOV     #4,CMDLG
3353  007572                                    ELSE                            ;ELSE - IF CMD IS A READ FWD:
3354  007572  000403                                                                         BR      50064$
3355  007574                                                                                50063$:
3356  007574                                    LET CMDLG := #6                   ;LOGGING CODE IS 6.
3357  007574  012737  000006  003354                                                          MOV     #6,CMDLG
3358  007602                                    ENDIF
3359  007602                                                                                50064$:
3360  007602  000427                           BR      3$                      ;CONTINUE.
3361  007604  010203                    1$:    MOV     R2,R3                   ;IS IT
3362  007606  162703  000004                   SUB     #CMD.C2,R3              ;A SET CHARACTERISTICS CMD?
3363  007612  001011                           BNE     4$                      ;BR IF NOT.
3364  007614                                    LET CMDPKT+CP.ADL := #SCHBK     ;SET UP ADR LO FOR SET CHAR.
3365  007614  012737  002442  002312                                                          MOV     #SCHBK,C
3366  007622  012737  000010  002316           MOV     #SCHCNT,CMDPKT+CP.CNT   ;SET BUFFER EXTENT
3367  007630                                    LET SCHBK+6 := (R1)             ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
3368  007630  011137  002450                                                                  MOV     (R1),SCH
3369  007634  000412                           BR      3$                      ;CONTINUE.
3370  007636  010203                    4$:    MOV     R2,R3                   ;IS IT
3371  007640  162703  000006                   SUB     #CMD.C1!CMD.C2,R3       ;A DIAGNOSTIC (DIA) CMD?
3372  007644  001006                           BNE     5$                      ;BR IF NOT.
3373  007646  012737  000020  002316           MOV     #DIACNT,CMDPKT+CP.CNT   ;LOAD BUFFER EXTENT.
```

```
3374  007654  012737  003334  002312          MOV     #DIABLK,CMDPKT+CP.ADL   ;LOAD BUFFER ADR LOW.
3375  007662  005721                  3$:     TST     (R1)+                   ;POINT TO N (NUMBER OF TIMES TO EXECUTE
3376  007664                                  LET NCNT1 := (R1)+              ;SAVE NUMBER OF OPERATIONS
3377  007664  012137  003342                                                  MOV     (R1)+,NC
3378  007670                                  LET NCNT := #0                  ;CLEAR OPERATION COUNTER.
3379  007670  005037  003340                                                  CLR     NCNT
3380  007674  012137  003374                  MOV     (R1)+,PATERN            ;SAVE PATTERN CODE FOR CURRENT CMD.
3381  007700  010203                          MOV     R2,R3                   ;IS IT
3382  007702  162703  000005                  SUB     #CMD.CO!CMD.C2,R3       ;A WRITE?
3383  007706  001010                          BNE     5$                      ;BR IF NOT.
3384  007710  013737  003334  002312          MOV     DATAWT,CMDPKT+CP.ADL    ;LOAD WRITE BUFFER LO ORDER.
3385  007716  004737  010030                  JSR     PC,GENPAT               ;GO GENERATE THE WRITE PATTERN.
3386  007722                                  LET CMDLG := #2                 ;WRITE LOGGING CODE IS 2.
3387  007722  012737  000002  003354                                          MOV     #2,CMDLG
3388  007730                          5$:     IF #VFY.C SETIN CMDPKT THEN     ;IF DATA VERIFICATION IS REQUIRED:
3389  007730  032737  000100  002310                                          BIT     #VFY.C,C
3390  007736  001407                                                          BEQ     50065$
3391  007740                                    LET VFYFLG :B= #1             ;SET VERIFY FLAG.
3392  007740  112737  000001  003442                                          MOVB    #1,VFYFL
3393  007746  042737  000100  002310            BIC   #VFY.C,CMDPKT           ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
3394  007754                                  ELSE                            ;IF DATA VERIFICATION IS NOT REQUIRED:
3395  007754  000402                                                          BR      50066$
3396  007756                                                          50065$:
3397  007756                                    LET VFYFLG :B= #0             ;CLR VERIFY FLAG.
3398  007756  105037  003442                                                  CLRB    VFYFLG
3399  007762                                  ENDIF
3400  007762                                                          50066$:
3401  007762                                  LET PCMDWD := CMDWRD            ;SAVE PREVIOUS CMD WORD.
3402  007762  013737  003346  003352                                          MOV     CMDWRD,P
3403  007770                                  LET CMDWRD := CMDPKT            ;SAVE PRESENT CMD WORD.
3404  007770  013737  002310  003346                                          MOV     CMDPKT,C
3405  007776                                  IFB SWBFLG NE #0 THEN           ;IF SWAP BYTES IS ENABLED:
3406  007776  105737  003444                                                  TSTB    SWBFLG
3407  010002  001403                                                          BEQ     50067$
3408  010004                                    LET CMDPKT := CMDPKT SET.BY #SWB.C  ;SET SWAP BIT IN COMMAND.
3409  010004  052737  010000  002310                                          BIS     #SWB.C,C
3410  010012                                  ENDIF
3411  010012                                                          50067$:
3412  010012  042737  004000  002310          BIC     #BRF.C,CMDPKT           ;CLR BRF BIT (INTERNAL ONLY).
3413  010020                                  LET CMDSAV := CMDPKT             ;SAVE 1ST WORD OF COMMAND PACKET.
3414  010020  013737  002310  003350                                          MOV     CMDPKT,C
3415  010026  000207                          RTS     PC                      ;RETURN.
```

```
3416                                    ;       THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERAT
3417                                    ;       THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
3418                                    ;       INPUTS:
3419                                    ;       OUTPUTS:
3420                                    ;       REGISTERS:      R2, R3, R4.
3421                                    ;       CALLS:          PATR0 - PATR7
3422
3423  010030                            GENPAT:: LET R3 := PATERN SHIFT 1       ;SETUP PATTERN ROUTINE POINTER
3424  010030  013703  003374                                                                  MOV     PATERN,R
3425  010034  006303                                                                          ASL     R3
3426  010036                                    LET R4 := BRFCNT + #1   ;SET LENGTH OF WRITE BFR
3427  010036  013704  003344                                                                  MOV     BRFCNT,R
3428  010042  005204                                                                          INC     R4
3429  010044                                    LET R4 := R4 CLR.BY #1  ;ROUNDED UP TO NEXT WORD
3430  010044  042704  000001                                                                  BIC     #1,R4
3431  010050                                    LET R4 := R4 - #2       ;WITH FIRST WORD RESERVED
3432  010050  162704  000002                                                                  SUB     #2,R4
3433  010054                                    LET R2 := DATAWT * #2   ;FOR RECORD COUNT
3434  010054  013702  003334                                                                  MOV     DATAWT,R
3435  010060  062702  000002                                                                  ADD     #2,R2
3436  010064  004773  010072                   JSR     PC,@PATTBL(R3)  ;GO GENERATE THE APPROPRIATE PATTERN.
3437  010070  000207                           RTS     PC              ;RETURN TO SETUP SUBROUTINE.
3438
3439                                    ;TSO4 WRITE PATTERN LOOKUP TABLE.  USED TO JSR TO THE
3440                                    ;CORRECT DATA PATTERN GENERATING ROUTINE.
3441
3442  010072  010114                    PATTBL: PATR0
3443  010074  010152                            PATR1
3444  010076  010172                            PATR2
3445  010100  010202                            PATR3
3446  010102  010226                            PATR4
3447  010104  010240                            PATR5
3448  010106  010252                            PATR6
3449  010110  010272                            PATR7
3450  010112  010324                            PATR8
3451
3452
3453                                    ;INCREMENTING PATTERN.  0 - 377.
3454
3455  010114                            PATR0:: LET R3 := #400
3456  010114  012703  000400                                                                  MOV     #400,R3
3457  010120                            1$:     LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
3458  010120  162704  000002                                                                  SUB     #2,R4
3459  010124  100411                           BMI     2$              ;BR IF DONE.
3460  010126                                    LET (R2)+ := R3         ;STORE DATA WORD.
3461  010126  010322                                                                          MOV     R3,(R2)+
3462  010130                                    LET R3 := R3 + #1002    ;UPDATE PATTERN.
3463  010130  062703  001002                                                                  ADD     #1002,R3
3464  010134                                    IF R3 EQ #1000 THEN     ;IF PATTERN HAS WRAPPED AROUND THEN:
3465  010134  020327  001000                                                                  CMP     R3,#1000
3466  010140  001002                                                                          BNE     500$
3467  010142                                      LET R3 := #400          ;INIT THE PATTERN AGAIN.
3468  010142  012703  000400                                                                  MOV     #400,R3
3469  010146                                    ENDIF
3470  010146                                                                          500$:
3471  010146  000764                           BR      1$              ;DO IT AGAIN.
```

F7


```
3472  010150  000207                    2$:     RTS     PC              ;RETURN.
3473
3474                                      ;ALL ONE'S PATTERN.
3475
3476  010152  012703  177777            PATR1:: MOV     #-1,R3          ;ALL ONES PATTERN;.
3477  010156                            ZROPAT: LET R4 := R4 - #2       ;DECREMENT BYTE COUNT.
3478  010156  162704  000002                                                             SUB     #2,R4
3479  010162  100402                            BMI     1$              ;DONE?,BR IF YES.
3480  010164  010322                            MOV     R3,(R2)+        ;IF NOT LOAD NEXT BYTE WITH PATTERN.
3481  010166  000773                            BR      ZROPAT          ;DO IT AGAIN.
3482
3483  010170  000207                    1$:     RTS     PC              ;RETURN.
```

```
3484                                            ;ALL ZEROES PATTERN.
3485
3486  010172  005003                    PATR2:: CLR     R3              ;CLR PATTERN REGISTER.
3487  010174  004737  010156                    JSR     PC,ZROPAT       ;GO GENERATE IT.
3488  010200  000207                            RTS     PC              ;RETURN.
3489
3490                                            ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
3491
3492  010202  012703  000401            PATR3:: MOV     #401,R3         ;INIT PATTERN REGISTER.
3493  010206                            WLKZRO: LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
3494  010206  162704  000002                                                                     SUB     #2,R4
3495  010212  100404                            BMI     1$              ;BR IF DONE.
3496  010214  010322                            MOV     R3,(R2)+        ;LOAD DATA.
3497  010216  006303                            ASL     R3              ;SHIFT PATTERN.
3498  010220  005503                            ADC     R3              ;ADD CARRY BACK INTO PATTERN.
3499  010222  000771                            BR      WLKZRO          ;DO IT AGAIN.
3500  010224  000207                    1$:     RTS     PC              ;RETURN.
3501
3502                                            ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
3503
3504  010226  012703  177376            PATR4:: MOV     #177376,R3      ;INIT PATTERN REGISTER.
3505  010232  004737  010206                    JSR     PC,WLKZRO       ;GO GENERATE ;IT.
3506  010236  000207                            RTS     PC              ;RETURN.
3507
3508                                            ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
3509                                            ;COMPLEMENTED.
3510
3511  010240  012703  125125            PATR5:: MOV     #125125,R3      ;INIT PATTERN REGISTER.
3512  010244  004737  010156                    JSR     PC,ZROPAT       ;GO GENERATE IT.
3513  010250  000207                            RTS     PC              ;RETURN.
3514
3515                                            ;ALTERNATING BYTES OF 000 AND 377.
3516
3517  010252  012703  177400            PATR6:: MOV     #177400,R3      ;INIT PATTERN REGISTER.
3518  010256                            1$:     LET R4 := R4 - #2       ;DECREMENT WORD COUNT.
3519  010256  162704  000002                                                                     SUB     #2,R4
3520  010262  100402                            BMI     2$              ;BR IF DONE.
3521  010264  010322                            MOV     R3,(R2)+        ;LOAD DATA.
3522  010266  000773                            BR      1$              ;DO IT AGAIN.
3523  010270  000207                    2$:     RTS     PC              ;RETURN.
3524
3525                                            ;RANDOM PATTERN GENERATOR
3526
3527  010272                            PATR7:: LET R4 := R4 - #2       ;DECREMENT WORD COUNT
3528  010272  162704  000002                                                                     SUB     #2,R4
3529  010276  100411                            BMI     GIT             ;BR IF DONE.
3530  010300  063737  003362  003360            ADD     RANS,RANB
3531  010306  063737  003360  003362            ADD     RANB,RANS       ;GET NEW #.
3532  010314  013722  003362                    MOV     RANS,(R2)+      ;SAVE #.
3533  010320  000764                            BR      PATR7           ;CONTINUE.
3534  010322  000207                    GIT:    RTS     PC              ;RETURN
3535
3536                                            ;       NO PATTERN GENERATION.
3537
3538  010324  000207                    PATR8:: RTS     PC              ;RETURN.
```

```
                                        ;       THIS SUBROUTINE INITIATES TS04 COMMAND EXECUTION
                                        ;       AND CHECKS FOR TS04 RESPONSE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2, R3.
                                        ;       CALLS:          DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.

010326                                  EXCUTE:: LET TIME1 := #-1               ;INIT TIMEOUT COUNTER.
010326  012737  177777  003364                                                          MOV     #-1,TIME
010334                                          REPEAT                          ;WAIT -
010334                                                                                  50071$:
010334                                            LET TIME1 := TIME1 - #1       ;UPDATE TIMEOUT COUNTER.
010334  005337  003364                                                                  DEC     TIME1
010340                                            IF TIME1 EQ #0 THEN           ;IF TIMED OUT:
010340  005737  003364                                                                  TST     TIME1
010344  001011                                                                        BNE     50072$
010346  004737  011224                                JSR PC,MOVMSG               ;MOVE CURRENT PACKET MSG.
010352                                              ERRDF #2,NSSRM,STAERM         ;REPORT TS04 NOT READY
010352  104455                                                                        TRAP    C$ERDF
010354  000002                                                                      .WORD   2
010356  004271                                                                      .WORD   NSSRM
010360  005372                                                                      .WORD   STAERM
010362  004737  015554                                JSR PC,DROPU                ;DROP THE UNIT.
010366  000522                                      BR  EXCRTN                    ;RETURN.
010370                                            ENDIF
010370                                                                                  50072$:
010370                                          UNTIL #TS.SSR SETIN @TSSR(R5)   ;WAIT UNTIL DEVICE IS READY.
010370  032775  000200  002462                                                          BIT     #TS.SSR,
010376  001756                                                                        BEQ     50071$
010400                                  IF CMD IRD EQ #SCH THEN         ;IF WE ARE DOING A SET CHAR CMD THEN:
010400  023727  003346  140004                                                          CMP     CMDWRD,#
010406  001022                                                                        BNE     50073$
010410                                    LET R5SAVE := R5                ;SAVE CURRENT DEVICE POINTER.
010410  010537  003400                                                                  MOV     R5,R5SAV
010414  004737  015452                    JSR   PC,FIRSTU                 ;FIND FIRST UNIT.
010420                                    WHILE DEVTBL(R5) NE #END DO
010420                                                                                  50074$:
010420  026527  002532  177777                                                          CMP     DEVTBL(R
010426  001405                                                                        BEQ     50075$
010430  004737  011170                      JSR PC,WSSR                     ;WAIT FOR UNIT READY OR TIME OUT.
010434  004737  015520                      JSR PC,NEXTU                    ;FIND NEXT UNIT.
010440                                    ENDDO
010440  000767                                                                        BR      50074$
010442                                                                                  50075$:
010442                                    LET R5 := R5SAVE                ;RESTORE CURRENT DEVICE POINTER.
010442  013705  003400                                                                  MOV     R5SAVE,R
010446                                    LET SCHBK := MSGPKA(R5)         ;SET UP ADR OF MSG PKT IN SCH BLOCK.
010446  016537  002502  002442                                                          MOV     MSGPKA(R
010454                                  ENDIF
010454                                                                                  50073$:
010454                                  LET R3 := MSGPKA(R5)            ;ADR OF THIS UNIT'S MSG PACKET.
010454  016503  002502                                                                  MOV     MSGPKA(R
010460                                  LET R2 := #0                    ;CLR COUNTER.
010460  005002                                                                        CLR     R2
010462                                  WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
010462                                                                                  50076$:
```

```
3595  010462  020227  000016                                                                    CMP     R2,#MSGC
3596  010466  001405                                                                            BEQ     50077$
3597  010470                                  LET (R3)+ := #-1          ;INIT THE MSG PACKET WITH ALL 1'S
3598  010470  012723  177777                                                                    MOV     #-1,(R3)
3599  010474                                  LET R2 := R2 + #2         ;UPDATE COUNTER.
3600  010474  062702  000002                                                                    ADD     #2,R2
3601  010500                                ENDDO
3602  010500  000770                                                                            BR      50076$
3603  010502                                                                                 50077$:
3604  010502  105737  002210                TSTB    DINT              ;ARE INTERRUPTS DISABLED.
3605  010506  001023                        BNE     1$                ;BR IF YES.
3606  010510                                IFB INTFLG(R5) GT #1 THEN ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
3607  010510  126527  003416  000001                                                            CMPB    INTFLG(R
3608  010516  003412                                                                            BLE     50100$
3609  010520                                  LET TSSREG := @TSSR(R5)         ;FREEZE THE CURRENT STATUS REG F
3610  010520  017537  002462  003402                                                            MOV     @TSSR(R5
3611  010526                                  ERRDF #15,TOOMM,STAERM  ;REPORT TOO MANY INTERRUPTS.
3612  010526  104455                                                                            TRAP    C$ERDF
3613  010530  000017                                                                            .WORD   15
3614  010532  004460                                                                            .WORD   TOOMM
3615  010534  005372                                                                            .WORD   STAERM
3616  010536  004737  015554                  JSR PC,DROPU            ;DROP THE UNIT
3617  010542  000434                          BR  EXCRTN              ;RETURN - UNIT HAS BEEN DROPPED.
3618  010544                                ENDIF
3619  010544                                                                                 50100$:
3620  010544                                LET INTFLG(R5) := #0      ;CLR INTERRUPT FLAG FOR THIS DEV.
3621  010544  005065  003416                                                                    CLR     INTFLG(R
3622  010550  052737  000200  002310        BIS     #IE.C,CMDPKT      ;SET INT ENABLE BIT.
3623  010556                          1$:   IFB ERRREC EQ #0 THEN     ;IF NOT RETRYING
3624  010556  105737  003415                                                                    TSTB    ERRREC
3625  010562  001005                                                                            BNE     50101$
3626  010564                                  LET RECCNT(R5) := RECCNT(R5) + #1
3627  010564  005265  003324                                                                    INC     RECCNT(R
3628  010570                                  LET @DATAWT := RECCNT(R5)     ;THEN UPDATE REC COUNT TO WRITE IT ON TA
3629  010570  016577  003324  172536                                                            MOV     RECCNT(R
3630  010576                                ENDIF
3631  010576                                                                                 50101$:
3632  010576  012775  002310  002452        MOV     #CMDPKT,@TSDB(R5) ;LOAD TSDB WITH CMDPKT ADDRESS
3633                                                                  ;THIS INITIATES COMMAND EXECUTION.
3634  010604                                IF #TS.SSR SETIN @TSSR(R5) THEN ;IF READY DID NOT DROP THEN:
3635  010604  032775  000200  002462                                                            BIT     #TS.SSR,
3636  010612  001410                                                                            BEQ     50102$
3637  010614  004737  011224                  JSR   PC,MOVMSG             ;MOVE CURRENT MESSAGE PACKET TO COMMON
3638  010620                                  ERRDF #3,TOERM,STAERM       ;REPORT NO TS04 RESPONSE.
3639  010620  104455                                                                            TRAP    C$ERDF
3640  010622  000003                                                                            .WORD   3
3641  010624  004207                                                                            .WORD   TOERM
3642  010626  005372                                                                            .WORD   STAERM
3643  010630  004737  015554                  JSR PC,DROPU              ;DROP THE UNIT
3644  010634                                ENDIF
3645  010634                                                                                 50102$:
3646  010634  000207                  EXCRTN: RTS     PC                ;RETURN.
```

```
                        ;       THIS SUBROUTINE WAITS FOR THE TS04 INERRUPT OR DONE BIT TO SET AND ALLOW
                        ;       OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
                        ;       UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
                        ;       LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
                        ;       INPUTS:
                        ;       OUTPUTS:
                        ;       REGISTERS:      R2, R3.
                        ;       CALLS:          DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.

010634                  GOWAIT::IF DEVTBL(R5) EQ #NINUSE THEN   ;BTL
010636  026527  002532  177774                                                  CMP     DEVTBL(R
010644  001003                                                                  BNE     50103$
010646  000137  011152          JMP 1$                          ;BTL
010652                  ELSE                                    ;BTL
010652  000400                                                                  BR      50104$
010654                                                                  50103$:
010654                  ENDIF                                   ;BTL
010654                                                                  50104$:
010654                  LET TIME1 := #-1                        ;INIT TIME OUT COUNTER.
010654  012737  177777  003364                                                  MOV     #-1,TIME
010662                  REPEAT                                  ;REPEAT UNTIL INTERRUPT OCCURES:
010662                                                                  50105$:
010662                    BREAK                                 ;GO TO THE SUPER TO ALLOW TTY INPUT.
010662  104422                                                                  TRAP    C$BRK
010664                    IF CMDWRD EQ #RWD THEN                ;IF COMMAND WAS REWIND THEN:
010664  023727  003346  102010                                                  CMP     CMDWRD,#
010672  001014                                                                  BNE     50106$
010674                      DELAY 10.                           ;WAIT  EXTRA MSECS EACH LOOP.
010674  012727  000012                                                          MOV     #10.,(PC
010700  000000                                                                  .WORD   0
010702  013727  002116                                                          MOV     L$DLY,(P
010706  000000                                                                  .WORD   0
010710  005367  177772                                                          DEC     -6(PC)
010714  001375                                                                  BNE     .-4
010716  005367  177756                                                          DEC     -22(PC)
010722  001367                                                                  BNE     .-20
010724                    ENDIF
010724                                                                  50106$:
010724                    IF CMDWRD EQ #SFF OR CMDWRD EQ #SFR THEN
010724  023727  003346  105010                                                  CMP     CMDWRD,#
010732  001404                                                                  BEQ     50107$
010734  023727  003346  105410                                                  CMP     CMDWRD,#
010742  001014                                                                  BNE     50110$
010744                                                                  50107$:
010744                      DELAY 12.                           ;ADD DELAY FOR SPACE TAPE MARK COMMANDS
010744  012727  000014                                                          MOV     #12.,(PC
010750  000000                                                                  .WORD   0
010752  013727  002116                                                          MOV     L$DLY,(P
010756  000000                                                                  .WORD   0
010760  005367  177772                                                          DEC     -6(PC)
010764  001375                                                                  BNE     .-4
010766  005367  177756                                                          DEC     -22(PC)
010772  001367                                                                  BNE     .-20
010774                    ENDIF
010774                                                                  50110$:
010774                  IFB DINT EQ #0 THEN                     ;IF INTERRUPTS ARE ENABLED.
```

```
3703  010774  105737  002210                                                    TSTB    DINT
3704  011000  001003                                                            BNE     50111$
3705  011002                    LET R2 := INTFLG(R5)        ;FETCH INTERRUPT OCCURRED FLAG.
3706  011002  016502  003416                                                    MOV     INTFLG(R
3707  011006                  ELSE                          ;IF IN BRUTUS MODE:
3708  011006  000406                                                            BR      50112$
3709  011010                                                              50111$:
3710  011010                    LET R3 := COMP #TS.SSR      ;SET UP A MASK FOR THE DONE BIT.
3711  011010  012703  000200                                                    MOV     #TS.SSR,
3712  011014  005103                                                            COM     R3
3713  011016                    LET R2 := @TSSR(R5) CLR.BY R3  ;FETCH DONE BIT.
3714  011016  017502  002462                                                    MOV     @TSSR(R5
3715  011022  040302                                                            BIC     R3,R2
3716  011024                  ENDIF
3717  011024                                                              50112$:
3718  011024                  LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
3719  011024  005337  003364                                                    DEC     TIME1
3720  011030                UNTIL R2 NE #0 OR TIME1 EQ #0  ;REPEAT UNTIL INTERRUPT OR READY OCCURES
3721  011030  005702                                                            TST     R2
3722  011032  001003                                                            BNE     50113$
3723  011034  005737  003364                                                    TST     TIME1
3724  011040  001310                                                            BNE     50105$
3725  011042                                                              50113$:
3726  011042                IF TIME1 EQ #0 THEN           ;IF TIME OUT HAS OCCURRED:
3727  011042  005737  003364                                                    TST     TIME1
3728  011046  001022                                                            BNE     50114$
3729  011050                  LET @DATAWT := RECCNT(R5) - #1 ;RE-ADJUST REC COUNT DOWN
3730  011050  016577  003324  172256                                            MOV     RECCNT(R
3731  011056  005377  172252                                                    DEC     @DATAWT
3732  011062  004737  011224                JSR   PC,MOVMSG             ;MOVE CURRENT MSG PACKET TO COMMON AREA.
3733  011066                                ERRDF #4,NOINTM,STAERM        ;REPORT NO INTERRUPT.
3734  011066  104455                                                            TRAP    C$ERDF
3735  011070  000004                                                            .WORD   4
3736  011072  004421                                                            .WORD   NOINTM
3737  011074  005372                                                            .WORD   STAERM
3738  011076  004737  015554                JSR PC,DROPU          ;DROP THE UNIT.
3739  011102                                LET R3 := #ENDERF
3740  011102  012703  003416                                                    MOV     #ENDERF,
3741  011106  004737  011154                JSR PC,CLRERR               ;CLEAR ALL ERROR FLAGS
```

```
3742
3743  011112                                    ELSE
3744  011112  000417                                                        BR      50115$
3745  011114                                                            50114$:
3746  011114  004737  011224                      JSR   PC,MOVMSG       ;MOVE CURRENT MSG. PACKET TO COMMON AREA
3747  011120  004737  011310                      JSR   PC,RECUD        ;UPDATE THE RECORD COUNT.
3748  011124  004737  011456                      JSR   PC,CHKERR       ;CHECK FOR STATUS ERRORS.
3749  011130                                      IFB WRTYFG EQ #0 THEN ;
3750  011130  105737  003407                                            TSTB    WRTYFG
3751  011134  001006                                                    BNE     50116$
3752  011136  004737  014102                        JSR PC,LOG          ;LOG BYTES AND ERRORS.
3753  011142                                        LET R3 := #ENDERF
3754  011142  012703  003416                                            MOV     #ENDERF,
3755  011146  004737  011154                        JSR PC,CLRERR       ;CLEAR ALL ERROR FLAGS
3756  011152                                      ENDIF
3757  011152                                                            50116$:
3758  011152                                    ENDIF
3759  011152                                                            50115$:
3760  011152  000207                      1$:    RTS     PC            ;RETURN IF DONE.
```

```
3761                                    ;       SUBROUTINE TO CLEAR FLAGS.
3762                                    ;       INPUTS:         R3 = LWA TO BE CLEARED + 2.
3763                                    ;       OUTPUTS:
3764                                    ;       REGISTERS:      R2
3765                                    ;       CALLS:
3766
3767  011154                            CLRERR:: LET R2 := #BGNFLG
3768  011154  012702  003404                                                        MOV     #BGNFLG,
3769  011160                                    REPEAT
3770  011160                                                                  50117$:
3771  011160                                      LET (R2)+ := #0
3772  011160  005022                                                                CLR     (R2)+
3773  011162                                    UNTIL R2 EQ R3
3774  011162  020203                                                                CMP     R2,R3
3775  011164  001375                                                                BNE     50117$
3776  011166  000207                           RTS PC
3777
3778
3779
3780                                    ;       SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
3781                                    ;       INPUTS:
3782                                    ;       OUTPUTS:
3783                                    ;       REGISTERS:
3784                                    ;       CALLS:
3785
3786  011170                            WSSR::  LET TIME1 := #-1                ;INIT TIMEOUT COUNTER.
3787  011170  012737  177777  003364                                                MOV     #-1,TIME
3788  011176                                    REPEAT                          ;REPEAT UNTIL DEV READY OR TIMEOUT:
3789  011176                                                                  50120$:
3790  011176                                      BREAK                           ;BREAK TO THE SUPERVISOR.
3791  011176  104422                                                                TRAP    C$BRK
3792  011200                                      LET TIME1 := TIME1 - #1         ;UPDATE TIMEOUT COUNTER.
3793  011200  005337  003364                                                        DEC     TIME1
3794  011204                                    UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
3795  011204  032775  000200  002462                                                BIT     #TS.SSR,
3796  011212  001003                                                                BNE     50121$
3797  011214  005737  003364                                                        TST     TIME1
3798  011220  001366                                                                BNE     50120$
3799  011222                                                                  50121$:
3800                                                                          ;REPEAT UNTIL DEV READY OR TIMEOUT.
3801  011222  000207                           RTS PC                          ;RETURN.
3802
3803
```

```
3804
3805                                    ;       SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
3806                                    ;       TO UPDATE THE CURRENT TERMINATION CLASS CODE.
3807                                    ;       INPUTS:
3808                                    ;       OUTPUTS:
3809                                    ;       REGISTERS:      R2, R3.
3810                                    ;       CALLS:
3811
3812  011224                            MOVMSG:: LET TSSREG := @TSSR(R5)        ;FREEZE THE STATUS REG CONTENTS
3813  011224  017537  002462  003402                                                          MOV     @TSSR(R5
3814  011232                                    LET R2 := TSSREG CLR.BY #TSC.TCC ;EXTRACT THE TERMINATION CLASS CODE,
3815  011232  013702  003402                                                                 MOV     TSSREG,R
3816  011236  042702  177761                                                                 BIC     #TSC.TCC
3817  011242                                    LET CTCC := R2 SHIFT -1         ;AND SAVE IT
3818  011242  010237  003376                                                                 MOV     R2,CTCC
3819  011246  006237  003376                                                                 ASR     CTCC
3820  011252                                    LET R3 := MSGPKA(R5)            ;ADR OF THIS DEVICE'S MSG.
3821  011252  016503  002502                                                                 MOV     MSGPKA(R
3822  011256                                    LET R2 := #0                    ;CLR COUNTER.
3823  011256  005002                                                                         CLR     R2
3824  011260                                    WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
3825  011260                                                                                50122$:
3826  011260  020227  000016                                                                 CMP     R2,#MSGC
3827  011264  001405                                                                         BEQ     50123$
3828  011266                                      LET MSGPKT(R2) := (R3)+       ;MOVE MSG TO COMMON AREA.
3829  011266  012362  002334                                                                 MOV     (R3)+,MS
3830  011272                                      LET R2 := R2 + #2             ;UPDATE COUNTER.
3831  011272  062702  000002                                                                 ADD     #2,R2
3832  011276                                    ENDDO
3833  011276  000770                                                                         BR      50122$
3834  011300                                                                                50123$:
3835  011300                                    LET EOTFLG(R5) := MSGPKT+MS.XS0 ;MOVE XSTATO TO EOT FLAG.
3836  011300  013765  002342  003426                                                         MOV     MSGPKT+M
3837  011306  000207                            RTS     PC
```

```
                                        ;       SUBROUTINE TO ADJUST THE RECORD COUNT.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

011310                                  RECUD:: IFB RECLOG EQ #0 THEN           ;IF RECORD HAS NOT BEEN LOGGED:
011310  105737  003411                                                                  TSTB    RECLOG
011314  001057                                                                        BNE     50124$
011316                                    LET RECCNT(R5) := RECCNT(R5) - #1
011316  005365  003324                                                              DEC     RECCNT(R
011322                                    IF #BITO NOTSETIN CTCC AND #X2.OPM SETIN MSGPKT+MS.XS2 THEN   ;IF TAPE
011322  032737  000001  003376                                                          BIT     #BITO.CT
011330  001046                                                                        BNE     50125$
011332  032737  100000  002346                                                          BIT     #X2.OPM,
011340  001442                                                                        BEQ     50125$
011342                                      LET RECLOG :B= RECLOG + #1  ;SET RECORD LOGGED,
011342  105237  003411                                                              INCB    RECLOG
011346                                      IF CMDWRD EQ #RWD THEN      ;IF THIS IS A REWIND CMD:
011346  023727  003346  102010                                                          CMP     CMDWRD,#
011354  001003                                                                        BNE     50126$
011356                                        LET RECCNT(R5) := #0       ;CLEAR RECORD COUNT,
011356  005065  003324                                                              CLR     RECCNT(R
011362                                      ELSE
011362  000431                                                                      BR      50127$
011364                                                                          50126$:
011364                                        IF #BRF.C SETIN CMDWRD THEN       ;IF BRF USED, UPDATE RECORD COUN
011364  032737  004000  003346                                                          BIT     #BRF.C,C
011372  001425                                                                        BEQ     50130$
011374                                          IF #MOD.CO NOTSETIN CMDWRD THEN  ;IF A FORWARD CMD:
011374  032737  000400  003346                                                          BIT     #MOD.CO,
011402  001007                                                                        BNE     50131$
011404                                            IF #MOD.CO NOTSETIN PCMDWD THEN  ;IF PREV CMD WAS A FWD ALSO:
011404  032737  000400  003352                                                          BIT     #MOD.CO,
011412  001002                                                                        BNE     50132$
011414                                              LET RECCNT(R5) := RECCNT(R5) + #1  ;INCREMENT RECORD COUNT.
011414  005265  003324                                                              INC     RECCNT(R
011420                                            ENDIF
011420                                                                          50132$:
011420                                          ELSE                        ;IF REVERSE CMD:
011420  000412                                                                      BR      50133$
011422                                                                          50131$:
011422                                            IF #MOD.CO SETIN PCMDWD THEN  ;IF PREVIOUS CMD WAS A REV ALSO:
011422  032737  000400  003352                                                          BIT     #MOD.CO,
011430  001406                                                                        BEQ     50134$
011432                                              IF #X0.BOT NOTSETIN EOTFLG(R5) THEN ;WHEN NOT AT BOT THEN
011432  032765  000002  003426                                                          BIT     #X0.BOT,
011440  001002                                                                        BNE     50135$
011442                                                LET RECCNT(R5) := RECCNT(R5) - #1  ;DECREMENT RECORD COUNT
011442  005365  003324                                                              DEC     RECCNT(R
011446                                            ENDIF
011446                                                                          50135$:
011446                                          ENDIF
011446                                                                          50134$:
011446                                        ENDIF
011446                                                                          50133$:
```

```
011446                                          ENDIF
011446                                                                      50130$:
011446                                        ENDIF
011446                                                                      50127$:
011446                                      ENDIF
011446                                                                      50125$:
011446                                      LET @DATAWT := RECCNT(R5)
011446  016577  003324  171660                                                       MOV     RECCNT(R
011454                                    ENDIF
011454                                                                      50124$:
011454  000207                            RTS     PC                  ;RETURN.
```

```
3905                                    ;       THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
3906                                    ;       SUBROUTINE IS CALLED TO CHECK THE TS04 STATUS.
3907                                    ;       IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
3908                                    ;       IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
3909                                    ;       THEN AN ERROR RFC IS REPORTED,
3910                                    ;       INPUTS:
3911                                    ;       OUTPUTS:
3912                                    ;       REGISTERS:      R2, R4.
3913                                    ;       CALLS:          TCC0-TCC7.
3914
3915  011456                            CHKERR:: IF DEVTBL(R5) EQ #NINUSE THEN  ;BTL
3916  011456  026527  002532  177774                                                    CMP     DEVTBL(R
3917  011464  001003                                                                   BNE     50136$
3918  011466  000137  011676                    JMP 1$                          ;BTL
3919  011472                                    ELSE                            ;BTL
3920  011472  000400                                                                   BR      50137$
3921  011474                                                                  50136$:
3922  011474                                    ENDIF                           ;BTL
3923  011474                                                                  50137$:
3924  011474                                    IF #TS.SC SETIN TSSREG THEN           ;IF SPECIAL COND STATUS IS SET T
3925  011474  032737  100000  003402                                                    BIT     #TS.SC,T
3926  011502  001441                                                                   BEQ     50140$
3927  011504                                      IF CTCC NE #2 THEN            ;IF TCC IS NOT 2 THEN:
3928  011504  023727  003376  000002                                                    CMP     CTCC,#2
3929  011512  001405                                                                   BEQ     50141$
3930  011514                                        IFB ERRREC EQ #0 THEN       ;IF NOT IN ERROR RECOVERY:
3931  011514  105737  003415                                                          TSTB    ERRREC
3932  011520  001002                                                                   BNE     50142$
3933  011522  005265  003264                         INC     SCCNT(R5)         ;INC SC COUNTER.
3934  011526                                      ENDIF
3935  011526                                                                  50142$:
3936  011526                                    ENDIF
3937  011526                                                                  50141$:
3938  011526                                    IF #TS.NXM SETIN TSSREG OR #TS.UPE SETIN TSSREG THEN  ;WHEN NON-EXISTA
3939  011526  032737  004000  003402                                                    BIT     #TS.NXM,
3940  011534  001004                                                                   BNE     50143$
3941  011536  032737  040000  003402                                                    BIT     #TS.UPE,
3942  011544  001412                                                                   BEQ     50144$
3943  011546                                                                  50143$:
3944  011546                                      IF #X2.OPM NOTSETIN MSGPKT+MS.XS2 THEN          ;AND TAPE NOT MO
3945  011546  032737  100000  002346                                                    BIT     #X2.OPM,
3946  011554  001003                                                                   BNE     50145$
3947  011556                                        LET R2 := #5                ;SET TCC5 INDEX
3948  011556  012702  000005                                                          MOV     #5,R2
3949  011562                                      ELSE
3950  011562  000402                                                                   BR      50146$
3951  011564                                                                  50145$:
3952  011564                                        LET R2 := #4                ;TAPE MOVED, SET TCC4 INDEX
3953  011564  012702  000004                                                          MOV     #4,R2
3954  011570                                      ENDIF
3955  011570                                                                  50146$:
3956  011570                                    ELSE
3957  011570  000402                                                                   BR      50144$
3958  011572                                                                  50144$:
3959  011572                                      LET R2 := CTCC                ;SET DETECTED TCC INDEX
3960  011572  013702  003376                                                          MOV     CTCC,R2
```

```
011576                                      ENDIF
                                                                                   50147$:
011576                                      LET R2 := R2 SHIFT 1  ;CURRENT TCC X 2.
011576  006302                                                                          ASL     R2
011600  004772  011700                       JSR    PC,@TCCRA(R2)          ;GO TO THE TCC HANDLING SUBROUTINE.
011604                                     ELSE
011604  000426                                                                          BR      50150$
011606                                                                             50140$:
011606                                      IF #BRF.C SETIN CMDWRD THEN    ;IF BRF IS USED IN THIS CMD THEN:
011606  032737  004000  003346                                                          BIT     #BRF.C,C
011614  001422                                                                          BEQ     50151$
011616                                        IF MSGPKT+MS.RFC NE #0 THEN   ;IF THERE IS AN RFC THEN:
011616  005737  002340                                                                  TST     MSGPKT+M
011622  001417                                                                          BEQ     50152$
011624                                          IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
011624  105737  003441                                                                  TSTB    RANDOM
011630  001403                                                                          BEQ     50153$
011632  105737  003442                                                                  TSTB    VFYFLG
011636  001411                                                                          BEQ     50154$
011640                                                                             50153$:
                                                                        ;IF NOT IN RANDOM OR IF CMD IS WTV:
011640                                            IFB IRE EQ #0 THEN           ;IF RFC ERROR REPORTS ARE ALLOWED:
011640  105737  003445                                                                  TSTB    IRE
011644  001006                                                                          BNE     50155$
011646                                              LET HRDCNT(R5) := HRDCNT(R5) + #1  ;UPDATE HARD ERROR COUNT
011646  005265  003304                                                                  INC     HRDCNT(R
011652                                              ERRHRD #13,RFCERM,STAERM      ;REPORT RFC ERROR
011652  104456                                                                          TRAP    C$ERHRD
011654  000015                                                                          .WORD   13
011656  004254                                                                          .WORD   RFCERM
011660  005372                                                                          .WORD   STAERM
011662                                            ENDIF
                                                                                   50155$:
011662                                          ENDIF
                                                                                   50154$:
011662                                        ENDIF
                                                                                   50152$:
011662                                      ENDIF
                                                                                   50151$:
011662                                     ENDIF
                                                                                   50150$:
011662                                     IFB RWERR NE #0 THEN             ;IF A READ/WRITE ERROR HAS OCCURRED THEN
011662  105737  003413                                                                  TSTB    RWERR
011666  001403                                                                          BEQ     50156$
011670                                      LET CMDPKT := CMDSAV          ;RESTORE CMD PACKET AFTER ERROR RECOV.
011670  013737  003350  002310                                                          MOV     CMDSAV,C
011676                                     ENDIF
                                                                                   50156$:
011676  000207                      1$:    RTS     PC                      ;RETURN.
```

```
4010                                    ;       ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
4011
4012  011700  011720                    TCCRA:  TCC0
4013  011702  011736                            TCC1
4014  011704  011754                            TCC2
4015  011706  012064                            TCC3
4016  011710  012102                            TCC4
4017  011712  012552                            TCC5
4018  011714  012650                            TCC6
4019  011716  012700                            TCC7
```

```
                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
                                        ;       CONDITION ERROR.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

011720                                  TCC0::  LET HRDCNT(R5) := HRDCNT(R5) + #1  ;UPDATE HARD ERROR COUNT.
011720  005265  003304                                                              INC     HRDCNT(R
011724                                          ERRHRD #5,SCERM,STAERM          ;REPORT SPECIAL CONDITION ERROR.
011724  104456                                                                    TRAP    C$ERHRD
011726  000005                                                                    .WORD   5
011730  004230                                                                    .WORD   SCERM
011732  005372                                                                    .WORD   STAERM
011734  000207                                  RTS PC                          ;RETURN.



                                        ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
                                        ;       THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
                                        ;       SUCH AS GOING OFFLINE OR COMING ONLINE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2,R4
                                        ;       CALLS:          DROPU

011736                                  TCC1::  ERRDF #6,ATTNM,STAERM           ;REPORT ATTENTION-UNIT OFF LINE.
011736  104455                                                                    TRAP    C$ERDF
011740  000006                                                                    .WORD   6
011742  004335                                                                    .WORD   ATTNM
011744  005372                                                                    .WORD   STAERM
011746  004737  015554                          JSR PC,DROPU                    ;DROP THE UNIT.
011752  000207                                  RTS PC                          ;RETURN.
```

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

011754                                  TCC2::    IF @XO.BOT SETIN MSGPKT+MS.XSO ANDB EXPBOT NE @0 THEN
011754  032737  000002  002342                                                          BIT     @XO.BOT,
011762  001404                                                                         BEQ     50157$
011764  105737  003440                                                                 TSTB    EXPBOT
011770  001401                                                                         BEQ     50157$
                                                                        ;IF AT BOT AND BOT IS EXPECTED:
011772  000433                                    BR TC2RTN             ;RETURN-TCC2 CAUSED BY EXPECTED BOT.
011774                                          ENDIF
011774                                                                  50157$:
011774                                          IF @XO.RLS!XO.RLL!XO.TMK!XO.LET!XO.BOT SETIN MSGPKT+MS.XSO THEN
011774  032737  170002  002342                                                          BIT     @XO.RLS!
012002  001427                                                                         BEQ     50160$
                                                                        ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
012004                                            IFB RANDOM EQ @0 ORB VFYFLG NE @0 THEN
012004  105737  003441                                                                 TSTB    RANDOM
012010  001403                                                                         BEQ     50161$
012012  105737  003442                                                                 TSTB    VFYFLG
012016  001421                                                                         BEQ     50162$
012020                                                                  50161$:
                                                                        ;IF NOT IN RANDOM OR IF CMD IS WTV:
012020                                              IFB IRE EQ @0 THEN  ;IF RFC ERROR REPORTS ARE ALLOWED:
012020  105737  003445                                                                 TSTB    IRE
012024  001016                                                                         BNE     50163$
012026                                                IFB ERRREC NE @0 THEN ;IF WE ARE IN ERROR RECOVERY THE
012026  105737  003415                                                                 TSTB    ERRREC
012032  001403                                                                         BEQ     50164$
012034                                                  LET UNREC :B= UNREC + @1     ;SET UNRECOVERABLE FLAG FOR LO
012034  105237  003414                                                                 INCB    UNREC
012040                                                ELSE                          ;ELSE - IF NOT IN ERROR RECOVERY
012040  000402                                                                         BR      50165$
012042                                                                  50164$:
012042                                                  LET SCCNT(R5) := SCCNT(R5) + @1 ;INCREMENT THE SPEC COND COUNT
012042  005265  003264                                                                 INC     SCCNT(R5
012046                                                ENDIF
012046                                                                  50165$:
012046                                                  LET HRDCNT(R5) := HRDCNT(R5) + @1  ;UPDATE HARD ERROR COUNT.
012046  005265  003304                                                                 INC     HRDCNT(R
012052                                                  ERRHRD @7,TSAM,STAERM       ;REPORT TAPE STATUS ALERT.
012052  104456                                                                         TRAP    C$ERHRD
012054  000007                                                                         .WORD   7
012056  004436                                                                         .WORD   TSAM
012060  005372                                                                         .WORD   STAERM
012062                                            ENDIF
012062                                                                  50163$:
012062                                          ENDIF
012062                                                                  50162$:
012062                                  ENDIF
012062                                                                  50160$:
```

```
012062  000207                      TC2RTN:  RTS PC                                    ;RETURN.





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

012064                              TCC3::   ERRDF #8,FUNRM,STAERM            ;REPORT FUNCTION REJECT.
012064  104455                                                                              TRAP     C$ERDF
012066  000010                                                                              .WORD    8
012070  004353                                                                              .WORD    FUNRM
012072  005372                                                                              .WORD    STAERM
012074  004737  015554                       JSR PC,DROPU                     ;DROP THE UNIT.
012100  000207                               RTS PC                           ;RETURN.
```

```
                                ;       SUBROUTINE TO HANDLE 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.
                                ;       2 WRITE-ERROR-RECOVERY ALGORITHMS CAN BE SELECTED:
                                ;       THE FIRST ONE, VIA BADTSW SWITCH,  DOES DETECT BAD SPOTS ON TAPE.
                                ;       IT CALLS A WRITE RETRY SUBR UNTIL THE RECORD IS RECOVERED
                                ;       OR 20 BAD SPOTS HAVE BEEN LOGGED. ON REACHING 20 BAD
                                ;       SPOTS LOGGED, A BAD TAPE OVERFLOW MSG IS PRINTED AND THE
                                ;       UNIT DROPPED.
                                ;       THE SECOND ALGORITHM ISSUES THE TS11 WRITE RETRY COMMAND
                                ;       UP TO 16 TIMES BEFORE DROPPING THE UNIT OR PROCEEDING
                                ;       WITH THE NEXT RECORD ON RECOVERY.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2,R4.
                                ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU, WRTY

012102                          TCC4::  IF DEVTBL(R5) EQ #NINUSE THEN   ;BTL
012102  026527  002532  177774                                                  CMP     DEVTBL(R
012110  001003                                                                  BNE     50166$
012112  000137  012550                  JMP 3$                          ;BTL
012116                                  ELSE                            ;BTL
012116  000400                                                                  BR      50167$
012120                                                                  50166$:
012120                                  ENDIF                           ;BTL
012120                                                                  50167$:
012120                                  IF CMDLG EQ #2 ANDB BADTSW NE #0 THEN
012120  023727  003354  000002                                                  CMP     CMDLG,#2
012126  001134                                                                  BNE     50170$
012130  105737  002206                                                          TSTB    BADTSW
012134  001531                                                                  BEQ     50170$
012136
012136  105737  003415          IFB ERRREC EQ #0 ANDB ERCVER NE #0 THEN
012142  001007                                                                  TSTB    ERRREC
012144  105737  002205                                                          BNE     50171$
012150  001404                                                                  TSTB    ERCVER
012152                                                                          BEQ     50171$
012152  104457                    ERRSOFT #9,RERM,STAERM        ;
012154  000011                                                                  TRAP    C$ERSOFT
012156  004550                                                                  .WORD   9
012160  005372                                                                  .WORD   RERM
012162                                                                          .WORD   STAERM
012162                          ENDIF
012162                                                                  50171$:
012162  105737  002211          IFB IREC EQ #0 THEN             ;
012166  001111                                                                  TSTB    IREC
012170                                                                          BNE     50172$
012170  105237  003415            LET ERRREC :B= ERRREC + #1   ;RETRY FLAG FOR EXCUTE SUBR; DON'T UPDAT
012174                                                                          INCB    ERRREC
012174  105237  003410            LET WRTYER :B= WRTYER + #1   ;REWRITE ERROR FLAG FOR WRTY SUBR
012200                                                                          INCB    WRTYER
012200  105737  003407            IFB WRTYFG EQ #0 THEN       ;FIRST RETRY ON THIS RECORD; SUBSEQUENT
012204  001101                                                                  TSTB    WRTYFG
                                                                                BNE     501?3$
                                                                ;RETRIES WITH TCC4 ERRORS BY-PASS THIS S
012206                                LET WTYWRD := CMDWRD      ;SAVE WRITE COMMAND PACKET
```

```
 4188  012206  013737  003346  013366
 4189  012214
 4190  012214  013737  002310  013364
 4191  012222
 4192  012222  013737  002316  013370
 4193  012230
 4194  012230  105237  003413
 4195  012234
 4196  012234  105237  003407
 4197  012240
 4198  012240
 4199  012240
 4200  012240  005265  003244
 4201  012244
 4202  012244  005037  003404
 4203  012250
 4204  012250  105037  003406
 4205  012254  004737  013044
 4206  012260
 4207  012260  026527  002532  177774
 4208  012266  001003
 4209  012270  000137  012550
 4210  012274
 4211  012274  000400
 4212  012276
 4213  012276
 4214  012276
 4215  012276
 4216  012276  105737  003410
 4217  012302  001404
 4218  012304  027727  171126  000050
 4219  012312  103752
 4220  012314
 4221
 4222  012314
 4223  012314  027727  171116  000050
 4224  012322  103423
 4225  012324
 4226  012324  012746  013457
 4227  012330  012746  000001
 4228  012334  010600
 4229  012336  104414
 4230  012340  062706  000004
 4231  012344  004737  013576
 4232  012350
 4233  012350  005365  003324
 4234  012354  004737  015554
 4235  012360
 4236  012360  005065  003324
 4237  012364
 4238  012364  012775  002330  002452
 4239  012372
 4240  012372
 4241  012372
 4242  012372  105037  003407
 4243  012376
```

```
LET WTYCMD :* CMDPKT      ;                                  MOV     CMDWRD,W
LET WTYBRF :* CMDPKT+CP.CNT       ;                          MOV     CMDPKT,W
LET RWERR :B* RWERR + #1  ;LOG SUBR FLAG: COUNT WRT ERRORS   MOV     CMDPKT+C
LET WRTYFG :B* WRTYFG + #1        ;RETRY IN PROGRESS FLAG    INCB    RWERR
REPEAT                                                       INCB    WRTYFG
                                                          50174$:
  LET WRTYCT(R5) :* WRTYCT(R5) + #1       ;COUNT GLOBAL WRITE RETR
                                                             INC     WRTYCT(R
  LET RETRYC :* #0                ;CLEAR # OF RETRIES PER RECORD
                                                             CLR     RETRYC
  LET RPTCNT :B* #0               ;CLEAR # OF REPEATS
                                                             CLRB    RPTCNT
  JSR PC,WRTY             ;CALL WRITE RETRY
  IF DEVTBL(R5) EQ #NINUSE THEN   ;BTL
                                                             CMP     DEVTBL(R
                                                             BNE     50175$
  JMP 3$                          ;BTL
  ELSE                            ;BTL
                                                             BR      50176$
                                                          50175$:
  ENDIF                           ;BTL
                                                          50176$:
UNTILB WRTYER EQ #0 OR @BTPT HIS #40.     ;REPEAT RETRIES ON SAME
                                                             TSTB    WRTYER
                                                             BEQ     50177$
                                                             CMP     @BTPT,#4
                                                             BLO     50174$
                                                          50177$:
                          ;UNTIL RECOVERED OR 20 BAD SPOTS
IF @BTPT HIS #40. THEN    ;WHEN 20 BAD SPOTS LOGGED
                                                             CMP     @BTPT,#4
                                                             BLO     50200$
  PRINTB #BTMSG2          ;PRINT BAD TAPE OVERFLOW MSG
                                                             MOV     #BTMSG2,
                                                             MOV     #1,-(SP)
                                                             MOV     SP,R0
                                                             TRAP    C:PNTB
                                                             ADD     #4,SP
  JSR PC,BORERS           ;ERASE BAD RECORD
  LET RECCNT(R5) :* RECCNT(R5) - #1       ;
                                                             DEC     RECCNT(R
  JSR PC,DROPU            ;DROP UNIT
  LET RECCNT(R5) :*  #0   ;
                                                             CLR     RECCNT(R
  LET @TSDB(R5) :* #RWCPK ;REWIND UNIT
                                                             MOV     #RWCPK,@
ENDIF
                                                          50200$:
LET WRTYFG :B* #0         ;RETRY COMPLETE FLAG
                                                             CLRB    WRTYFG
LET MISCFG :B* MISCFG + #1        ;DO NOT HALT ON THIS CMD FLG
```

```
012376  105237  003455                                                                  INCB    MISCFG
012402                              LET PCMDWD := WTYWRD      ;RESTORE ORIGINAL WRT CMD AFTER RECOVERY
012402  013737  013366  003352                                                          MOV     WTYWRD,P
012410                            ENDIF
012410                                                                       50173$:
012410                          ELSE
012410  000402                                                                          BR      50201$
012412                                                                       50172$:
012412                            LET UNREC :B= UNREC + #1     ;
012412  105237  003414                                                                  INCB    UNREC
012416                          ENDIF
012416                                                                       50201$:
012416                        ELSE
012416  000454                                                                          BR      50202$
012420                                                                       50170$:
012420  004737  012716          JSR PC,RTLE                 ;CHECK FOR RETRY LIMIT EXCEEDED.
012424                          IF CMDLG GT #2 THEN         ;IF READ CMD THEN:
012424  023727  003354  000002                                                          CMP     CMDLG,#2
012432  003411                                                                          BLE     50203$
012434                            LET R2 := #RRECL SHIFT -1   ;R2=READ RETRY COUNT LIMIT / 2
012434  012702  000020                                                                  MOV     #RRECL,R
012440  006202                                                                          ASR     R2
012442                            IF RETRYC GE R2 THEN                 ;IF RETRY COUNT IS MORE THAN HAL
012442  023702  003404                                                                  CMP     RETRYC,R
012446  002403                                                                          BLT     50204$
012450                              LET CMDPKT := CMDPKT SET.BY #OPP.C        ;SET OPPOSITE BIT FOR RE
012450  052737  020000  002310                                                          BIS     #OPP.C,C
012456                            ENDIF
012456                                                                       50204$:
012456                          ENDIF
012456                                                                       50203$:
012456                          IF RETRYC EQ #0 ANDB ERCVER NE #0 THEN  ;IF THIS IS THE ORIGINAL ERROR
012456  005737  003404                                                                  TST     RETRYC
012462  001007                                                                          BNE     50205$
012464  105737  002205                                                                  TSTB    ERCVER
012470  001404                                                                          BEQ     50205$
012472                            ERRSOFT #9,RERM,STAERM      ;REPORT RECOVERABLE ERROR
012472  104457                                                                          TRAP    C$ERSOFT
012474  000011                                                                          .WORD   9
012476  004550                                                                          .WORD   RERM
012500  005372                                                                          .WORD   STAERM
012502                          ENDIF                       ;PROVIDED OPERATOR HAS ENABLED THE REPOR
012502                                                                       50205$:
012502                          LET RETRYC := RETRYC + #1   ;UPDATE RETRY COUNT.
012502  005237  003404                                                                  INC     RETRYC
012506                          LET CMDPKT := CMDPKT SET.BY #MOD.C1   ;SET RETRY BIT IN CMD PACKET.
012506  052737  001000  002310                                                          BIS     #MOD.C1,
012514                          IFB IREC EQ #0 THEN         ;IF ERROR RECOVERY ENABLED:
012514  105737  002211                                                                  TSTB    IREC
012520  001011                                                                          BNE     50206$
012522                            LET ERRREC :B= ERRREC + #1  ;SET ERROR RECOVERY FLAG.
012522  105237  003415                                                                  INCB    ERRREC
012526                            POP R2,R2                 ;POP 2 RTN ADRS FROM STACK.
012526  012602                                                                          MOV     (SP)+,R2
012530  012602                                                                          MOV     (SP)+,R2
012532  004737  010326            JSR PC,EXCUTE                    ;GO EXECUTE THE RETRY COMMAND.
```

```
4300  012536  000137  010636                    JMP GOWAIT                ;GO WAIT FOR INTERRUPT + CHECK STATUS.
4301  012542                                  ELSE                        ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
4302  012542  000402                                                        BR      50207$
4303  012544                                                            50206$:
4304  012544                                    LET UNREC :B= UNREC + #1   ;SET UNRECOVERABLE ERROR FLAG.
4305  012544  105237  003414                                              INCB    UNREC
4306  012550                                  ENDIF
4307  012550                                                            50207$:
4308  012550                                ENDIF
4309  012550                                                            50202$:
4310  012550  000207                3$:       RTS PC                    ;RETURN
```

```
                                ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
                                ;       TAPE POSITION HAS NOT CHANGED.  RECOVERY PROCEDURE IS TO LOG THE
                                ;       ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
                                ;       INPUTS:
                                ;       OUTPUTS:
                                ;       REGISTERS:      R2,R4.
                                ;       CALLS:          RTLE, EXCUTE, GOWAIT, DROPU.

012552  004737  012716          TCC5::  JSR PC,RTLE                     ;CHECK FOR RETRY LIMIT EXCEEDED
012556                          IF RETRYC EQ #0 THEN                    ;IF THIS IS THE ORIGINAL ERROR THEN:
012556  005737  003404                                                          TST     RETRYC
012562  001004                                                                  BNE     50210$
012564                            ERRSOFT #10,RERM,STAERM               ;REPORT RECOVERABLE ERROR.
012564  104457                                                                  TRAP    C$ERSOFT
012566  000012                                                                  .WORD   10
012570  004550                                                                  .WORD   RERM
012572  005372                                                                  .WORD   STAERM
012574                          ENDIF
012574                                                                  50210$:
012574                          LET RETRYC := RETRYC + #1                ;UPDATE RETRY COUNTER.
012574  005237  003404                                                          INC     RETRYC
012600                          IFB IREC EQ #0 THEN                     ;IF ERROR RECOVERY IS ENABLED:
012600  105737  002214                                                          TSTB    IREC
012604  001016                                                                  BNE     50211$
012606                            LET ERRREC :B= ERRREC + #1            ;SET ERROR RECOVERY FLAG.
012606  105237  003415                                                          INCB    ERRREC
012612                            LET RECCNT(R5) := RECCNT(R5) + #1      ;UPDATE REC COUNT
012612  005265  003324                                                          INC     RECCNT(R
012616                            LET @DATAWT := RECCNT(R5)              ;AND INSERT IT INTO WRT BFR
012616  016577  003324  170510                                                  MOV     RECCNT(R
012624                            POP R2,R2                             ;POP 2 RTN ADRS FROM STACK.
012624  012602                                                                  MOV     (SP)+,R2
012626  012602                                                                  MOV     (SP)+,R2
012630  004737  010326              JSR PC,EXCUTE                       ;GO RE-ISSUE THE COMMAND.
012634  000137  010636              JMP GOWAIT                          ;GO WAIT FOR INTERRUPT + CHECK STATUS.
012640                          ELSE                                    ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
012640  000402                                                                  BR      50212$
012642                                                                  50211$:
012642                            LET UNREC :B= UNREC + #1              ;SET UNRECOVERABLE ERROR FLAG.
012642  105237  003414                                                          INCB    UNREC
012646                          ENDIF
012646                                                                  50212$:
012646  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:          RTLF, WSSR, EXCUTE, GOWAIT, DROPU

012650                  TCC6::  LET @TSDB(R5) := @RWCPK         ;ISSUE A REWIND COMMAND.
012650  012775  002330  002452                                          MOV     @RWCPK,@
012656  004737  011170                  JSR PC,WSSR             ;WAIT FOR SUBSYSTEM READY.
012662                          ERRDF 011,UNERM,STAERM          ;REPORT UNRECOVERABLE ERROR.
012662  104455                                                          TRAP    C$ERDF
012664  000013                                                          .WORD   11
012666  004572                                                          .WORD   UNERM
012670  005372                                                          .WORD   STAERM
012672  004737  015554                  JSR PC,DROPU            ;REPORT ERROR + DROP UNIT.
012676  000207                  RTS PC                          ;RETURN
```

```
4377                                    ;       SUBROUTINE TO HANDLE TERMINATION CLASS CODE 7, FATAL SUBSYSTEM
4378                                    ;       ERROR.  THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING
4379                                    ;       COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE.
4380                                    ;       REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR
4381                                    ;       ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR.
4382                                    ;       INPUTS:
4383                                    ;       OUTPUTS:
4384                                    ;       REGISTERS:      R2, R4
4385                                    ;       CALLS:
4386
4387  012700                            TCC7::  ERRDF #12,FATSM,STAERM          ;REPORT FATAL SUBSYSTEM ERROR.
4388  012700  104455                                                                  TRAP    C$ERDF
4389  012702  000014                                                                  .WORD   12
4390  012704  004373                                                                  .WORD   FATSM
4391  012706  005372                                                                  .WORD   STAERM
4392  012710  004737  015554                   JSR PC,DROPU                  ;DROP THE UNIT.
4393  012714  000207                           RTS PC                        ;RETURN.
4394
4395
4396
4397                                    ;       SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED.  PRINTS ERROR MESSAGE
4398                                    ;       IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
4399                                    ;       INPUTS:
4400                                    ;       OUTPUTS:
4401                                    ;       REGISTERS:      R2, R4.
4402                                    ;       CALLS:          DROPU
4403
4404  012716                            RTLE::  IF CMDLG EQ #0 THEN             ;IF CMD IS NOT A READ OR WRITE THEN:
4405  012716  005737  003354                                                          TST     CMDLG
4406  012722  001010                                                                  BNE     50213$
4407  012724                              ERRDF #11,UNERM,STAERM        ;REPORT UNRECOVERABLE ERROR.
4408  012724  104455                                                                  TRAP    C$ERDF
4409  012726  000013                                                                  .WORD   11
4410  012730  004572                                                                  .WORD   UNERM
4411  012732  005372                                                                  .WORD   STAERM
4412  012734  004737  015554                   JSR PC,DROPU                  ;DROP THE UNIT.
4413  012740                              POP R2
4414  012740  012602                                                                  MOV     (SP)+,R2
4415  012742  000437                       BR RTLRTN                     ;AND RETURN.
4416  012744                            ENDIF
4417  012744                                                                  50213$:
4418  012744                            LET RWERR :B= RWERR + #1          ;SET READ/WRITE ERROR FLAG.
4419  012744  105237  003413                                                          INCB    RWERR
4420  012750                            IF CMDLG EQ #2 THEN               ;IF CMD IS A WRT OR WTM:
4421  012750  023727  003354  000002                                                  CMP     CMDLG,#2
4422  012756  001016                                                                  BNE     50214$
4423  012760                              IF RETRYC EQ #RECL THEN         ;IF RETRY COUNT HAS REACHED LIMIT:
4424  012760  023727  003404  000020                                                  CMP     RETRYC,#
4425  012766  001011                                                                  BNE     50215$
4426  012770                                LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE FLAG
4427  012770  105237  003414                                                          INCB    UNREC
4428  012774                                ERRDF #14,RLEXM,STAERM        ;REPORT RETRY LIMIT EXCEEDED.
4429  012774  104455                                                                  TRAP    C$ERDF
4430  012776  000016                                                                  .WORD   14
4431  013000  004310                                                                  .WORD   RLEXM
4432  013002  005372                                                                  .WORD   STAERM
```

```
4433  013004  004737  015554                          JSR PC,DROPU              ;DROP THE UNIT.
4434  013010                                          POP R2
4435  013010  012602                                                                   MOV     (SP)+,R2
4436  013012                                        ENDIF
4437  013012                                                                      50215$:
4438  013012                                      ELSE                          ;ELSE - CMD IS A READ:
4439  013012  000413                                                                   BR      50216$
4440  013014                                                                      50214$:
4441  013014                                        IF RETRYC EQ #RRECL THEN      ;IF RETRY COUNT HAS REACHED LIMIT:
4442  013014  023727  003404  000020                                                   CMP     RETRYC,#
4443  013022  001007                                                                   BNE     50217$
4444  013024                                          LET UNREC :B= UNREC + #1    ;SET UNRECOVERABLE FLAG
4445  013024  105237  003414                                                         INCB    UNREC
4446  013030                                          ERRHRD #14,RLEXM,STAERM     ;REPORT RECOVERABLE ERROR.
4447  013030  104456                                                               TRAP    C$ERHRD
4448  013032  000016                                                               .WORD   14
4449  013034  004310                                                               .WORD   RLEXM
4450  013036  005372                                                               .WORD   STAERM
4451  013040                                          POP R2
4452  013040  012602                                                               MOV     (SP)+,R2
4453  013042                                        ENDIF
4454  013042                                                                      50217$:
4455  013042                                      ENDIF
4456  013042                                                                      50216$:
4457  013042  000207                       RTLRTN: RTS PC                        ;RETURN
```

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

                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R3,R4
                                        ;       CALLS:          BORERS, REWRT

013044                                  WRTY::  IF DEVTBL(R5) EQ #NINUSE THEN   ;BTL
013044  026527  002532  177774                                                           CMP     DEVTBL(R
013052  001003                                                                            BNE     50220$
013054  000137  013362                          JMP 1$                          ;BTL
013060                                          ELSE                            ;BTL
013060  000400                                                                          BR      50221$
013062                                                                          50220$:
013062                                          ENDIF                           ;BTL
013062                                                                          50221$:
013062                                          BEGIN RETRY
013062                                            REPEAT
013062                                                                          50223$:
013062                                      >       BEGIN REPEAT
013062                                            REPEAT
013062                                                                          50225$:
013062  004737  013576                            JSR PC,BORERS                   ;BACKSPACE/ERASE ONE RECORD
013066                                            LET WRTYER :B= #0               ;CLEAR WRITE RETRY ERROR
013066  105037  003410                                                                   CLRB    WRTYER
013072  004737  013752                            JSR PC,REWRT                    ;REWRITE RECORD ON SAME SPOT
013076                                             IF DEVTBL(R5) EQ #NINUSE THEN  ;BTL
013076  026527  002532  177774                                                           CMP     DEVTBL(R
013104  001003                                                                            BNE     50226$
013106  000137  013362                             JMP 1$                         ;BTL
013112                                             ELSE                           ;BTL
013112  000400                                                                          BR      50227$
013114                                                                          50226$:
013114                                             ENDIF                          ;BTL
013114                                                                          50227$:
013114                                            LET RPTCNT :B= RPTCNT + #1      ;COUNT REPEATS
013114  105237  003406                                                                   INCB    RPTCNT
013120                                          UNTILB RPTCNT EQ #4 ORB WRTYER NE #0    ;LIMIT: 4 REPEATS OR REC
013120  123727  003406  000004                                                           CMPB    RPTCNT,#
013126  001403                                                                          BEQ     50230$
013130  105737  003410                                                                   TSTB    WRTYER
013134  001752                                                                          BEQ     50225$
013136                                                                          50230$:
013136                                  END REPEAT                              ;
013136                                                                          50224$:
013136                                  LET RETRYC := RETRYC + #1                ;COUNT RETRIES
013136  005237  003404                                                                   INC     RETRYC
```

```
4514  013142
4515  013142  026527  002532  177774          .
4516  013150  001003
4517  013152  000137  013362
4518  013156
4519  013156  000400
4520  013160
4521  013160
4522  013160
4523  013160
4524  013160  105737  003410
4525  013164  001001
4526  013166
4527  013166  000457
4528  013170
4529  013170
4530  013170
4531  013170  105737  002205
4532  013174  001415
4533  013176
4534  013176  005046
4535  013200  153716  003406
4536  013204  013746  003404
4537  013210  012746  013372
4538  013214  012746  000003
4539  013220  010600
4540  013222  104414
4541  013224  062706  000010
4542  013230
4543  013230
4544  013230
4545  013230  023727  003404  000001
4546  013236  001021
4547  013240
4548  013240  016537  002544  003436
4549  013246
4550  013246  017704  170164
4551  013252  062704  000002
4552  013256
4553  013256  010477  170154
4554  013262
4555  013262  020427  000050
4556  013266  101005
4557  013270
4558  013270  013703  003436
4559  013274
4560  013274  060304
4561  013276
4562  013276  016514  003324
4563  013302
4564  013302
4565  013302
4566  013302
4567  013302
4568  013302  105237  003451
4569  013306
```

```
IF DEVTBL(R5) EQ #NINUSE THEN        ;BTL
                                                CMP     DEVTBL(R
                                                BNE     50231$
JMP 1$                               ;BTL
ELSE                                 ;BTL
                                                BR      50232$
                                        50231$:
ENDIF                                ;BTL
                                        50232$:
IFB WRTYER EQ #0 THEN                ;
                                                TSTB    WRTYER
                                                BNE     50233$
  LEAVE RETRY                        ;EXIT RETRY LOOP IF RECOVERED
                                                BR      50222$
ELSE                                 ;
                                        50233$:
  IFB ERCVER NE #0 THEN              ;
                                                TSTB    ERCVER
                                                BEQ     50235$
    PRINTB #BTMSG1,RETRYC,<B,RPTCNT>        ;PRINT SUSPECTED BAD SPO
                                                CLR     -(SP)
                                                BISB    RPTCNT,(
                                                MOV     RETRYC,-
                                                MOV     #BTMSG1,
                                                MOV     #3,-(SP)
                                                MOV     SP,R0
                                                TRAP    C$PNTB
                                                ADD     #10,SP
  ENDIF                              ;
                                        50235$:
ENDIF                                ;
                                        50235$:
IF RETRYC EQ #1 THEN      ;ON FIRST RETRY, LOGG BAD SPOT
                                                CMP     RETRYC,#
                                                BNE     50236$
  LET BTPT := BTADDR(R5)             ;BTPT IS BOTH THE BAD SPOT COUNT
                                                MOV     BTADDR(R
  LET R4 := @BTPT + #2               ;AND THE LOGGING INDEX
                                                MOV     @BTPT,R4
                                                ADD     #2,R4
  LET @BTPT := R4                    ;
                                                MOV     R4,@BTPT
  IF R4 LOS #40. THEN                ;
                                                CMP     R4,#40.
                                                BHI     50237$
    LET R3 := BTPT                   ;STORE FIRST 20 BAD SPOTS
                                                MOV     BTPT,R3
    LET R4 := R4 + R3                ;
                                                ADD     R3,R4
    LET (R4) := RECCNT(R5)           ;
                                                MOV     RECCNT(R
  ENDIF
                                        50237$:
ENDIF                                ;
                                        50236$:
LET ERSFLG :B= ERSFLG + #1           ;ERASE FLAG TO ERASE BAD RECORD
                                                INCB    ERSFLG
LET RWERR :B= #0                     ;CANCELL "LOG" ERROR FLAG ON FAI
```

```
4570  013306  105037  003413                          LET RPTCNT :B= #0
4571  013312                                        ENDIF
4572  013312  105037  003406
4573  013316                                      UNTIL RETRYC EQ #4
4574  013316
4575  013316
4576  013316  023727  003404  000004
4577  013324  001256
4578  013326                                    END RETRY
4579  013326
4580  013326                                    IFB WRTYER NE #0 THEN
4581  013326  105737  003410
4582  013332  001413
4583  013334                                      IFB ERCVER NE #0 THEN
4584  013334  105737  002205
4585  013340  001410
4586  013342                                        PRINTB #BTMSG3
4587  013342  012746  013527
4588  013346  012746  000001
4589  013352  010600
4590  013354  104414
4591  013356  062706  000004
4592  013362                                      ENDIF
4593  013362
4594  013362                                    ENDIF
4595  013362
4596  013362  000207                      1$:   RTS PC
4597
4598
4599
4600
```

```
                        CLRB    RWERR
;CLEAR REPEAT COUNT FOR NEXT RET
                        CLRB    RPTCNT
;
        50234$:
;LIMIT: 4 RETRIES
                        CMP     RETRYC,#
                        BNE     50223$
;
        50222$:
;
                        TSTB    WRTYER
                        BEQ     50240$
;
                        TSTB    ERCVER
                        BEQ     50241$
;PRINT RETRY FAILED
                        MOV     #BTMSG3,
                        MOV     #1,-(SP)
                        MOV     SP,R0
                        TRAP    C$PNTB
                        ADD     #4,SP
        50241$:
        50240$:
```

```
4601
4602  013364  000000                    WTYCMD: .WORD   0               ;STORAGE FOR WRITE CMD WHILE RETRYING
4603  013366  000000                    WTYWRD: .WORD   0               ;STORAGE FOR WRITE CMD WORD WHILE RETRYING
4604  013370  000000                    WTYBRF: .WORD   0               ;STORAGE FOR WRITE BPCR WHILE RETRYING
4605
4606
4607  013372  040445  052523  050123    BTMSG1: .ASCIZ  /%ASUSPECT BAD SPOT AFTER %D1%A RETRY, %D1%A REPEAT%N/
4608  013400  041505  020124  040502
4609  013406  020104  050123  052117
4610  013414  040440  052106  051105
4611  013422  022440  030504  040445
4612  013430  051040  052105  054522
4613  013436  020054  042045  022461
4614  013444  020101  042522  042520
4615  013452  052101  047045     000
4616  013457     045  022516  041101    BTMSG2: .ASCIZ  /%N%ABAD TAPE OVERFLOW: CHANGE TAPE!%N%N/
4617  013464  042101  052040  050101
4618  013472  020105  053117  051105
4619  013500  046106  053517  020072
4620  013506  044103  047101  042507
4621  013514  052040  050101  020505
4622  013522  047045  047045     000
4623  013527     045  051101  052105    BTMSG3: .ASCIZ  /%ARETRY FAILED ON BAD SPOT...ERASED!%N/
4624  013534  054522  043040  044501
4625  013542  042514  020104  047117
4626  013550  041040  042101  051440
4627  013556  047520  027124  027056
4628  013564  051105  051501  042105
4629  013572  022441  000116
4630                                    .EVEN
```

```
4631                                    ;       SUBR TO BACSPACE ONE RECORD
4632                                    ;       IF THE ERASE FLAG IS SET, THEN ERASE THAT RECORD
4633                                    ;       INPUTS:         ERSFLG  1 = DO ERASE
4634                                    ;       OUTPUTS:
4635                                    ;       REGISTERS:
4636                                    ;       CALLS:          EXCUTE, GOWAIT, CKHAE
4637
4638  013576                            BORERS:: LET PCMDWD := CMDWRD   ;SET COMMAND  TO SPACE REV
4639  013576  013737  003346  003352                                                    MOV     CMDWRD,P
4640  013604          LET CMDWRD := #SRR      ;
4641  013604  012737  104410  003346                                                    MOV     #SRR,CMD
4642  013612          LET CMDPKT := CMDWRD CLR.BY #BRF.C      ;
4643  013612  013737  003346  002310                                                    MOV     CMDWRD,C
4644  013620  042737  004000  002310                                                    BIC     #BRF.C,C
4645  013626          LET CMDSAV := CMDPKT    ;
4646  013626  013737  002310  003350                                                    MOV     CMDPKT,C
4647  013634          LET CMDPKT+CP.ADL := #1 ;
4648  013634  012737  000001  002312                                                    MOV     #1,CMDPK
4649  013642          LET CMDLG := #0         ;
4650  013642  005037  003354                                                           CLR     CMDLG
4651  013646  004737  007344          JSR PC,CMDAC            ;
4652  013652  004737  010326          JSR PC,EXCUTE           ;
4653  013656  004737  010636          JSR PC,GOWAIT           ;
4654  013662  004737  016060          JSR PC,CKHAE            ;
4655  013666          IFB ERSFLG NE #0 THEN   ;WHEN ERASE FLAG IS SET, DO ERASE
4656  013666  105737  003451                                                           TSTB    ERSFLG
4657  013672  001426                                                                  BEQ     50242$
4658  013674
4659  013674  013737  003346  003352            LET PCMDWD := CMDWRD     ;
4660  013702                                                                         MOV     CMDWRD,P
4661  013702  012737  100411  003346            LET CMDWRD := #ERS       ;
4662  013710                                                                         MOV     #ERS,CMD
4663  013710  013737  003346  002310            LET CMDPKT := CMDWRD     ;
4664  013716                                                                         MOV     CMDWRD,C
4665  013716  013737  002310  003350            LET CMDSAV := CMDPKT     ;
4666  013724  004737  007344                                                        MOV     CMDPKT,C
4667  013730  004737  010326                    JSR PC,CMDAC            ;
4668  013734  004737  010636                    JSR PC,EXCUTE
4669  013740  004737  016060                    JSR PC,GOWAIT
4670  013744                                    JSR PC,CKHAE
4671  013744  105037  003451                    LET ERSFLG :B= #0
4672  013750                                                                         CLRB    ERSFLG
4673  013750          ENDIF
4674  013750  000207                                                        50242$:
4675                                    ;       RTS PC
4676                                    ;       SUBR TO REWRITE A BADLY WRITTEN RECORD
4677  013752                            REWRT:  IF DEVTBL(R5) EQ #NINUSE THEN   ;BTL
4678  013752  026527  002532  177774                                                  CMP     DEVTBL(R
4679  013760  001003                                                                  BNE     50243$
4680  013762  000137  014100          JMP 1$                  ;BTL
4681  013766          ELSE                    ;BTL
4682  013766  000400                                                                  BR      50244$
4683  013770                                                                 50243$:
4684  013770          ENDIF                   ;BTL
4685  013770                                                                 50244$:
4686  013770          LET PCMDWD := CMDWRD     ;RESTORE WRITE COMMAND PACKET
```

```
 4687  013770  013737  003346  003352                                                           MOV     CMDWRD,P
 4688  013776                                  LET CMDWRD :* WTYWRD    ;
 4689  013776  013737  013366  003346                                                           MOV     WTYWRD,C
 4690  014004                                  LET CMDPKT :* WTYCMD    ;
 4691  014004  013737  013364  002310                                                           MOV     WTYCMD,C
 4692  014012                                  LET CMDSAV :* CMDPKT    ;
 4693  014012  013737  002310  003350                                                           MOV     CMDPKT,C
 4694  014020                                  LET CMDPKT+CP.ADL :* DATAWT      ;
 4695  014020  013737  003334  002312                                                           MOV     DATAWT,C
 4696  014026                                  LET CMDPKT+CP.CNT :* WTYBRF      ;
 4697  014026  013737  013370  002316                                                           MOV     WTYBRF,C
 4698  014034                                  LET CMDLG :* #2                  ;
 4699  014034  012737  000002  003354                                                           MOV     #2,CMDLG
 4700  014042  004737  007344                  JSR PC,CMDAC
 4701  014046  004737  010326                  JSR PC,EXCUTE                    ;RE WRITE RECORD
 4702  014052                                  IF DEVTBL(R5) EQ #NINUSE THEN    ;BTL
 4703  014052  026527  002532  177774                                                           CMP     DEVTBL(R
 4704  014060  001003                                                                           BNE     50245$
 4705  014062  000137  014100                  JMP 1$                           ;BTL
 4706  014066                                  ELSE                             ;BTL
 4707  014066  000400                                                                           BR      50246$
 4708  014070                                                                           50245$:
 4709  014070                                  ENDIF                            ;BTL
 4710  014070                                                                           50246$:
 4711  014070  004737  010636                  JSR PC,GOWAIT                    ;
 4712  014074  004737  016060                  JSR PC,CKHAE                     ;
 4713  014100  000207                  1$:     RTS PC
```

```
4714                                    ;       SUBROUTINE TO LOG BYTES READ/WRITTEN.
4715                                    ;       ALSO UPDATES READ/WRITE ERROR COUNTERS.
4716                                    ;       INPUTS:
4717                                    ;       OUTPUTS:
4718                                    ;       REGISTERS:      R2, R3, R4.
4719                                    ;       CALLS:
4720
4721  014102                            LOG::   IFB ERLOG EQ #0 THEN            ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED
4722  014102  105737  003412                                                              TSTB    ERLOG
4723  014106  001126                                                                       BNE     50247$
4724  014110                                    LET ERLOG :B= ERLOG + #1       ;SET LOG DONE FLAG.
4725  014110  105237  003412                                                              INCB    ERLOG
4726  014114                                    LET R4 := CMDLG                ;GET CURRENT CMD LOGGING CODE.
4727  014114  013704  003354                                                              MOV     CMDLG,R4
4728  014120                                    IF R4 NE #0 THEN               ;IF THERE IS A CODE THEN:
4729  014120  005704                                                                       TST     R4
4730  014122  001520                                                                       BEQ     50250$
4731  014124                                      LET R4 := R4 - #2            ;ADJUST THE CODE FOR TABLE INDEX.
4732  014124  162704  000002                                                              SUB     #2,R4
4733  014130                                      LET R2 := R5 + BINC(R4) + #CNTBGN  ;R2 = ADR OF BYTE COUNT LSW.
4734  014130  010502                                                                       MOV     R5,R2
4735  014132  066402  014366                                                              ADD     BINC(R4)
4736  014136  062702  002554                                                              ADD     #CNTBGN,
4737  014142                                      LET (R2) := (R2) + BRFCNT    ;ADD BRF TO LSW.
4738  014142  063712  003344                                                              ADD     BRFCNT,(
4739  014146                                      IF MSGPKT+MS.RFC LOS BRFCNT THEN  ;IF THE RFC IS LOWER OR THE SAME AS
4740  014146  023737  002340  003344                                                      CMP     MSGPKT+M
4741  014154  101002                                                                       BHI     50251$
4742  014156                                        LET (R2) := (R2) - MSGPKT+MS.RFC  ;SUBTRACT RFC FROM EXPECTED BRF.
4743  014156  163712  002340                                                              SUB     MSGPKT+M
4744  014162                                    ENDIF
4745  014162                                                                        50251$:
4746  014162                                    LET R3 := R2 + #10             ;R3 = ADR OF 2ND WORD.
4747  014162  010203                                                                       MOV     R2,R3
4748  014164  062703  000010                                                              ADD     #10,R3
4749  014170                                    WHILE (R2) GT #999. DO
4750  014170                                                                        50252$:
4751  014170  021227  001747                                                              CMP     (R2),#99
4752  014174  003404                                                                       BLE     50253$
4753  014176                                      LET (R2) := (R2) - #1000.    ;UPDATE BYTE COUNT
4754  014176  162712  001750                                                              SUB     #1000.,(
4755  014202                                      LET (R3) := (R3) + #1        ;2ND WORD.
4756  014202  005213                                                                       INC     (R3)
4757  014204                                    ENDDO
4758  014204  000771                                                                       BR      50252$
4759  014206                                                                        50253$:
4760  014206                                    LET R2 := R3 + #10             ;R2 = ADR OF 3RD WORD.
4761  014206  010302                                                                       MOV     R3,R2
4762  014210  062702  000010                                                              ADD     #10,R2
4763  014214                                    WHILE (R3) GT #999. DO
4764  014214                                                                        50254$:
4765  014214  021327  001747                                                              CMP     (R3),#99
4766  014220  003404                                                                       BLE     50255$
4767  014222                                      LET (R3) := (R3) - #1000.    ;UPDATE BYTE COUNT
4768  014222  162713  001750                                                              SUB     #1000.,(
4769  014226                                      LET (R2) := (R2) + #1        ;3RD WORD.
```

```
014226  005212                                                                      INC     (R2)
014230                          ENDDO
014230  000771                                                                      BR      50254$
014232                                                                  50255$:
014232                          LET R3 := R2 + #10            ;R3 = ADR OF 4TH WORD.
014232  010203                                                                      MOV     R2,R3
014234  062703  000010                                                              ADD     #10,R3
014240                          WHILE (R2) GT #999. DO
014240                                                                  50256$:
014240  021227  001747                                                              CMP     (R2),#99
014244  003404                                                                      BLE     50257$
014246                            LET (R2) := (R2) - #1000.   ;UPDATE BYTE COUNT
014246  162712  001750                                                              SUB     #1000.,(
014252                            LET (R3) := (R3) + #1       ;4TH WORD.
014252  005213                                                                      INC     (R3)
014254                          ENDDO
014254  000771                                                                      BR      50256$
014256                                                                  50257$:
014256                          IFB RWERR NE #0 THEN          ;IF R/W ERROR, UPDATE ERROR COUNT.
014256  105737  003413                                                              TSTB    RWERR
014262  001440                                                                      BEQ     50260$
014264                            LET R2 := R5 + EINC(R4) + #WRREC  ;R2 = ADR OF COUNTER.
014264  010502                                                                      MOV     R5,R2
014266  066402  014374                                                              ADD     EINC(R4)
014272  062702  002714                                                              ADD     #WRREC,R
014276                            IFB UNREC NE #0 THEN        ;IS THE ERROR UNRECOVERABLE?
014276  105737  003414                                                              TSTB    UNREC
014302  001404                                                                      BEQ     50261$
014304                              LET R2 := R2 + #10        ;YES, POINT TO NEXT COUNTER.
014304  062702  000010                                                              ADD     #10,R2
014310                              LET (R2) := (R2) + #1     ;UPDATE THE ERROR COUNTER
014310  005212                                                                      INC     (R2)
014312                            ELSE                        ;ELSE - IF ERROR IS RECOVERABLE:
014312  000424                                                                      BR      50262$
014314                                                                  50261$:
014314                              LET (R2) := (R2) + #1     ;UPDATE THE ERROR COUNTER
014314  005212                                                                      INC     (R2)
014316                              IFB IREC EQ #0 THEN       ;IF ERROR RECOVERY IS ENABLED:
014316  105737  002211                                                              TSTB    IREC
014322  001020                                                                      BNE     50263$
014324                                IFB DROPED EQ #0 ANDB ERCVER NE #0 THEN ;IF UNIT HAS NOT BEEN DR
014324  105737  003446                                                              TSTB    DROPED
014330  001015                                                                      BNE     50264$
014332  105737  002205                                                              TSTB    ERCVER
014336  001412                                                                      BEQ     50264$
014340                                  PRINTB #NURTY1,RETRYC    ;PRINT # OF RETRIES TO RECOVER
014340  013746  003404                                                              MOV     RETRYC,-
014344  012746  005073                                                              MOV     #NURTY1,
014350  012746  000002                                                              MOV     #2,-(SP)
014354  010600                                                                      MOV     SP,R0
014356  104414                                                                      TRAP    C$PNTB
014360  062706  000006                                                              ADD     #6,SP
014364                                ENDIF                       ;PROVIDED PRINT HAS BEEN ENABLED
014364                                                                  50264$:
014364                              ENDIF
014364                                                                  50263$:
```

```
 4826  014364                                    ENDIF
 4827  014364                                                                  50262$:
 4828  014364                                  ENDIF
 4829  014364                                                                  50260$:
 4830  014364                                ENDIF
 4831  014364                                                                  50250$:
 4832  014364                                ENDIF
 4833  014364                                                                  50247$:
 4834  014364  000207                       RTS PC
 4835                                ;       INDEXES TO BYTE COUNTERS.
 4836  014366  000000                BINC:   0                               ;WRITE.
 4837  014370  000040                        40                              ;READ REV.
 4838  014372  000100                        100                             ;READ FWD.
 4839                                ;       INDEXES TO READ/WRITE ERROR COUNTERS.
 4840  014374  000000                EINC:   0                               ;WRITE.
 4841  014376  000020                        20                              ;READ REV.
 4842  014400  000040                        40                              ;READ FWD.
 4843
 4844
```

```
4845
4846                                    ;       IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
4847                                    ;       TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
4848                                    ;       READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
4849                                    ;       INPUTS:
4850                                    ;       OUTPUTS:
4851                                    ;       REGISTERS:
4852                                    ;       CALLS:          VFEXC.
4853
4854  014402                            VFYDAT::  IFB VFYFLG NE #0 THEN         ;IF DATA IS TO BE VERIFIED:
4855  014402  105737  003442                                                                  TSTB    VFYFLG
4856  014406  001435                                                                           BEQ     50265$
4857  014410                                    LET PCMDWD := CMDWRD           ;SAVE THE PREVIOUS COMMAND WORD.
4858  014410  013737  003346  003352                                                          MOV     CMDWRD,P
4859  014416                                    LET CMDWRD := #RDR             ;COMMAND IS READ REV.
4860  014416  012737  104401  003346                                                          MOV     #RDR,CMD
4861  014424                                    LET CMDLG := #4                ;SET UP CMD LOGGING INDEX.
4862  014424  012737  000004  003354                                                          MOV     #4,CMDLG
4863  014432  004737  014504                   JSR   PC,VFEXC                 ;GO READ ALL THE RECORDS REV.
4864  014436                                    IF DEVTBL(R5) EQ #NINUSE THEN ;BTL
4865  014436  026527  002532  177774                                                          CMP     DEVTBL(R
4866  014444  001003                                                                         BNE     50266$
4867  014446  000137  014502                   JMP 1$                         ;BTL
4868  014452                                    ELSE                           ;BTL
4869  014452  000400                                                                         BR      50267$
4870  014454                                                                          50266$:
4871  014454                                    ENDIF                          ;BTL
4872  014454                                                                          50267$:
4873  014454                                    LET PCMDWD := CMDWRD           ;SAVE THE PREVIOUS COMMAND WORD.
4874  014454  013737  003346  003352                                                          MOV     CMDWRD,P
4875  0144 2                                    LET CMDWRD := #RDF             ;COMMAND IS READ FWD.
4876  014462  012737  104001  003346                                                          MOV     #RDF,CMD
4877  014470                                    LET CMDLG := #6                ;SET UP CMD LOGGING INDEX.
4878  014470  012737  000006  003354                                                          MOV     #6,CMDLG
4879  014476  004737  014504                   JSR   PC,VFEXC                 ;GO READ ALL RECORDS FWD.
4880  014502                                    ENDIF
4881  014502                                                                          50265$:
4882  014502  000207                   1$:     RTS     PC      ;RETURN.
```

```
4883                                    ;       SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
4884                                    ;       INPUTS:
4885                                    ;       OUTPUTS:
4886                                    ;       REGISTERS:      R2
4887                                    ;       CALLS:          CMDAC, FIRSTU, VFISU, NEXTU, CKHAF.
4888
4889  014504                            VFEXC:: LET CMDPKT := CMDWRD CLR.BY #BRF.C  ;COMMAND PACKET = READ REV OR FWD.
4890  014504  013737  003346  002310                                                      MOV     CMDWRD,C
4891  014512  042737  004000  002310                                                      BIC     #BRF.C,C
4892  014520                                  IFB SWBFLG NE #0 THEN           ;IF BYTES ARE TO BE SWAPPED:
4893  014520  105737  003444                                                             TSTB    SWBFLG
4894  014524  001403                                                                     BEQ     50270$
4895  014526                                    LET CMDPKT := CMDPKT SET.BY #SWB.C  ;SET SWAB BIT IN CMD PACKET.
4896  014526  052737  010000  002310                                                      BIS     #SWB.C,C
4897  014534                                  ENDIF
4898  014534                                                                      50270$:
4899  014534                                  LET CMDSAV := CMDPKT             ;SAVE COMMAND PACKET 1ST WORD.
4900  014534  013737  002310  003350                                                      MOV     CMDPKT,C
4901  014542  013737  003336  002312          MOV     DATARD,CMDPKT+CP.ADL     ;SAVE BUFFER START ADDRESS.
4902  014550                                  LET NCNT := #0                   ;CLEAR NUMBER OF OPERATIONS.
4903  014550  005037  003340                                                             CLR     NCNT
4904  014554                                  WHILE NCNT LT NCNT1 DO           ;WHILE THERE ARE RECORDS REMAINING:
4905  014554                                                                      50271$:
4906  014554  023737  003340  003342                                                      CMP     NCNT,NCN
4907  014562  002071                                                                     BGE     50272$
4908  014564  004737  007344                    JSR PC,CMDAC                   ;STORE CMD ASCII IN ERROR MSG.
4909  014570  004737  015452                    JSR   PC,FIRSTU                ;SET UP FOR FIRST UNIT.
4910  014574                                    WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE DEVICES REMAINING:
4911  014574                                                                      50273$:
4912  014574  026527  002532  177777                                                      CMP     DEVTBL(R
4913  014602  001442                                                                     BEQ     50274$
4914  014604                                IF #MOD.CO SETIN CMDWRD THEN  ;IF CMD IS REVERSE THEN:
4915  014604  032737  000400  003346                                                      BIT     #MOD.CO,
4916  014612  001421                                                                     BEQ     50275$
4917  014614                                  IF #XO.BOT NOTSETIN FOTFLG(R5) THEN  ;IF NOT AT BOT
4918  014614  032765  000002  003426                                                      BIT     #XO.BOT,
4919  014622  001014                                                                     BNE     50276$
4920  014624                                    IF #XO.EOT SETIN FOTFLG(R5) THEN   ;BUT IF AT EOT
4921  014624  032765  000001  003426                                                      BIT     #XO.EOT,
4922  014632  001406                                                                     BEQ     50277$
4923  014634                                      IFB ALLEOT NE #0 THEN          ;AND ALL OTHERS AT EOT
4924  014634  105737  003450                                                             TSTB    ALLEOT
4925  014640  001402                                                                     BEQ     50300$
4926  014642  004737  014750                      JSR PC,VFISU                 ;THEN READ VERIFY
4927  014646                                    ENDIF                          ;IF NOT ALL AT EOT, FREEZE
4928  014646                                                                      50300$:
4929  014646                                    ELSE                           ;IF NOT AT BOT AND
4930  014646  000402                                                                     BR      50301$
4931  014650                                                                      50277$:
4932  014650  004737  014750                      JSR PC,VFISU                 ;NOT AT EOT, READ VFY
4933  014654                                    ENDIF
4934  014654                                                                      50301$:
4935  014654                                  ENDIF
4936  014654                                                                      50276$:
4937  014654                                ELSE                       ;ELSE IF CMD IS NOT REVERSE;
4938  014654  000412                                                             BR      50302$
```

```
014656                                                                     50275$:
014656                                  IF #XO.EOT NOTSETIN FOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
014656  032765  000001  003426                                                           BIT     #XO.EOT,
014664  001404                                                                           BEQ     50303$
014666  032737  000001  003346                                                           BIT     #CMD.CO,
014674  001002                                                                           BNE     50304$
014676                                                                     50303$:
                                                      ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
014676  004737  014750                     JSR PC,VFISU          ;ISSUE CMD. CHECK STATUS AND DATA.
014702                                  ENDIF
014702                                                                     50304$:
014702                               ENDIF
014702                                                                     50302$:
014702  004737  015520             JSR PC,NEXTU               ;GO FIND THE NEXT UNIT.
014706                            ENDDO
014706  000732                                                                           BR      50273$
014710                                                                     50274$:
014710  004737  016060            JSR   PC,CKHAE             ;CHECK FOR HALT AFTER EACH CMD.
014714                            IF DEVTBL(R5) EQ #NINUSE THEN ;BTL
014714  026527  002532  177774                                                           CMP     DEVTBL(R
014722  001003                                                                           BNE     50305$
014724  000137  014746            JMP 1$                     ;BTL
014730                            ELSE                       ;BTL
014730  000400                                                                           BR      50306$
014732                                                                     50305$:
014732                            ENDIF                      ;BTL
014732                                                                     50306$:
014732                            LET NCNT := NCNT + #1      ;UPDATE THE RECORD COUNT.
014732  005237  003340                                                                   INC     NCNT
014736                            LET PCMDWD := CMDWRD       ;SAVE PREVIOUS COMMAND WORD.
014736  013737  003346  003352                                                           MOV     CMDWRD,P
014744                         ENDDO
014744  000703                                                                           BR      50271$
014746                                                                     50272$:
014746  000207              1$:    RTS     PC                ;RETURN.
```

```
                                        ;       SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
                                        ;       CHECK STATUS, CHECK DATA.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2
                                        ;       CALLS:          EXCUTE, GOWAIT, CKDATA.

014750                                  VFISU::     LET R2 := DATARD + 08.          ;INIT READ BUFFER POINTER.
014750  013702  003336                                                                      MOV     DATARD,R
014754  062702  000010                                                                      ADD     08.,R2
014760                                              WHILE R2 NE DATARD DO           ;UNTIL 8 BYTES HAVE BEEN SET,
014760                                                                                  50307$:
014760  020237  003336                                                                      CMP     R2,DATAR
014764  001403                                                                            BEQ     50310$
014766                                                LET -(R2) := 0-1              ;INIT READ BUFFER.
014766  012742  177777                                                                      MOV     0-1,-(R2
014772                                              ENDDO
014772  000772                                                                            BR      50307$
014774                                                                                  50310$:
014774  004737  010326                              JSR PC,EXCUTE                   ;GO EXECUTE THE COMMAND.
015000                                              IFB DROPED EQ 00 THEN           ;IF UNIT HAS NOT BEEN DROPPED THEN:
015000  105737  003446                                                                      TSTB    DROPED
015004  001002                                                                            BNE     50311$
015006  004737  010636                                JSR     PC,GOWAIT               ;GO WAIT FOR DONE BIT.
015012                                              ENDIF
015012                                                                                  50311$:
015012                                              IFB DROPED EQ 00 THEN           ;IF UNIT HAS NOT BEEN DROPPED THEN:
015012  105737  003446                                                                      TSTB    DROPED
015016  001006                                                                            BNE     50312$
015020                                                IF 0X0.BOT NOTSETIN EOTFLG(R5) THEN     ;WHEN NOT REVERSED INTO B
015020  032765  000002  003426                                                                BIT     0X0.BOT,
015026  001002                                                                            BNE     50313$
015030  004737  015036                                  JSR     PC,CKDATA           ;GO VERIFY DATA.
015034                                                ENDIF
015034                                                                                  50313$:
015034                                              ENDIF
015034                                                                                  50312$:
015034  000207                              RTS PC
```

```
                        ;       SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
                        ;       AND PRINT ERROR MESSAGE ON MISCOMPARE.
                        ;       INPUTS:
                        ;       OUTPUTS:
                        ;       REGISTERS:      R2, R3, R4.
                        ;       CALLS:          GCMDA

015036                  CKDATA:: LET R3 := BRFCNT - MSGPKT+MS.RFC ;COMPUTE REC LENGTH READ
015036  013703  003344                                                  MOV     BRFCNT,R
015042  163703  002340                                                  SUB     MSGPKT+M
015046                          IF R3 EQ #0 THEN                ;WHEN NO DATA RECEIVED
015046  005703                                                          TST     R3
015050  001015                                                          BNE     50314$
015052                            ERRHRD 17,WTVERM,DTAERM               ;PRINT ERROR AND EXIT
015052  104456                                                          TRAP    C$ERHRD
015054  000021                                                          .WORD   17
015056  004164                                                          .WORD   WTVERM
015060  005224                                                          .WORD   DTAERM
015062                            PRINTB #DTAER4                ;COMPARE ROUTINE
015062  012746  005010                                                  MOV     #DTAER4,
015066  012746  000001                                                  MOV     #1,-(SP)
015072  010600                                                          MOV     SP,R0
015074  104414                                                          TRAP    C$PNTB
015076  062706  000004                                                  ADD     #4,SP
015102                          ELSE
015102  000560                                                          BR      50315$
015104                                                          50314$:
015104                            IF R3 HI BRFCNT THEN          ;WHEN REC READ IS LONGER
015104  020337  003344                                                  CMP     R3,BRFCN
015110  101417                                                          BLOS    50316$
015112                            ERRHRD 17,WTVERM,DTAERM               ;THAN EXPECTED, PRINT
015112  104456                                                          TRAP    C$ERHRD
015114  000021                                                          .WORD   17
015116  004164                                                          .WORD   WTVERM
015120  005224                                                          .WORD   DTAERM
015122                            PRINTB #DTAER5,CMDPKT+CP.CNT          ;AN ERROR MESSAGE
015122  013746  002316                                                  MOV     CMDPKT+C
015126  012746  005031                                                  MOV     #DTAER5,
015132  012746  000002                                                  MOV     #2,-(SP)
015136  010600                                                          MOV     SP,R0
015140  104414                                                          TRAP    C$PNTB
015142  062706  000006                                                  ADD     #6,SP
015146                          ELSE                            ;AND EXIT ROUTINE
015146  000536                                                          BR      50317$
015150                                                          50316$:
015150                            LET CKDCNT := R3 - #1                 ;SAVE VERIFICATION LENGTH - 1.
015150  010337  015446                                                  MOV     R3,CKDCN
015154  005337  015446                                                  DEC     CKDCNT
015160  005037  015450                  CLR CKDFF               ;CLEAR # OF BYTES IN ERROR COUNTER.
015164  005002                          CLR R2                  ;INIT BYTE COUNTER
015166                                  LET R3 := DATAWT        ;GET WRITE BUFFER ADDRESS.
015166  013703  003334                                                  MOV     DATAWT,R
015172                                  LET R4 := DATARD        ;GET READ BUFFER ADDRESS.
015172  013704  003336                                                  MOV     DATARD,R
015176                                  IFB T1SWB NE #0 THEN    ;WHEN RUNNING TEST1-SUB 1?.
015176  105737  003447                                                  TSTB    T1SWB
```

```
015202 001401                                                                                  BEQ    50320$
015204 000313                           SWAB (R3)                 ;SWAP FIRST WORD OF WRT BFR
015206                                 ENDIF                      ;WHICH CONTAINS THE RECORD COUNT
015206                                                                              50320$:
015206                                 REPEAT                     ;REPEAT UNTIL ALL DATA IS COMPARED:
015206                                                                              50321$:
015206                                   IF R2 EQ CKDCNT THEN     ;IF THIS IS THE LAST BYTE THEN:
015206 020237 015446                                                                           CMP    R2,CKDCN
015212 001011                                                                                  BNE    50322$
015214                                     IFB SWBFLG NE #0 THEN  ;IF BYTE SWAPPING IS ENABLED THEN:
015214 105737 003444                                                                           TSTB   SWBFLG
015220 001406                                                                                  BEQ    50323$
015222                                       IF #BIT00 NOTSETIN CKDCNT THEN     ;IF RECORD LENGTH IS ODD
015222 032737 000001 015446                                                                    BIT    #BIT00,C
015230 001002                                                                                  BNE    50324$
015232 105723                                  TSTB        (R3)+            ;LAST BYTE WILL BE IN
015234 105724                                  TSTB        (R4)+            ;THE UPPER BYTE.
015236                                       ENDIF
015236                                                                              50324$:
015236                                     ENDIF
015236                                                                              50323$:
015236                                   ENDIF
015236                                                                              50322$:
015236 121314                            CMPB (R3),(R4)           ;ARE THEY EQUAL.
015240 001452                            BEQ        3$                  ;BR IF SO.
015242 005737 015450                     TST CKDFF                ;1 ST TIME THRU?
015246 001010                            BNE        2$                  ;BR IF NOT.
015250 005265 003274                     INC        VFYCNT(R5)          ;INC THE VERIFY ERROR COUNTER.
015254 005265 003304                     INC HRDCNT(R5)           ;INC THE HARD ERROR COUNT.
015260                                   ERRHRD #17,WTVERM,DTAERM ;REPORT WRITE/VERIFY ERROR.
015260 104456                                                                                  TRAP   C$ERHRD
015262 000021                                                                                  .WORD  17
015264 004164                                                                                  .WORD  WTVERM
015266 005224                                                                                  .WORD  DTAERM
015270                       2$:         LET CKDFF := CKDFF + #1  ;INCREMENT # OF BYTES IN ERROR.
015270 005237 015450                                                                           INC    CKDFF
015274 111437 003364                     MOVB (R4),TIME1          ;SAVE WAS DATA FOR TYPOUT.
015300 042737 177400 003364              BIC        #177400,TIME1       ;CLEAR GARBAGE.
015306 111337 003366                     MOVB (R3),TIME2          ;SAVE SHOULD BE DATA FOR TYPOUT.
015312 042737 177400 003366              BIC        #177400,TIME2       ;CLEAR GARBAGE.
015320                                   IF CKDFF LT #11. THEN    ;IF ERROR BYTE COUNT IS LESS THAN 11:
015320 023727 015450 000013                                                                    CMP    CKDFF,#1
015326 002017                                                                                  BGE    50325$
015330                                     PRINTX #DTAER2,R2,<B,TIME1>,<B,TIME2>  ;PRINT EXP + ACT DATA.
015330 005046                                                                                  CLR    -(SP)
015332 153716 003366                                                                           BISB   TIME2,(S
015336 005046                                                                                  CLR    -(SP)
015340 153716 003364                                                                           BISB   TIME1,(S
015344 010246                                                                                  MOV    R2,-(SP)
015346 012746 004677                                                                           MOV    #DTAER2,
015352 012746 000004                                                                           MOV    #4,-(SP)
015356 010600                                                                                  MOV    SP,R0
015360 104415                                                                                  TRAP   C$PNTX
015362 062706 000012                                                                           ADD    #12,SP
015366                                   ENDIF
015366                                                                              50325$:
```

```
5125  015366  105723                3$:     TSTB (R3)+                      ;UPDATE WRITE BUFFER ADDRESS.
5126  015370  105724                        TSTB (R4)+                      ;UPDATE READ BUFFER ADDRESS.
5127  015372  105722                        TSTB (R2)+                      ;UPDATE BYTE COUNTER.
5128  015374                              UNTIL R2 GT CKDCNT          ;END OF DATA COMPARE REPEAT LOOP.
5129  015374  020237  015446                                                    CMP     R2,CKDCN
5130  015400  003702                                                          BLE     50321$
5131  015402                              LET CKDCNT := CKDCNT + #1   ;CKDCNT EQUALS RECORD LENGTH.
5132  015402  005237  015446                                                    INC     CKDCNT
5133  015406                              IF CKDFF NE #0 THEN         ;IF COMPARE ERROR HAS OCCURED THEN:
5134  015406  005737  015450                                                    TST     CKDFF
5135  015412  001414                                                          BEQ     50326$
5136  015414                                PRINTB #DTAER3,CKDFF,CKDCNT       ;PRINT # OF BYTES IN ERROR.
5137  015414  013746  015446                                                    MOV     CKDCNT,-
5138  015420  013746  015450                                                    MOV     CKDFF,-(
5139  015424  012746  C04746                                                    MOV     #DTAER3,
5140  015430  012746  000003                                                    MOV     #3,-(SP)
5141  015434  010600                                                          MOV     SP,R0
5142  015436  104414                                                          TRAP    C$PNTB
5143  015440  062706  000010                                                    ADD     #10,SP
5144  015444                                ENDIF
5145  015444                                                          50326$:
5146  015444                              ENDIF
5147  015444                                                          50317$:
5148  015444                            ENDIF
5149  015444                                                          50315$:
5150  015444  000207                      RTS     PC                  ;OTHERWISE, RETURN.
5151
5152  015446  000000              CKDCNT: .WORD   0                   ;# OF BYTES TO BE VERIFIED -1.
5153  015450  000000              CKDFF:  .WORD   0                   ;# OF BYTES IN ERROR COUNTER.
```

```
5154                                    ;       SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
5155                                    ;       INPUTS:
5156                                    ;       OUTPUTS:
5157                                    ;       REGISTERS:
5158                                    ;       CALLS:
5159
5160  015452                            FIRSTU:: LET DROPED :B= #0                ;CLR UNIT DROPPED FLAG
5161  015452  105037  003446                                                              CLRB    DROPED
5162  015456                                    LET R5 := #0                      ;CLR DEVICE POINTER.
5163  015456  005005                                                                     CLR     R5
5164  015460                                    WHILE DEVTBL(R5) EQ #NINUSE DO    ;WHILE DEVICES ARE NOT IN USE:
5165  015460                                                                                50327$:
5166  015460  026527  002532  177774                                                       CMP     DEVTBL(R
5167  015466  001003                                                                       BNE     50330$
5168  015470                                      LET R5 := R5 + #2               ;POINT TO NEXT DEVICE.
5169  015470  062705  000002                                                             ADD     #2,R5
5170  015474                                    ENDDO
5171  015474  000771                                                                     BR      50327$
5172  015476                                                                        50330$:
5173  015476                                    IF DEVTBL(R5) EQ #END THEN        ;IF ALL UNITS HAVE BEEN DROPPED THEN:
5174  015476  026527  002532  177777                                                       CMP     DEVTBL(R
5175  015504  001001                                                                       BNE     50331$
5176  015506                                      DOCLN                             ;DO CLEAN CODE AND TERMINATE PASS.
5177  015506  104444                                                                     TRAP    C$DCLN
5178  015510                                    ENDIF
5179  015510                                                                        50331$:
5180  015510                                    LET L$LUN := DEVTBL(R5)           ;SET UNIT # IN "HEADER" FOR ERROR REPORT
5181  015510  016537  002532  002074                                                     MOV     DEVTBL(R
5182  015516  000207                                    RTS     PC                ;RETURN WITH 1ST DEVICE IN R5.
5183
5184
5185
5186
5187
5188                                    ;       SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
5189                                    ;       INPUTS:
5190                                    ;       OUTPUTS:
5191                                    ;       REGISTERS:
5192                                    ;       CALLS:
5193
5194  015520                            NEXTU:: LET DROPED :B= #0                 ;CLR UNIT DROPPED FLAG
5195  015520  105037  003446                                                              CLRB    DROPED
5196  015524  042705  177770                   BIC     #177770,R5                ;BTL
5197  015530                                    REPEAT                            ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
5198  015530                                                                                50332$:
5199  015530                                      LET R5 := R5 + #2               ;UPDATE DEVICE TABLE POINTER.
5200  015530  062705  000002                                                             ADD     #2,R5
5201  015534                                    UNTIL DEVTBL(R5) NE #NINUSE
5202  015534  026527  002532  177774                                                       CMP     DEVTBL(R
5203  015542  001772                                                                       BEQ     50332$
5204  015544                                    LET L$LUN := DEVTBL(R5)           ;SET UNIT # IN "HEADER" FOR ERROR REPORT
5205  015544  016537  002532  002074                                                     MOV     DEVTBL(R
5206  015552  000207                                    RTS     PC                ;RETURN.
5207
5208
5209
```

```
5210                                    ;       SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
5211                                    ;       INPUTS:
5212                                    ;       OUTPUTS:
5213                                    ;       REGISTERS:
5214                                    ;       CALLS:          MOVMSG, PRXST, LOG
5215
5216  015554                            DROPU:: LET R5 := R5SAVE                ;BTL
5217  015554  013705  003400                                                            MOV     R5SAVE,R
5218  015560                                    LET FTLCNT(R5) := FTLCNT(R5) + #1  ;INCREMENT THE FATAL ERROR COUNT.
5219  015560  005265  003314                                                            INC     FTLCNT(R
5220  015564                                    LET R4 := MSGPKT+MS.XS3 CLR.BY #377 ;GET UDIAG ERROR CODE FROM XSTAT3.
5221  015564  013704  002350                                                            MOV     MSGPKT+M
5222  015570  042704  000377                                                            BIC     #377,R4
5223  015574                                    LET R3 := MSGPKA(R5)              ;ADR OF THIS UNIT'S MSG PACKET.
5224  015574  016503  002502                                                            MOV     MSGPKA(R
5225  015600                                    LET R2 := #0                      ;CLR COUNTER.
5226  015600  005002                                                            CLR     R2
5227  015602                                    WHILE R2 NE #MSGCNT DO            ;WHILE THERE ARE MORE LOCATIONS:
5228  015602                                                                  50333$:
5229  015602  020227  000016                                                            CMP     R2,#MSGC
5230  015606  001405                                                            BEQ     50334$
5231  015610                                      LET (R3)+ := #-1                ;INIT THE MSG PACKET WITH ALL 1'S
5232  015610  012723  177777                                                            MOV     #-1,(R3)
5233  015614                                      LET R2 := R2 + #2               ;UPDATE COUNTER.
5234  015614  062702  000002                                                            ADD     #2,R2
5235  015620                                    ENDDO
5236  015620  000770                                                            BR      50333$
5237  015622                                                                  50334$:
5238  015622                                    LET @TSDB(R5) := #GSCPK           ;INITIATE A GET STATUS COMMAND.
5239  015622  012775  002320  002452                                                    MOV     #GSCPK,@
5240  015630  004737  011170                  JSR PC,WSSR                       ;WAIT A WHILE FOR SSR=1
5241  015634  004737  011224                  JSR PC,MOVMSG                     ;MOVE MSG PACKET TO COMMON AREA.
5242  015640                                  IF R4 EQ #X3.RNY THEN             ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
5243  015640  020427  157400                                                            CMP     R4,#X3.R
5244  015644  001005                                                            BNE     50335$
5245  015646                                    ERRDF #16,RNYM,STAERM             ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
5246  015646  104455                                                            TRAP    C$ERDF
5247  015650  000020                                                            .WORD   16
5248  015652  004504                                                            .WORD   RNYM
5249  015654  005372                                                            .WORD   STAERM
5250  015656                                  ELSE                              ;ELSE-IF NOT A RUNNAWAY:
5251  015656  000402                                                            BR      50336$
5252  015660                                                                  50335$:
5253  015660  004737  015776                    JSR PC,PRXST                    ;PRINT EXTENDED STATUS REGISTERS.
5254  015664                                  ENDIF
5255  015664                                                                  50336$:
5256  015664                                  IFB RECLOG NE #0 THEN             ;IF THE RECORD HAS BEEN LOGGED THEN:
5257  015664  105737  003411                                                            TSTB    RECLOG
5258  015670  001404                                                            BEQ     50337$
5259  015672                                    LET DROPED :B= DROPED + #1      ;SET UNIT DROPPED FLAG.
5260  015672  105237  003446                                                            INCB    DROPED
5261  015676  004737  014102                    JSR PC,LOG                      ;LOG DATA BYTES + RD/WR ERRORS.
5262  015702                                  ENDIF
5263  015702                                                                  50337$:
5264  015702                                  DORPT                             ;PRINT PERFORMANCE REPORT
5265  015702  104424                                                            TRAP    C$DRPT
```

```
5266  015704                          DROPUA: IF PASCNT(R5) NE #0 THEN
5267  015704  005765  003254                                                  TST     PASCNT(R
5268  015710  001402                                                          BEQ     50340$
5269  015712                            LET PASCNT(R5) := PASCNT(R5) - #1
5270  015712  005365  003254                                                  DEC     PASCNT(R
5271  015716                          ENDIF
5272  015716                                                              50340$:
5273  015716                          LET DROPN := DEVTBL(R5)          ;SAVE # OF UNIT TO BE DROPPED.
5274  015716  016537  002532  015774                                          MOV     DEVTBL(R
5275  015724                          LET R0 := R5 SHIFT -1            ;R0=LOGICAL DEVICE NUMBER
5276  015724  010500                                                          MOV     R5,R0
5277  015726  006200                                                          ASR     R0
5278  015730                          DODU R0                  ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU = 0
5279  015730  104451                                                          TRAP    C$DODU
5280  015732                          IF DEVTBL(R5) NE #NINUSE THEN    ;IF UNIT NOT DROPPED
5281  015732  026527  002532  177774                                          CMP     DEVTBL(R
5282  015740  001410                                                          BEQ     50341$
5283  015742                            IFB IREC EQ #0 THEN              ;IF RECOVERY IS ENABLED THEN:
5284  015742  105737  002211                                                  TSTB    IREC
5285  015746  001005                                                          BNE     50342$
5286  015750  000240                               NOP
5287  015752  000240                               NOP
5288  015754  000240                               NOP
5289  015756                                       LET STAFLG :B= STAFLG + #1      ;SET START FLAG TO ENABLE REWIND.
5290  015756  105237  003452                                                  INCB    STAFLG
5291  015762                            ENDIF
5292  015762                                                              50342$:
5293  015762                          ENDIF
5294  015762                                                              50341$:
5295  015762                  DRORTN: LET DROPED :B= DROPED + #1        ;SET UNIT DROPPED FLAG.
5296  015762  105237  003446                                                  INCB    DROPED
5297  015766                          LET R5 := R5SAVE                 ;BTL
5298  015766  013705  003400                                                  MOV     R5SAVE,R
5299  015772  000207                 RTS     PC                       ;RETURN.
5300
5301  015774  000000          DROPN:  .WORD   0                        ;# OF UNIT TO BE DROPPED
```

```
5302                                    ;       SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
5303                                    ;       INPUTS:
5304                                    ;       OUTPUTS:
5305                                    ;       REGISTERS:
5306                                    ;       CALLS:
5307
5308  015776                            PRXST:: PRINTX #GETSTM
5309  015776  012746  005157                                                  MOV     #GETSTM,
5310  016002  012746  000001                                                  MOV     #1,-(SP)
5311  016006  010600                                                          MOV     SP,R0
5312  016010  104415                                                          TRAP    C$PNTX
5313  016012  062706  000004                                                  ADD     #4,SP
5314  016016                                  PRINTX  #STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
5315  016016  013746  002350                                                  MOV     MSGPKT+M
5316  016022  013746  002346                                                  MOV     MSGPKT+M
5317  016026  013746  002344                                                  MOV     MSGPKT+M
5318  016032  013746  002342                                                  MOV     MSGPKT+M
5319  016036  012746  006217                                                  MOV     #STAER5,
5320  016042  012746  000005                                                  MOV     #5,-(SP)
5321  016046  010600                                                          MOV     SP,R0
5322  016050  104415                                                          TRAP    C$PNTX
5323  016052  062706  000014                                                  ADD     #14,SP
5324  016056  000207                                  RTS PC
5325
5326
5327
5328
5329                                    ;       SUBROUTINE TO HALT AFTER EACH COMMAND.
5330                                    ;       INPUTS:
5331                                    ;       OUTPUTS:
5332                                    ;       REGISTERS:      R3, R4
5333                                    ;       CALLS:
5334
5335  016060                            CKHAE:: IFB HAE NE #0 THEN              ;IF HALT FLAG IS SET:
5336  016060  105737  002204                                                  TSTB    HAE
5337  016064  001430                                                          BEQ     50343$
5338  016066                                    IFB MISCFG EQ #0 THEN         ;
5339  016066  105737  003455                                                  TSTB    MISCFG
5340  016072  001023                                                          BNE     50344$
5341  016074                                      MANUAL                      ;IS MANUAL INTERVENTION ALLOWED?
5342  016074  104450                                                          TRAP    C$MANI
5343  016076                                      BNCOMPLETE CKHRTN           ;BR IF NOT.
5344  016076  103023                                                          BCC     CKHRTN
5345  016100                                      LET R4 := CMDWRD            ;COMMAND WORD.
5346  016100  013704  003346                                                  MOV     CMDWRD,R
5347  016104  004737  007416                     JSR PC,GCMDA                ;FETCH ADR OF CMD ASCII.
5348  016110                                      LET HALTM :B= (R3)+         ;MOVE CMD ASCII
5349  016110  112337  004042                                                  MOVB    (R3)+,HA
5350  016114                                      LET HALTM+1 :B= (R3)+
5351  016114  112337  004043                                                  MOVB    (R3)+,HA
5352  016120                                      LET HALTM+2 :B= (R3)                ;INTO MESSAGE.
5353  016120  111337  004044                                                  MOVB    (R3),HAL
5354  016124                                      GMANIL HALTM,TIME1,1,YES    ;HALT - WAIT FOR AN OEPRATOR INPUT.
5355  016124  104443                                                          TRAP    C$GMAN
5356  016126  000404                                                          BR      10000$
5357  016130  003364                                                          .WORD   TIME1
```

```
5358  016132  000130                                                          .WORD   T$CODE
5359  016134  004042                                                          .WORD   HALTM
5360  016136  000001                                                          .WORD   1
5361  016140                                10000$:
5362  016140                                          ELSE
5363  016140  000407                                                          BR      50345$
5364  016142                                                        50344$:
5365  016142                                            LET MISCFG :B= #0     :
5366  016142  105037  003455                                                  CLRB    MISCFG
5367  016146                                          ENDIF
5368  016146                                                        50345$:
5369  016146                                        ENDIF
5370  016146                                                        50343$:
5371  016146  000207                       CKHRTN: RTS     PC                ;RETURN
5372                                                .EVEN
5373
5374  016150                                        ENDMOD
```

```
5375
5376                                    .TITLE MISCELLANEOUS SECTIONS
5377                                    .SBTTL  REPORT CODING SECTION
5378
5379  016150                                    BGNMOD
5380
5381                                    ;++
5382                                    ; THE REPORT CODING SECTION CONTAINS THE
5383                                    ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
5384                                    ;--
5385
5386  016150                                    BGNRPT
5387  016150                            L$RPT::
5388
5389
5390  016150                                    LET     R5SAVE := R5            ;SAVE CURRENT DEVICE POINTER.
5391  016150  010537  003400                                                            MOV     R5,R5SAV
5392  016154  004737  015452                    JSR     PC,FIRSTU               ;FIND THE FIRST UNIT.
5393  016160                                    WHILE DEVTBL(R5) NE #END DO     ;WHILE THERE ARE MORE DEVICES:
5394  016160                                                                                50346$:
5395  016160  026527  002532  177777                                                      CMP     DEVTBL(R
5396  016166  001562                                                                      BEQ     50347$
5397  016170                                      PRINTS      #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
5398  016170  016546  003324                                                            MOV     RECCNT(R
5399  016174  016546  003254                                                            MOV     PASCNT(R
5400  016200  016546  002532                                                            MOV     DEVTBL(R
5401  016204  012746  017012                                                            MOV     #RPT1A,-
5402  016210  012746  000004                                                            MOV     #4,-(SP)
5403  016214  010600                                                                    MOV     SP,R0
5404  016216  104416                                                                    TRAP    C$PNTS
5405  016220  062706  000012                                                            ADD     #12,SP
5406  016224                                      PRINTS      #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
5407  016224  016546  002554                                                            MOV     WRBC(R5)
5408  016230  016546  002564                                                            MOV     WRBC+10(
5409  016234  016546  002574                                                            MOV     WRBC+20(
5410  016240  016546  002604                                                            MOV     WRBC+30(
5411  016244  012746  017067                                                            MOV     #RPT1B,-
5412  016250  012746  000005                                                            MOV     #5,-(SP)
5413  016254  010600                                                                    MOV     SP,R0
5414  016256  104416                                                                    TRAP    C$PNTS
5415  016260  062706  000014                                                            ADD     #14,SP
5416  016264                                      PRINTS      #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
5417  016264  016546  002614                                                            MOV     RRBC(R5)
5418  016270  016546  002624                                                            MOV     RRBC+10(
5419  016274  016546  002634                                                            MOV     RRBC+20(
5420  016300  016546  002644                                                            MOV     RRBC+30(
5421  016304  012746  017140                                                            MOV     #RPT1C,-
5422  016310  012746  000005                                                            MOV     #5,-(SP)
5423  016314  010600                                                                    MOV     SP,R0
5424  016316  104416                                                                    TRAP    C$PNTS
5425  016320  062706  000014                                                            ADD     #14,SP
5426  016324                                      PRINTS      #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
5427  016324  016546  002654                                                            MOV     RFBC(R5)
5428  016330  016546  002664                                                            MOV     RFBC+10(
5429  016334  016546  002674                                                            MOV     RFBC+20(
5430  016340  016546  002704                                                            MOV     RFBC+30(
```

```
 5431  016344  012746  017211                                                          MOV     #RPT1D,-
 5432  016350  012746  000005                                                          MOV     #5,-(SP)
 5433  016354  010600                                                                 MOV     SP,R0
 5434  016356  10441F                                                                 TRAP    C$PNTS
 5435  016360  062706  000014                                                         ADD     #14,SP
 5436  016364                          PRINTS      #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
 5437  016364  016546  002754                                                          MOV     RFREC(R5
 5438  016370  016546  002734                                                          MOV     RRREC(R5
 5439  016374  016546  002714                                                          MOV     WRREC(R5
 5440  016400  012746  017315                                                          MOV     #RPT1F,-
 5441  016404  012746  000004                                                          MOV     #4,-(SP)
 5442  016410  010600                                                                 MOV     SP,R0
 5443  016412  104416                                                                 TRAP    C$PNTS
 5444  016414  062706  000012                                                         ADD     #12,SP
 5445  016420                          PRINTS      #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
 5446  016420  016546  002764                                                          MOV     RFUNR(R5
 5447  016424  016546  002744                                                          MOV     RRUNR(R5
 5448  016430  016546  002724                                                          MOV     WRUNR(R5
 5449  016434  012746  017366                                                          MOV     #RPT1G,-
 5450  016440  012746  000004                                                          MOV     #4,-(SP)
 5451  016444  010600                                                                 MOV     SP,R0
 5452  016446  104416                                                                 TRAP    C$PNTS
 5453  016450  062706  000012                                                         ADD     #12,SP
 5454  016454                          IFB BADTSW NE #0 THEN           ;
 5455  016454  105737  002206                                                         TSTB    BADTSW
 5456  016460  001402                                                                 BEQ     50350$
 5457  016462  004737  016544            JSR PC,BTRPT        ;GO PRINT BAD TAPE SPOTS WHEN  ENABLED
 5458  016466                          ENDIF
 5459  016466                                                                                  50350$:
 5460  016466                          PRINTS      #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)
 5461  016466  016546  003274                                                          MOV     VFYCNT(R
 5462  016472  016546  003314                                                          MOV     FTLCNT(R
 5463  016476  016546  003304                                                          MOV     HRDCNT(R
 5464  016502  016546  003264                                                          MOV     SCCNT(R5
 5465  016506  012746  017563                                                          MOV     #RPT1I,-
 5466  016512  012746  000005                                                          MOV     #5,-(SP)
 5467  016516  010600                                                                 MOV     SP,R0
 5468  016520  104416                                                                 TRAP    C$PNTS
 5469  016522  062706  000014                                                         ADD     #14,SP
 5470  016526  004737  015520            JSR    PC,NEXTU                 ;FIND THE NEXT UNIT
 5471  016532                          ENDDO
 5472  016532  000612                                                                 BR      50346$
 5473  016534                                                                                  50347$:
 5474  016534                          LET R5 := R5SAVE                 ;RESTORE CURRENT DEVICE POINTER.
 5475  016534  013705  003400                                                         MOV     R5SAVE,R
 5476  016540                          EXIT    RPT
 5477  016540  000137                                                                 .WORD   J$JMP
 5478  016542  001130                                                                 .WORD   L10010-2
 5479
 5480
 5481
 5482
 5483                            ;       SUBR TO PRINT BAD TAPES SPOTS DURING THE REPORT PRINTS
 5484                            ;       WRITE RETRIES: CUMULATIVE COUNT
 5485                            ;       BAD TAPE SPOTS: COUNT PER TAPE PASS ONLY, NOT CUMULATIVE.
 5486                            ;       COUNT OF RECOVERABLE WRITE ERRORS EXCLUDES BAD TAPE SPOTS.
```

```
5487
5488
5489  016544                                  BTRPT:  PRINTS  @RPT1E,WRTYCT(R5)       ;PRINT GLOBAL WRITE RETRY COUNT
5490  016544  016546  003244                                                                MOV     WRTYCT(R
5491  016550  012746  017437                                                                MOV     @RPT1E,-
5492  016554  012746  000002                                                                MOV     #2,-(SP)
5493  016560  010600                                                                        MOV     SP,R0
5494  016562  104416                                                                        TRAP    C$PNTS
5495  016564  062706  000006                                                                ADD     #6,SP
5496  016570                                          LET BTPT := BTADDR(R5)  ;BTPT IS BOTH THE BAD TAPE SPOT COUNTER
5497  016570  016537  002544  003436                                                        MOV     BTADDR(R
5498  016576                                          LET R3 := @BTPT SHIFT -1        ;AND THE LOGGING INDEX
5499  016576  017703  164634                                                                MOV     @BTPT,R3
5500  016602  006203                                                                        ASR     R3
5501  016604                                          PRINTS  @RPT1J,R3       ;PRINT # OF BAD TAPE SPOTS
5502  016604  010346                                                                        MOV     R3,-(SP)
5503  016606  012746  017467                                                                MOV     @RPT1J,-
5504  016612  012746  000002                                                                MOV     #2,-(SP)
5505  016616  010600                                                                        MOV     SP,R0
5506  016620  104416                                                                        TRAP    C$PNTS
5507  016622  062706  000006                                                                ADD     #6,SP
5508  016626                                          IF R3 NE #0 THEN                ;PRINT RECORD # IF BAD SPOTS DETECTED
5509  016626  005703                                                                        TST     R3
5510  016630  001457                                                                        BEQ     50351$
5511  016632                                            IF R3 HI #20. THEN            ;
5512  016632  020327  000024                                                                CMP     R3,#20.
5513  016636  101402                                                                        BLOS    50352$
5514  016640                                              LET R3 := #20.              ;20 BAD SPOTS IS THE LIMIT
5515  016640  012703  000024                                                                MOV     #20.,R3
5516  016644                                            ENDIF
5517  016644                                                                          50352$:
5518  016644                                          PRINTS          @CRLFSP         ;
5519  016644  012746  005216                                                                MOV     @CRLFSP,-
5520  016650  012746  000001                                                                MOV     #1,-(SP)
5521  016654  010600                                                                        MOV     SP,R0
5522  016656  104416                                                                        TRAP    C$PNTS
5523  016660  062706  000004                                                                ADD     #4,SP
5524  016664                                          LET R4 := BTPT + #2     ;FETCH A BAD SPOT ID
5525  016664  013704  003436                                                                MOV     BTPT,R4
5526  016670  062704  000002                                                                ADD     #2,R4
5527  016674                                          LET R2 := #0            ;R2 = PRINT COUNT PER LINE: 10 MAX
5528  016674  005002                                                                        CLR     R2
5529  016676                                          REPEAT                          ;
5530  016676                                                                          50353$:
5531  016676                                            PRINTS        @RPT1K,(R4)     ;PRINT A BAD SPOT ID
5532  016676  011446                                                                        MOV     (R4),-(S
5533  016700  012746  017554                                                                MOV     @RPT1K,-
5534  016704  012746  000002                                                                MOV     #2,-(SP)
5535  016710  010600                                                                        MOV     SP,R0
5536  016712  104416                                                                        TRAP    C$PNTS
5537  016714  062706  000006                                                                ADD     #6,SP
5538  016720                                            LET R2 := R2 + #1     ;COUNT PRINTS
5539  016720  005202                                                                        INC     R2
5540  016722                                            LET R4 := R4 + #2     ;NEXT
5541  016722  062704  000002                                                                ADD     #2,R4
5542  016726                                            IF R2 LO #10. THEN    ;
```

```
5543  016726  020227  000012                                                    CMP     R2,#10.
5544  016732  001014                                                            BNE     50354$
5545  016734                          PRINTS #CRLFSP          ;GO TO NEXT PRINT LINE PAST 10 PRINTS
5546  016734  012746  005216                                                    MOV     #CRLFSP,
5547  016740  012746  000001                                                    MOV     #1,-(SP)
5548  016744  010600                                                            MOV     SP,R0
5549  016746  104416                                                            TRAP    C$PNTS
5550  016750  062706  000004                                                    ADD     #4,SP
5551  016754                          LET R3 := R3 - #10.     ;ADJUST BAD SPOT COUNT
5552  016754  162703  000012                                                    SUB     #10.,R3
5553  016760                          LET R2 := R2 - #10.     ;ADJUST PRINT COUNT
5554  016760  162702  000012                                                    SUB     #10.,R2
5555  016764                        ENDIF                     ;
5556  016764                                                          50354$:
5557  016764                      UNTIL R2 EQ R3              ;LIMIT: # OF BAD SPOTS
5558  016764  020203                                                            CMP     R2,R3
5559  016766  001343                                                            BNE     50353$
5560  016770                    ENDIF                         ;
5561  016770                                                          50351$:
5562  016770                    PRINTS  #CRLF                 ;
5563  016770  012746  005213                                                    MOV     #CRLF,-(
5564  016774  012746  000001                                                    MOV     #1,-(SP)
5565  017000  010600                                                            MOV     SP,R0
5566  017002  104416                                                            TRAP    C$PNTS
5567  017004  062706  000004                                                    ADD     #4,SP
5568  017010  000207                    RTS PC
5569
5570
5571                                    .NLIST  BEX
      017012  047045  047045  040445  RPT1A:  .ASCIZ  /=N=N=AUNIT =D1=S3=APASS:=D5=S3=ARECORD:=D5=N/
      017067    045   041101  052131  RPT1B:  .ASCIZ  /=ABYTES WRITTEN  =D3=A,=Z3=A,=Z3=A,=Z3=N/
      017140  040445  054502  042524  RPT1C:  .ASCIZ  /=ABYTES READ REV =D3=A,=Z3=A,=Z3=A,=Z3=N/
      017211    045   041101  052131  RPT1D:  .ASCII  /=ABYTES READ FWD =D3=A,=Z3=A,=Z3=A,=Z3=N/
      017261    045   031123  022463          .ASCIZ  /=S23=AWRT=S4=ARDR=S4=ARDF=N/
      017315    045   051101  041505  RPT1F:  .ASCIZ  /=ARECOVERABLE ERRORS   =D5=S2=D5=S2=D5=N/
      017366  040445  047125  042522  RPT1G:  .ASCIZ  /=AUNRECOVERABLE ERRORS =D5=S2=D5=S2=D5=N/
      017437    045   053501  044522  RPT1E:  .ASCIZ  /=AWRITE RETRIES=S8=D5=N/
      017467    045   022516  031104  RPT1J:  .ASCIZ  /=N=D2=A BAD SPOTS THIS TAPE PASS PRECEDING RECORD #:/
      017554  042045  022465  030523  RPT1K:  .ASCIZ  /=D5=S1/
      017563    045   051501  042520  RPT1I:  .ASCII  "=ASPEC COND=S3=AHARD=S3=AFATAL=S3=ACOMPARE=N"
      017637    045   031523  042045          .ASCIZ  /=S3=D5=S3=D5=S3=D5=S3=D5=N=N/
                                              .LIST   BEX
5572                                          .EVEN
5573
5574  017674                          ENDRPT
5575  017674                      L10010:
5576  017674  104425                                                            TRAP    C$RPT
5577
5578                                  .SBTTL  LOAD DEVICE PROTECTION TABLE
5579
5580                                  ;++
5581                                  ;TABLE FOR SUPERVISOR TO IDENTIFY THE P TBL FOR THE LOAD DEV
5582                                  ;THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD
5583                                  ;--
5584
5585  017676                          BGNPROT
```

```
5586  017676                          L$PROT::
5587  017676  000000                          .WORD 0          ;P-TBL OFFSET OF TSSR, THE TS11 CSR
5588  017700  177777                          .WORD -1         ;P-TBL OFFSET OF MASS BUS UNIT 0: -1 = NOT A MAS
5589  017702  177777                          .WORD -1         ;P-TBL OFFSET OF DRIVE 0: -1 = NONE, ONE DRIVE P
5590  017704                                ENDPROT
```

```
                                          .SBTTL  INITIALIZE SECTION

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

 017704                                           BGNINIT
 017704                                   L$INIT::

 017704                                   INIT10: IF #BIT0!BIT1 SETIN #CMDPKT THEN  ;IF CMD PACKET IS NOT ON MODULO 4 BOUN
 017704  032727  000003  002310                                                                     BIT     #BIT0!BI
 017712  001426                                                                                     BEQ     50355$
 017714                                                  ERRSF #1,CMDPKM                ;PRINT ERROR MSG.
 017714  104454                                                                                     TRAP    C$ERSF
 017716  000001                                                                                     .WORD   1
 017720  004102                                                                                     .WORD   CMDPKM
 017722  000000                                                                                     .WORD   0
 017724  012746  000010                                  MOV    #8.,-(SP)               ;SETUP STACK FOR LONG DELAY
 017730                                   97$:           DELAY 250.                     ;GO TO SUPERVISOR, WAIT 2 SECONDS.
 017730  012727  000372                                                                             MOV     #250.,(P
 017734  000000                                                                                     .WORD   0
 017736  013727  002116                                                                             MOV     L$DLY,(P
 017742  000000                                                                                     .WORD   0
 017744  005367  177772                                                                             DEC     -6(PC)
 017750  001375                                                                                     BNE     .-4
 017752  005367  177756                                                                             DEC     -22(PC)
 017756  001367                                                                                     BNE     .-20
 017760  005316                                          DEC    (SP)                    ;SUBTRACT 1
 017762  001362                                          BNE    97$                     ;BRANCH UNTIL DONE
 017764  005726                                          TST    (SP)+                   ;CLEAN UP THE STACK
 017766  000746                                          BR     INIT10                  ;
 017770                                                ENDIF
 017770                                                                                       50355$:

 017770                                                IFB CLRFLG NE #0 THEN            ;IF CLR COUNTERS FLAG SET:
 017770  105737  002202                                                                             TSTB    CLRFLG
 017774  001413                                                                                     BEQ     50356$
 017776  105037  002202                                  CLRB  CLRFLG                   ;INIT CLR FLAG.
 020002                                                  LET R2 := #0
 020002  005002                                                                                     CLR     R2
 020004                                                  WHILE R2 NE #CNTLEN DO
 020004                                                                                       50357$:
 020004  020227  000550                                                                             CMP     R2,#CNTL
 020010  001405                                                                                     BEQ     50360$
 020012                                                    LET WRBC(R2) := #0           ;CLR ALL STATISTICAL COUNTERS.
 020012  005062  002554                                                                             CLR     WRBC(R2)
 020016                                                    LET R2 := R2 + #2
 020016  062702  000002                                                                             ADD     #2,R2
 020022                                                  ENDDO
 020022  000770                                                                                     BR      50357$
 020024                                                                                       50360$:
 020024                                                ENDIF
 020024                                                                                       50356$:

 020024                                                IFB RRANV NE #0 THEN             ;IF RESET RANDOM VARIABLE FLAG IS SET TH
```

```
5647  020024  105737  002203                                                  TSTB    RRANV
5648  020030  001406                                                          BEQ     50361$
5649  020032
5650  020032  012737  153624  003360          LET RANB :* #RANBC              ;RESET RANDOM BASE #.
                                                                              MOV     #RANBC,R
5651  020040
5652  020040  012737  032561  003362          LET RANS :* #RANSC              ;RESET RANDOM SAVE LOCATION.
                                                                              MOV     #RANSC,R
5653  020046                                ENDIF
5654  020046                                                                50361$:
5655  020046                                READEF  #EF.START               ;READ START COMMAND EVENT FLAG.
5656  020046  012700  000040                                                 MOV     #EF.STAR
5657  020052  104447                                                         TRAP    C$REFG
5658  020054                                BNCOMPLETE      INIT15          ;BRANCH IF NOT STARTING.
5659  020054  103026                                                         BCC     INIT15
5660  020056
5661  020056  105237  003452                LET STAFLG :B* STAFLG + #1       ;SET START COMMAND FLAG.
                                                                              INCB    STAFLG
5662  020062
5663  020062  012705  000006                LET R5 :* #6
                                                                              MOV     #6,R5
5664  020066                                REPEAT                          ;INITIATE UNIT NUMBER TABLE
5665  020066                                                                50362$:
5666  020066                                  LET DEVTBL(R5) :* #NINUSE     ;BY STORING NOT IN USE IN EACH LOCATION.
5667  020066  012765  177774  002532                                         MOV     #NINUSE,
5668  020074
5669  020074  162705  000002                  LET R5 :* R5 - #2
                                                                              SUB     #2,R5
5670  020100                                UNTIL R5 EQ #0
5671  020100  005705                                                         TST     R5
5672  020102  001371                                                         BNE     50362$
5673  020104
5674  020104  013705  002012                LET R5 :* L$UNIT SHIFT 1
                                                                              MOV     L$UNIT,R
5675  020110  006305                                                         ASL     R5
5676  020112                                REPEAT                          ;STORE ALL UNIT
5677  020112                                                                50363$:
5678  020112                                  LET R5 :* R5 - #2             ;NUMBERS IN DEVTBL.
5679  020112  162705  000002                                                 SUB     #2,R5
5680  020116
5681  020116  010565  002532                  LET DEVTBL(R5) :* R5 SHIFT -1
                                                                              MOV     R5,DEVTB
5682  020122  006265  002532                                                 ASR     DEVTBL(R
5683  020126                                UNTIL R5 EQ #0
5684  020126  005705                                                         TST     R5
5685  020130  001370                                                         BNE     50363$
5686
5687  020132                                INIT15: READEF #EF.PWR            ;HAS THERE BE A POWER FAILURE?
5688  020132  012700  000034                                                 MOV     #EF.PWR,
5689  020136  104447                                                         TRAP    C$REFG
5690  020140
5691  020140  103004                        BNCOMPLETE INIT16               ;BRANCH IF NOT.
                                                                              BCC     INIT16
5692  020142
5693  020142  105237  003452                  LET STAFLG :B* STAFLG + #1       ;IF SO - SET THE START FLAG.
                                                                              INCB    STAFLG
5694  020146
5695  020146  105237  003453                  LET PWRFLG :B* PWRFLG + #1     ;IF SO - SET THE POWER FAIL FLAG.
                                                                              INCB    PWRFLG
5696
5697  020152                                INIT16: RFLAGS  OPFLAG            ;READ AND STORE FLAGS SET BY OPERATOR
5698  020152  104421                                                         TRAP    C$RFLA
5699  020154  010037  003456                                                 MOV     R0,OPFLA
5700  020160                                  LET R3 :* #0                  ;CLEAR EVENT FLAG
5701  020160  005003                                                         CLR     R3
5702  020162                                    IFB PWRFLG EQ #0 THEN       ;IF POWER FAIL HAS NOT OCCURRED THEN:
```

```
5703  020162  105737  003453                                                    TSTB    PWRFLG
5704  020166  001020                                                            BNE     50364$
5705  020170                    READEF #EF.NEW          ;UPDATE PASS COUNT WHEN
5706  020170  012700  000035                                                    MOV     #EF.NEW,
5707  020174  104447                                                            TRAP    C$REFG
5708  020176                    IFCOND CS THEN          ;SUPERVISOR IS IN NEW PASS
5709  020176  103014                                                            BCC     50365$
5710  020200                      IFB STAFLG EQ #0 THEN ;AND DIAG WAS NEITHER STARTED
5711  020200  105737  003452                                                    TSTB    STAFLG
5712  020204  001010                                                            BNE     50366$
5713  020206                        READEF #EF.RES      ;NOR
5714  020206  012700  000037                                                    MOV     #EF.RES,
5715  020212  104447                                                            TRAP    C$REFG
5716  020214                        IFCOND CC THEN      ;RESTARTED
5717  020214  103402                                                            BCS     50367$
5718  020216                          LET R3 := COMP R3 ;DO IT
5719  020216  005103                                                            COM     R3
5720  020220                        ELSE
5721  020220  000401                                                            BR      50370$
5722  020222                                                          50367$:
5723  020222                          LET R3 := R3 + #1 ;SET 1ST PASS IF NEW PASS AND
5724  020222  005203                                                            INC     R3
5725  020224                        ENDIF               ;RESTARTING
5726  020224                                                          50370$:
5727  020224                      ELSE
5728  020224  000401                                                            BR      50371$
5729  020226                                                          50366$:
5730  020226                          LET R3 := R3 + #1 ;SET 1ST PASS IF NEW PASS AND
5731  020226  005203                                                            INC     R3
5732  020230                        ENDIF               ;STARTING
5733  020230                                                          50371$:
5734  020230                      ENDIF                 ;DO NOT UPDATE IT ON CONTINUE
5735  020230                                                          50365$:
5736  020230                    ENDIF                   ;OR ON POWER FAIL
5737  020230                                                          50364$:
5738  020230  004737  015452  JSR     PC,FIRSTU       ;INIT DEVICE POINTER.
5739  020234                  LET R2 := #0              ;INIT DEVICE COUNTER.
5740  020234  005002                                                            CLR     R2
5741  020236                  WHILE DEVTBL(R5) NE #END DO
5742  020236                                                          50372$:
5743  020236  026527  002532  177777                                            CMP     DEVTBL(R
5744  020244  001450                                                            BEQ     50373$
5745  020246                    LET R2 := R2 + #1
5746  020246  005202                                                            INC     R2
5747  020250                    LET R0 := R5 SHIFT -1
5748  020250  010500                                                            MOV     R5,R0
5749  020252  006200                                                            ASR     R0
5750  020254                    GPHARD  R0,P0           ;GET HARDWARE P TABLE FROM SUPER.
5751  020254  104442                                                            TRAP    C$GPHRD
5752  020256                    IFCOND CS THEN
5753  020256  103036                                                            BCC     50374$
5754  020260                      LET TSSR(R5) := (R0)  ;SAVE TSSR ADDRESS.
5755  020260  011065  002462                                                    MOV     (R0),TSS
5756  020264                      LET TSDB(R5) := (R0)+-#2 ;SAVE TSDB ADDRESS.
5757  020264  012065  002452                                                    MOV     (R0)+,TS
5758  020270  162765  000002  002452                                            SUB     #2,TSDB(
```

```
5759  020276                                    LET TSVCT(R5) := (R0)        ;SAVE INTERRUPT VECTOR ADDRESS.
5760  020276  011065  002472                                                 MOV     (R0),TSV
5761  020302                                    SETVEC TSVCT(R5),TS4INT(R5),#INTPRI ;SET UP INTERUPT PROCESSING COND
5762  020302  012746  000340                                                 MOV     #INTPRI,
5763  020306  016546  002512                                                 MOV     TS4INT(R
5764  020312  016546  002472                                                 MOV     TSVCT(R5
5765  020316  012746  000003                                                 MOV     #3,-(SP)
5766  020322  104437                                                          TRAP    C$SVEC
5767  020324  062706  000010                                                 ADD     #10,SP
5768  020330                                    IF R3 NE #0 THEN             ;ACTUAL PASSCOUNT UPDATE PER R3
5769  020330  005703                                                         TST     R3
5770  020332  001410                                                         BEQ     50375$
5771  020334                                      IF R3 LT #0 THEN
5772  020334  005703                                                         TST     R3
5773  020336  002003                                                         BGE     50376$
5774  020340                                        LET PASCNT(R5) := PASCNT(R5) + #1
5775  020340  005265  003254                                                 INC     PASCNT(R
5776  020344                                      ELSE
5777  020344  000403                                                         BR      50377$
5778  020346                                                          50376$:
5779  020346                                        LET PASCNT(R5) := #1
5780  020346  012765  000001  003254                                         MOV     #1,PASCN
5781  020354                                      ENDIF
5782  020354                                                          50377$:
5783  020354                                    ENDIF
5784  020354                                                          50375$:
5785  020354                                  ENDIF
5786  020354                                                          50374$:
5787  020354                                    LET RECCNT(R5) := #0          ;CLEAR RECORD COUNT
5788  020354  005065  003324                                                 CLR     RECCNT(R
5789  020360  004737  015520                   JSR   PC,NEXTU               ;DO IT FOR ALL DEVICES.
5790  020364                                  ENDDO
5791  020364  000724                                                         BR      50372$
5792  020366                                                          50373$:
5793
5794  020366                                  IF R2 EQ #0 THEN               ;IF THERE ARE NO UNITS:
5795  020366  005702                                                         TST     R2
5796  020370  001033                                                         BNE     50400$
5797  020372                                    PRINTF #AUDRPM               ;PRINT ALL UNITS DROPPED.
5798  020372  012746  004645                                                 MOV     #AUDRPM,
5799  020376  012746  000001                                                 MOV     #1,-(SP)
5800  020402  010600                                                         MOV     SP,R0
5801  020404  104417                                                         TRAP    C$PNTF
5802  020406  062706  000004                                                 ADD     #4,SP
5803  020412  012746  000010                   MOV   #8.,-(SP)              ;SETUP STACK FOR LONG DELAY
5804  020416                          98$:      DELAY 250.                   ;GO TO SUPERVISOR, WAIT 2 SECONDS
5805  020416  012727  000372                                                 MOV     #250.,(P
5806  020422  000000                                                         .WORD   0
5807  020424  013727  002116                                                 MOV     L$DLY,(P
5808  020430  000000                                                         .WORD   0
5809  020432  005367  177772                                                 DEC     -6(PC)
5810  020436  001375                                                         BNE     .-4
5811  020440  005367  177756                                                 DEC     -22(PC)
5812  020444  001367                                                         BNE     .-20
5813  020446  005316                            DEC   (SP)                   ;SUBTRACT 1
5814  020450  001362                            BNE   98$                    ;BRANCH UNTIL DONE
```

```
5815  020452  005726                          TST   (SP)+                    ;CLEAN UP THE STACK
5816  020454                                  BREAK                          ;GO TO SUPERVISOR, CHECK TTY.
5817  020454  104422                                                                 TRAP    C$BRK
5818  020456                                DOCLN                            ;DO CLEAN CODE + ABORT PASS.
5819  020456  104444                                                                 TRAP    C$DCLN
5820  020460                                ENDIF
5821  020460                                                                 50400$:
5822
5823  020460                                SETPRI #PRI00                    ;LOWER CPU PRIORITY TO 0
5824  020460  012700  000000                                                        MOV     #PRI00,R
5825  020464  104441                                                                TRAP    C$SPRI
5826  020466                                IFB IREC EQ #0 AND #ADR NOTSETIN OPFLAG THEN    ;IF ERROR RECOVERY IS EN
5827  020466  105737  002211                                                      TSTB    IREC
5828  020472  001152                                                              BNE     50401$
5829  020474  032737  000020  003456                                             BIT     #ADR.OPF
5830  020502  001146                                                              BNE     50401$
5831  020504  004737  015452                  JSR PC,FIRSTU                    ;AND AUTO-DROP NOT CALLED, THEN SET UP F
5832  020510                                  WHILE DEVTBL(R5) NE #END DO      ;WHILE THERE ARE MORE DEVICES:
5833  020510                                                                 50402$:
5834  020510  026527  002532  177777                                             CMP     DEVTBL(R
5835  020516  001540                                                           BEQ     50403$
5836  020520                                    BEGIN COUNTER                  ;START 3.5 MINUTE COUNTER
5837  020520                                      INCR TIME1 FROM #1 TO #25 BY #1
5838  020520  012737  000001  003364                                             MOV     #1,TIME1
5839  020526  000402                                                           BR      50405$
5840  020530                                                                 50406$:
5841  020530  005237  003364                                                     INC     TIME1
5842  020534                                                                 50405$:
5843  020534  023727  003364  000025                                             CMP     TIME1,#2
5844  020542  003113                                                           BGT     50407$
5845  020544                                LET @TSDB(R5) := #GSCPK  ;AND GET UNITS STATUS
5846  020544  012775  002320  002452                                             MOV     #GSCPK,@
5847  020552                                DELAY 1                          ;WAIT
5848  020552  012727  000001                                                     MOV     #1,(PC)+
5849  020556  000000                                                           .WORD   0
5850  020560  013727  002116                                                     MOV     L$DLY,(P
5851  020564  000000                                                           .WORD   0
5852  020566  005367  177772                                                     DEC     -6(PC)
5853  020572  001375                                                           BNE     .-4
5854  020574  005367  177756                                                     DEC     -22(PC)
5855  020600  001367                                                           BNE     .-20
5856  020602                                IF #TS.SSR SETIN @TSSR(R5) THEN
5857  020602  032775  000200  002462                                             BIT     #TS.SSR,
5858  020610  001420                                                           BEQ     50410$
5859  020612                                  IF #TS.OFL NOTSETIN @TSSR(R5) THEN
5860  020612  032775  000100  002462                                             BIT     #TS.OFL,
5861  020620  001001                                                           BNE     50411$
5862  020622                                    LEAVE COUNTER                ;EXIT COUNTER WHEN UNIT ON LINE
5863  020622  000463                                                           BR      50404$
5864  020624                                  ELSE
5865  020624                                                                 50411$:
5866  020624                                    PRINTF #OFLINM,DEVTBL(R5)    ;PRINT UNIT OFF LINE EVERY 10 SEC
5867  020624  016546  002532                                                     MOV     DEVTBL(R
5868  020630  012746  005127                                                     MOV     #OFLINM,
5869  020634  012746  000002                                                     MOV     #2,-(SP)
5870  020640  010600                                                           MOV     SP,R0
```

```
5871  020642  104417                                                                  TRAP    C$PNTF
5872  020644  062706  000006                                                          ADD     #6,SP
5873  020650                                  ENDIF
5874  020650                                                                50412$:
5875  020650                                ELSE
5876  020650  000412                                                                  BR      50413$
5877  020652                                                                50410$:
5878  020652                                  PRINTF #NRDYM,DEVTBL(R5)
5879  020652  016546  002532                                                          MOV     DEVTBL(R
5880  020656  012746  021616                                                          MOV     #NRDYM,-
5881  020662  012746  000002                                                          MOV     #2,-(SP)
5882  020666  010600                                                                  MOV     SP,R0
5883  020670  104417                                                                  TRAP    C$PNTF
5884  020672  062706  000006                                                          ADD     #6,SP
5885  020676                                ENDIF
5886  020676                                                                50413$:
5887  020676                                INCR TIME2 FROM #1 TO #13 BY #1
5888  020676  012737  000001  003366                                                  MOV     #1,TIME2
5889  020704  000402                                                                  BR      50414$
5890  020706                                                                50415$:
5891  020706  005237  003366                                                          INC     TIME2
5892  020712                                                                50414$:
5893  020712  023727  003366  000013                                                  CMP     TIME2,#1
5894  020720  003023                                                                  BGT     50416$
5895  020722  012746  000004                  MOV   #4.,-(SP)          ;SETUP STACK FOR LONG DELAY
5896  020726                          99$:    DELAY 250.               ;GO TO SUPERVISOR, WAIT 1 SECOND
5897  020726  012727  000372                                                          MOV     #250.,(P
5898  020732  000000                                                                  .WORD   0
5899  020734  013727  002116                                                          MOV     L$DLY,(P
5900  020740  000000                                                                  .WORD   0
5901  020742  005367  177772                                                          DEC     -6(PC)
5902  020746  001375                                                                  BNE     .-4
5903  020750  005367  177756                                                          DEC     -22(PC)
5904  020754  001367                                                                  BNE     .-20
5905  020756  005316                  DEC   (SP)               ;SUBTRACT 1
5906  020760  001362                  BNE   99$                ;BRANCH UNTIL DONE
5907  020762  005726                  TST   (SP)+              ;CLEAN UP THE STACK
5908  020764                          BREAK           ;ALLOW TERMINAL INTERRUPT
5909  020764  104422                                                                  TRAP    C$BRK
5910  020766                                ENDINC
5911  020766  000747                                                                  BR      50415$
5912  020770                                                                50416$:
5913  020770                              ENDINC
5914  020770  000657                                                                  BR      50406$
5915  020772                                                                50407$:
5916  020772                            END COUNTER
5917  020772                                                                50404$:
5918  020772                            IF TIME1 GT #25 THEN          ;IF OFF LINE FOR 3.5 MINUTES
5919  020772  023727  003364  000025                                                  CMP     TIME1,#2
5920  021000  003404                                                                  BLE     50417$
5921  021002  004737  011224             JSR PC,MOVMSG             ;GET MESSAGE PACKET
5922  021006  004737  011736             JSR PC,TCC1               ;PRINT ERROR AND DROP OFF LINE UNIT
5923  021012                            ENDIF
5924  021012                                                                50417$:
5925                                      ;REPEAT UNTIL ON LINE OR TIMED OUT.
5926  021012  004737  015520           JSR PC,NEXTU                ;SET UP FOR NEXT UNIT.
```

```
021016                                  ENDDO
021016  000634                                                                    BR      50402$
021020                                                                  50403$:
021020                                ENDIF
021020                                                                  50401$:
021020                                IFB PWRFLG EQ #0 THEN
021020  105737  003453                                                            TSTB    PWRFLG
021024  001026                                                                    BNE     50420$
021026                                  MEMORY DATAWT                 ;REQUEST MEMORY FROM SUPER FOR RD/WR BUF
021026  104431                                                                    TRAP    C$MEM
021030  010037  003334                                                            MOV     RO,DATAW
021034                                  LET DATARD := DATAWT + #DATCNT        ;SET RD BFR AD
021034  013737  003334  003336                                                    MOV     DATAWT,D
021042  062737  004000  003336                                                    ADD     #DATCNT,
021050                                  IF @DATAWT LT #DATCNT THEN    ;WHEN NOT ENOUGH FREE MEMO AVAILABLE
021050  027727  162260  004000                                                    CMP     @DATAWT,
021056  002011                                                                    BGE     50421$
021060                                    PRINTF #MEMOM               ;WARN OPERATOR
021060  012746  021126                                                            MOV     #MEMOM,-
021064  012746  000001                                                            MOV     #1,-(SP)
021070  010600                                                                    MOV     SP,RO
021072  104417                                                                    TRAP    C$PNTF
021074  062706  000004                                                            ADD     #4,SP
021100                                    DOCLN                       ;AND ABORT PASS
021100  104444                                                                    TRAP    C$DCLN
021102                                  ENDIF         ;DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO
021102                                                                  50421$:
021102                                ENDIF
021102                                                                  50420$:

021102                                LET CHGFLG :B= #0               ;CLR CHANGE CMD SEQ TBL FLAG.
021102  105037  002212                                                            CLRB    CHGFLG
021106                                LET R3 := #ENDFLG
021106  012703  003452                                                            MOV     #ENDFLG,
021112  004737  011154                JSR     PC,CLRERR               ;CLEAR ALL FLAGS.
021116                                LET PWRFLG :B= #0               ;CLEAR THE POWER FAIL FLAG.
021116  105037  003453                                                            CLRB    PWRFLG

021122                                EXIT    INIT
021122  104432                                                                    TRAP    C$EXIT
021124  000104                                                                    .WORD   L10012-.
```

```
 5968
 5969  021126  040445  051106  042505          MEMOM:  .ASCII  /%AFREE MEMO TOO SMALL FOR RD-WR BFRS%N/
 5970  021134  046440  046505  020117
 5971  021142  047524  020117  046523
 5972  021150  046101  020114  047506
 5973  021156  020122  042122  053455
 5974  021164  020122  043102  051522
 5975  021172  047045
 5976  021174  040445  042522  046055                  .ASCIZ  /%ARE-LOAD IN LARGER MEMO%N/
 5977  021202  040517  020104  047111
 5978  021210  046040  051101  042507
 5979  021216  020122  042515  047515
 5980  021224  047045     000
 5981          021230                                  .EVEN
 5982
 5983  021230                                          ENDINIT
 5984  021230                                  L10012:
 5985  021230  104411                                                                  TRAP    C$INIT
```

```
                                      .SBTTL  AUTO DROP SECTION

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

021232                                          BGNAUTO
021232                                L$AUTO::

021232  004737  015452                          JSR PC,FIRSTU                  ;FIND FIRST UNIT
021236                                          WHILE DEVTBL(R5) NE #END DO    ;
021236                                                                                      50422$:
021236  026527  002532  177777                                                                      CMP     DEVTBL(R
021244  001525                                                                                      BEQ     50423$
021246                                            LET TRAPD4 :B= #0            ;
021246  105037  003454                                                                              CLRB    TRAPD4
021252                                            SETVEC #4,#TRAP4,#PRIO7      ;SET VECTOR 4
021252  012746  000340                                                                              MOV     #PRIO7,-
021256  012746  021646                                                                              MOV     #TRAP4,-
021262  012746  000004                                                                              MOV     #4,-(SP)
021266  012746  000003                                                                              MOV     #3,-(SP)
021272  104437                                                                                      TRAP    C$SVEC
021274  062706  000010                                                                              ADD     #10,SP
021300                                            LET R2 := @TSSR(R5)          ;ADDRESS TS11 INTERFACE
021300  017502  002462                                                                              MOV     @TSSR(R5
021304                                            CLRVEC #4                    ;CLEAR VECTOR AT 4
021304  012700  000004                                                                              MOV     #4,R0
021310  104436                                                                                      TRAP    C$CVEC
021312                                            IFB TRAPD4 NE #0 THEN
021312  105737  003454                                                                              TSTB    TRAPD4
021316  001423                                                                                      BEQ     50424$
021320                                              LET FTLCNT(R5) := FTLCNT(R5) + #1
021320  005265  003314                                                                              INC     FTLCNT(R
021324                                              PRINTF #AUTODM,TSSR(R5)    ;PRINT ERROR
021324  016546  002462                                                                              MOV     TSSR(R5)
021330  012746  021522                                                                              MOV     #AUTODM,
021334  012746  000002                                                                              MOV     #2,-(SP)
021340  010600                                                                                      MOV     SP,R0
021342  104417                                                                                      TRAP    C$PNTF
021344  062706  000006                                                                              ADD     #6,SP
021350                                              LET DROPN := DEVTBL(R5)              ;SAVE # OF UNIT TO BE DROPPED.
021350  016537  002532  015774                                                                      MOV     DEVTBL(R
021356                                              LET R0 := R5 SHIFT -1                ;R0=LOGICAL DEVICE NUMBER
021356  010500                                                                                      MOV     R5,R0
021360  006200                                                                                      ASR     R0
021362                                              DODU R0                    ;DROP THE UNIT; EXEC BGNDU-ENDDU CODE IF
021362  104451                                                                                      TRAP    C$DODU
021364                                            ELSE
021364  000452                                                                                      BR      50425$
021366                                                                                      50424$:
021366                                              LET @TSDB(R5) := #GSCPK    ;SEND GET STATUS COMMAND
021366  012775  002320  002452                                                                      MOV     #GSCPK,@
021374  004737  011170                              JSR PC,WSSR                ;WAIT
021400                                              IF #TS.SSR SETIN @TSSR(R5) THEN
```

```
021400  032775  000200  002462                                                      BIT     #TS.SSR,
021406  001423                                                                      BEQ     50426$
021410                                  IF #TS.OFL SETIN @TSSR(R5) THEN
021410  032775  000100  002462                                                      BIT     #TS.OFL,
021416  001416                                                                      BEQ     50427$
021420                                    LET FTLCNT(R5) := FTLCNT(R5) + #1
021420  005265  003314                                                              INC     FTLCNT(R
021424                                    PRINTF #OFLINM,DEVTBL(R5)
021424  016546  002532                                                              MOV     DEVTBL(R
021430  012746  005127                                                              MOV     #OFLINM,
021434  012746  000002                                                              MOV     #2,-(SP)
021440  010600                                                                      MOV     SP,R0
021442  104417                                                                      TRAP    C$PNTF
021444  062706  000006                                                              ADD     #6,SP
021450  004737  015704                    JSR PC,DROPUA
021454                                  ENDIF
021454                                                                      50427$:
021454                                ELSE
021454  000416                                                                      BR      50430$
021456                                                                      50426$:
021456                                  LET FTLCNT(R5) := FTLCNT(R5) + #1
021456  005265  003314                                                              INC     FTLCNT(R
021462                                  PRINTF #NRDYM,DEVTBL(R5)
021462  016546  002532                                                              MOV     DEVTBL(R
021466  012746  021616                                                              MOV     #NRDYM,-
021472  012746  000002                                                              MOV     #2,-(SP)
021476  010600                                                                      MOV     SP,R0
021500  104417                                                                      TRAP    C$PNTF
021502  062706  000006                                                              ADD     #6,SP
021506  004737  015704                  JSR PC,DROPUA
021512                                ENDIF
021512                                                                      50430$:
021512                              ENDIF
021512                                                                      50425$:
021512  004737  015520                JSR PC,NEXTU
021516                              ENDDO
021516  000647                                                                      BR      50422$
021520                                                                      50423$:

021520                              ENDAUTO
021520                      L10013:
021520  104461                                                                      TRAP    C$AUTO

021522  040445  052502  020123      AUTODM: .ASCII  /%ABUS TRAP AT %O6%N/
021530  051124  050101  040440
021536  020124  047445  022466
021544     116
021545     045  044501  052116              .ASCIZ  /%AINTERFACE BAD OR NOT SET TO ABOVE AD%N/
021552  051105  040506  042503
021560  041040  042101  047440
021566  020122  047516  020124
021574  042523  020124  047524
021602  040440  047502  042526
021610  040440  022504  000116
021616  040445  047125  052111      NRDYM:  .ASCIZ  /%AUNIT %D1%A NOT RDY%N/
021624  022440  030504  040445
```

```
 6098  021632  047040  052117  051040
 6099  021640  054504  047045     000
 6100          021646                          .EVEN
 6101
 6102                                  ;       DEVICE BUS TRAP HANDLER
 6103                                  ;       OUTPUT: TRAPD4 BYTE  1: TRAPED AT 4
 6104                                  ;                            0: NO TRAP
 6105
 6106  021646                          TRAP4:: LET TRAPD4 ;B= TRAPD4 + 01                    INCB    TRAPD4
 6107  021646  105237  003454                  RTI
 6108  021652  000002
 6109
 6110
 6111
```

```
                                        .SBTTL  CLEANUP CODING SECTION

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

021654                                          BGNCLN
021654                                  L$CLEAN::

021654  004737  015452                          JSR     PC,FIRSTU               ;FIND FIRST UNIT.
021660                                          WHILE DEVTBL(R5) NE #END DO
021660                                                                                  50431$:
021660  026527  002532  177777                                                          CMP     DEVTBL(R
021666  001410                                                                          BEQ     50432$
021670  004737  011170                            JSR PC,WSSR                 ;WAIT FOR UNIT READY OR TIMEOUT.
021674                                            CLRVEC      TSVCT(R5)       ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
021674  016500  002472                                                                  MOV     TSVCT(R5
021700  104436                                                                          TRAP    C$CVEC
021702  004737  015520                            JSR   PC,NEXTU              ;FIND NEXT UNIT.
021706                                          ENDDO
021706  000764                                                                          BR      50431$
021710                                                                          50432$:
                                        EXIT    CLN
021710                                                                                  TRAP    C$EXIT
021710  104432                                                                          .WORD   L10014-.
021712  000002
                                        .EVEN

021714                                  ENDCLN
021714                                  L10014:
021714  104412                                                                  TRAP    C$CLEAN
```

```
                                        .SBTTL  DROP UNIT SECTION

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

021716                                          BGNDU
021716                                  L$DU::

021716                                          LET R5 := R0 SHIFT 1            ;R5 = LOGICAL DEVICE NUMBER X 2.
021716  010005                                                                          MOV     R0,R5
021720  006305                                                                          ASL     R5
021722                                          LET DEVTBL(R5) := #NINUSE       ;SET NOT IN USE FLAG FOR THE DEVICE.
021722  012765  177774  002532                                                        MOV     #NINUSE,
021730                                          CLRVEC TSVCT(R5)                ;RELEASE THE INTERRUPT VECTOR.
021730  016500  002472                                                                MOV     TSVCT(R5
021734  104436                                                                      TRAP    C$CVEC
021736                                          PRINTF  #DROPDM,DROPN           ;PRINT DROP DEVICE MESSAGE
021736  013746  015774                                                                MOV     DROPN,-(
021742  012746  004616                                                                MOV     #DROPDM,
021746  012746  000002                                                                MOV     #2,-(SP)
021752  010600                                                                      MOV     SP,R0
021754  104417                                                                      TRAP    C$PNTF
021756  062706  000006                                                              ADD     #6,SP

021762                                          EXIT    DU
021762  000167                                                                      .WORD   J$JMP
021764  000000                                                                      .WORD   L10015-2
                                                .EVEN

021766                                          ENDDU
021766                                  L10015:
021766  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.
                                        ;--

021770                                          BGNAU
021770                                  L$AU::

021770                                          LET R5 := R0 SHIFT 1            ;R5 = LOGICAL DEVICE NUMBER X 2.
021770  010005                                                                          MOV     R0,R5
021772  006305                                                                          ASL     R5
021774
021774  010065  002532                          LET DEVTBL(R5) := R0     ;STORE UNIT # IN DEVICE TABLE.
                                                                                        MOV     R0,DEVTB
022000                                          GPHARD  R0,R0                   ;GET HARDWARE P TABLE FROM SUPER.
022000  104442                                                                          TRAP    C$GPHRD
022002                                          LET TSSR(R5) := (R0)            ;SAVE TSSR ADDRESS.
022002  011065  002462                                                                  MOV     (R0),TSS
022006                                          LET TSDB(R5) := (R0)+ - 02      ;SAVE TSDB ADDRESS.
022006  012065  002452                                                                  MOV     (R0)+,TS
022012  162765  000002  002452                                                          SUB     #2,TSDB(
022020                                          LET TSVCT(R5) := (R0)           ;SAVE INTERRUPT VECTOR ADDRESS.
022020  011065  002472                                                                  MOV     (R0),TSV
022024                                          SETVEC TSVCT(R5),TS4INT(R5),#INTPRI     ;SET UP INTERUPT PROCESSING COND
022024  012746  000340                                                                  MOV     #INTPRI,
022030  016546  002512                                                                  MOV     TS4INT(R
022034  016546  002472                                                                  MOV     TSVCT(R5
022040  012746  000003                                                                  MOV     #3,-(SP)
022044  104437                                                                          TRAP    C$SVEC
022046  062706  000010                                                                  ADD     #10,SP
022052                                          LET INTFLG(R5) := #0            ;CLEAR INTERRUPT FLAGS.
022052  005065  003416                                                                  CLR     INTFLG(R
                                                EXIT    AU
022056                                                                          .WORD   J$JMP
022056  000167                                                                  .WORD   L10016-2
022060  000000
                                                .EVEN

                                                ENDAU
022062                                  L10016:
022062
022062  104452                                                                  TRAP    C$AU

022064                                          ENDMOD
```

```
6228
6229                                    .TITLE HARDWARE TESTS
6230
6231                                    .SBTTL  TEST 1:  BASIC FUNCTIONS.
6232
6233                                    ;++
6234                                    ; TEST TO EXECUTE ALL TS04 FUNCTIONS.
6235                                    ; -
6236
6237  022064                                    BGNMOD
6238
6239  022064                                    BGNTST
6240  022064                            T1::
6241
6242  022064                                    LET RANDOM :B= #0             ;CLR THE RANDOM OPERATIONS FLAG.
6243  022064  105037  003441                                                          CLRB    RANDOM
6244  022070                                    LET EXPBOT :B= #0             ;CLR EXPECT BOT FLAG.
6245  022070  105037  003440                                                          CLRB    EXPBOT
6246
6247  022074                                    BGNSUB                        ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET S
6248  022074                            T1.1:
6249  022074  104402                                                          TRAP    C$BSUB
6250
6251  022076                                    LET R2 := #BFSEQ0             ;ADR OF CMD SEQ.
6252  022076  012702  022722                                                  MOV     #BFSEQ0,
6253  022102  004737  022676                    JSR     PC,BFSEQ              ;SET UP CMD SEQ.
6254  022106  004737  006510                    JSR     PC,EXALL              ;EXECUTE CMD SEQ ON ALL DEVICES.
6255  022112  004737  015452                    JSR     PC,FIRSTU             ;FIND THE FIRST UNIT.
6256  022116                                    WHILE DEVTBL(R5) NE #END DO   ;WHILE THERE ARE MORE DEVICES:
6257  022116                                                                  50433$:
6258  022116  026527  002532  177777                                          CMP     DEVTBL(R
6259  022124  001434                                                          BEQ     50434$
6260  022126
6261  022126  016502  002502                      LET R2 := MSGPKA(R5)        ;GET MSG PACKET ADR.
                                                                              MOV     MSGPKA(R
6262  022132
6263  022132  062702  000012                      LET R2 := R2 + #12          ;GET XSTAT2 ADR.
                                                                              ADD     #12,R2
6264  022136
6265  022136  011265  002522                      LET TS4CL(R5) := (R2) CLR.BY #177400  ;STORE CODE LEVEL FROM DTR BYTE.
                                                                              MOV     (R2),TS4
6266  022142  042765  177400  002522                                          BIC     #177400,
6267  022150
6268  022150  026527  003254  000001             IF PASCNT(R5) EQ #1 THEN     ;IF THIS IS PASS 1 THEN:
                                                                              CMP     PASCNT(R
6269  022156  001014                                                          BNE     50435$
6270  022160
6271  022160  016546  002522                        PRINTF #CODELM,DEVTBL(R5),TS4CL(R5) ;PRINT THE TS04 MICROCODE LEVEL.
                                                                              MOV     TS4CL(R5
6272  022164  016546  002532                                                  MOV     DEVTBL(R
6273  022170  012746  003772                                                  MOV     #CODELM,
6274  022174  012746  000003                                                  MOV     #3,-(SP)
6275  022200  010600                                                          MOV     SP,R0
6276  022202  104417                                                          TRAP    C$PNTF
6277  022204  062706  000010                                                  ADD     #10,SP
6278  022210
6279  022210                                    ENDIF
6280  022210  004737  015520                                                  50435$:
6281  022214                                    JSR   PC,NEXTU                ;FIND NEXT UNIT.
6282  022214  000740                    ENDDO
                                                                              BR      50433$
6283  022216                                                                  50434$:
```

```
6284  022216                                    ENDSUB
6285  022216                              L10020:
6286  022216  104403                                                    TRAP    C$ESUB
6287
6288  022220                                    BGNSUB                ;SUBTEST 2 - REWIND.
6289  022220                              T1.2:
6290  022220  104402                                                    TRAP    C$BSUB
6291
6292  022222                                    LET R2 := #BFSEQ1     ;ADR OF CMD SEQ.
6293  022222  012702  022774                                          MOV     #BFSEQ1,
6294  022226  004737  022676                    JSR     PC,BFSEQ      ;SET UP CMD SEQ.
6295  022232  004737  006510                    JSR     PC,EXALL      ;EXECUTE CMD SEQ ON ALL DEVICES.
6296  022236                                    LET STAFLG :B= #0     ;CLEAR START FLAG
6297  022236  105037  003452                                          CLRB    STAFLG
6298  022242                                    ENDSUB
6299  022242                              L10021:
6300  022242  104403                                                    TRAP    C$ESUB
6301
6302  022244                                    BGNSUB                ;SUBTEST 3   WRITE/VERIFY.
6303  022244                              T1.3:
6304  022244  104402                                                    TRAP    C$BSUB
6305
6306  022246                                    LET R2 := #BFSEQ2     ;ADR OF CMD SEQ.
6307  022246  012702  023006                                          MOV     #BFSEQ2,
6308  022252  004737  022676                    JSR     PC,BFSEQ      ;SET UP CMD SEQ.
6309  022256  004737  006510                    JSR     PC,EXALL      ;EXECUTE CMD SEQ ON ALL DEVICES.
6310  022262                                    ENDSUB
6311  022262                              L10022:
6312  022262  104403                                                     RAP    C$ESUB
6313
6314  022264                                    BGNSUB                ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
6315  022264                              T1.4:
6316  022264  104402                                                    TRAP    C$BSUB
6317
6318  022266                                    LET R2 := #BFSEQ3     ;ADR OF CMD SEQ.
6319  022266  012702  023100                                          MOV     #BFSEQ3,
6320  022272  004737  022676                    JSR     PC,BFSEQ      ;SET UP CMD SEQ.
6321  022276  004737  006510                    JSR     PC,EXALL      ;EXECUTE CMD SEQ ON ALL DEVICES.
6322  022302                                    ENDSUB
6323  022302                              L10023:
6324  022302  104403                                                    TRAP    C$ESUB
6325
6326  022304                                    BGNSUB                ;SUBTEST 5 - SPACE FILES.
6327  022304                              T1.5:
6328  022304  104402                                                    TRAP    C$BSUB
6329
6330  022306                                    LET R2 := #BFSEQ4     ;ADR OF CMD SEQ.
6331  022306  012702  023152                                          MOV     #BFSEQ4,
6332  022312  004737  022676                    JSR     PC,BFSEQ      ;SET UP CMD SEQ.
6333  022316  004737  006510                    JSR     PC,EXALL      ;EXECUTE CMD SEQ ON ALL DEVICES.
6334  022322                                    ENDSUB
6335  022322                              L10024:
6336  022322  104403                                                    TRAP    C$ESUB
6337
6338  022324                                    BGNSUB                ;SUBTEST 6 - SPACE RECORDS.
6339  022324                              T1.6:
```

```
6340  022324  104402                                                    TRAP    C$BSUB
6341
6342  022326                                  LET R2 := #BFSEQ5         ;ADR OF CMD SEQ.
6343  022326  012702  023214                                            MOV     #BFSEQ5,
6344  022332  004737  022676                  JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6345  022336  004737  006510                  JSR     PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
6346  022342                                  ENDSUB
6347  022342                          L10025:
6348  022342  104403                                                    TRAP    C$ESUB
6349
6350  022344                                  BGNSUB                    ;SUBTEST 7 - WRITE RETRY.
6351  022344                          T1.7:
6352  022344  104402                                                    TRAP    C$BSUB
6353
6354  022346                                  LET R2 := #BFSEQ6         ;ADR OF CMD SEQ.
6355  022346  012702  023266                                            MOV     #BFSEQ6,
6356  022352  004737  022676                  JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6357  022356  004737  006510                  JSR     PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
6358  022362                                  ENDSUB
6359  022362                          L10026:
6360  022362  104403                                                    TRAP    C$ESUB
6361
6362  022364                                  BGNSUB                    ;SUBTEST 8 - READ REV RETRY.
6363  022364                          T1.8:
6364  022364  104402                                                    TRAP    C$BSUB
6365
6366  022366                                  LET R2 := #BFSEQ7         ;ADR OF CMD SEQ.
6367  022366  012702  023320                                            MOV     #BFSEQ7,
6368  022372  004737  022676                  JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6369  022376  004737  006510                  JSR     PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
6370  022402                                  ENDSUB
6371  022402                          L10027:
6372  022402  104403                                                    TRAP    C$ESUB
6373
6374  022404                                  BGNSUB                    ;SUBTEST 9 - READ FWD RETRY.
6375  022404                          T1.9:
6376  022404  104402                                                    TRAP    C$BSUB
6377
6378  022406                                  LET R2 := #BFSEQ8         ;ADR OF CMD SEQ.
6379  022406  012702  023352                                            MOV     #BFSEQ8,
6380  022412  004737  022676                  JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6381  022416  004737  006510                  JSR     PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
6382  022422                                  ENDSUB
6383  022422                          L10030:
6384  022422  104403                                                    TRAP    C$ESUB
6385
6386  022424                                  BGNSUB                    ;SUBTEST 10- CLEAN.
6387  022424                          T1.10:
6388  022424  104402                                                    TRAP    C$BSUB
6389
6390  022426                                  LET R2 := #BFSEQ9         ;ADR OF CMD SEQ.
6391  022426  012702  023404                                            MOV     #BFSEQ9,
6392  022432  004737  022676                  JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6393  022436  004737  006510                  JSR     PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
6394  022442                                  ENDSUB
6395  022442                          L10031:
```

```
6396  022442  104403                                                                       TRAP     C$ESUB
6397
6398  022444                                    BGNSUB                    ;SUBTEST 11 - WTV SWAPPED DATA BYTES.
6399  022444                          T1.11:
6400  022444  104402                                                                       TRAP     C$BSUB
6401
6402  022446                                    LET R2 := #BFSE10         ;ADR OF CMD SEQ.
6403  022446  012702  023426                                                               MOV      #BFSE10,
6404  022452  004737  022676                    JSR     PC,BFSEQ          ;SET UP CMD SEQ.
6405  022456  004737  006510                    JSR     PC,EXALL          ;WRITE/VERIFY RECORDS 1 AND 2.
6406  022462                                    LET SWBFLG :B= #1         ;ENABLE BYTE SWAPPING.
6407  022462  112737  000001  003444                                                       MOVB     #1,SWBFL
6408  022470  004737  006510                    JSR     PC,EXALL          ;WRITE/VERIFY RECORDS 3 AND 4.
6409  022474                                    LET SWBFLG :B= #0         ;DISABLE BYTE SWAPPING.
6410  022474  105037  003444                                                               CLRB     SWBFLG
6411  022500                                    ENDSUB
6412  022500                          L10032:
6413  022500  104403                                                                       TRAP     C$ESUB
6414
6415  022502                                    LET R2 := DATAWT + #10.   ;INIT WRITE BUFFER POINTER.
6416  022502  013702  003334                                                               MOV      DATAWT,R
6417  022506  062702  000012                                                               ADD      #10.,R2
6418  022512                                    WHILE R2 NE DATAWT DO  ;UNTIL 10 BYTES HAVE BEEN SWAPPED.
6419  022512                                                                     50436$:
6420  022512  020237  003334                                                               CMP      R2,DATAW
6421  022516  001402                                                                       BEQ      50437$
6422  022520  000342                              SWAB -(R2)              ;SWAP DATA BYTES IN WRITE BUFFER.
6423  022522                                    ENDDO
6424  022522  000773                                                                       BR       50436$
6425  022524                                                                     50437$:
6426  022524                                    LET T1SWB :B= T1SWB + #1  ;SET T1 SWAP BYTES FLAG FOR "CKDATA" SUB
6427  022524  105237  003447                                                               INCB     T1SWB
6428
6429  022530                                    BGNSUB                    ;SUBTEST 12 - READ SWAPPED DATA BYTES.
6430  022530                          T1.12:
6431  022530  104402                                                                       TRAP     C$BSUB
6432
6433  022532                                    LET CMDWRD := #RDR        ;CMD IS READ REV.
6434  022532  012737  104401  003346                                                       MOV      #RDR,CMD
6435  022540  004737  014504                    JSR     PC,VFEXC          ;VERIFY ODD LENGTH SWAP (RECORD 4).
6436  022544                                    LET CMDPKT+CP.CNT := #12  ;CHANGE BYTE COUNT TO 10.
6437  022544  012737  000012  002316                                                       MOV      #12,CMDP
6438  022552  004737  014504                    JSR     PC,VFEXC          ;VERIFY EVEN LENGTH SWAP (RECORD 3).
6439  022556                                    LET SWBFLG :B= #1         ;ENABLE BYTE SWAPPING.
6440  022556  112737  000001  003444                                                       MOVB     #1,SWBFL
6441  022564                                    LET CMDPKT+CP.CNT := #11          ;CHANGE BYTE COUNT TO 9.
6442  022564  012737  000011  002316                                                       MOV      #11,CMDP
6443  022572  004737  014504                    JSR     PC,VFEXC          ;VERIFY ODD LENGTH SWAP (RECORD 2).
6444  022576                                    LET CMDPKT+CP.CNT := #12  ;CHANGE BYTE COUNT TO 10.
6445  022576  012737  000012  002316                                                       MOV      #12,CMDP
6446  022604  004737  014504                    JSR     PC,VFEXC          ;VERIFY EVEN LENGTH SWAP (RECORD 1).
6447  022610                                    LET CMDWRD := #RDF        ;CMD IS READ FWD.
6448  022610  012737  104001  003346                                                       MOV      #RDF,CMD
6449  022616  004737  014504                    JSR     PC,VFEXC          ;VERIFY EVEN LENGTH SWAP (RECORD 1).
6450  022622                                    LET CMDPKT+CP.CNT := #11          ;CHANGE BYTE COUNT TO 9.
6451  022622  012737  000011  002316                                                       MOV      #11,CMDP
```

```
6452  022630  004737  014504                    JSR     PC,VFEXC            ;VERIFY ODD LENGTH SWAP (RECORD 2).
6453  022634                                    LET SWBFLG :B= #0           ;DISABLE BYTE SWAPPING.
6454  022634  105037  003444                                                 CLRB    SWBFLG
6455  022640                                    LET CMDPKT+CP.CNT := #12    ;CHANGE BYTE COUNT TO 10.
6456  022640  012737  000012  002316                                        MOV     #12,CMDP
6457  022646  004737  014504                    JSR     PC,VFEXC            ;VERIFY EVEN LENGTH SWAP (RECORD 3).
6458  022652                                    LET CMDPKT+CP.CNT := #11    ;CHANGE BYTE COUNT TO 9.
6459  022652  012737  000011  002316                                        MOV     #11,CMDP
6460  022660  004737  014504                    JSR     PC,VFEXC            ;VERIFY ODD LENGTH SWAP (RECORD 4).
6461
6462  022664                                    ENDSUB
6463  022664                              L10033:
6464  022664  104403                                                       TRAP    C$ESUB
6465
6466  022666                                    LET T1SWB :B= #0            ;CLEAR T1 SWAP BYTES FLAG
6467  022666  105037  003447                                               CLRB    T1SWB
6468
6469
6470  022672                                    EXIT    TST
6471  022672  104432                                                       TRAP    C$EXIT
6472  022674  000554                                                       .WORD   L10017-.
```

```
                                ;       SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
                                ;       INPUTS:         R2 = FWA OF COMMAND SEQUENCE.
                                ;       OUTPUTS:
                                ;       REGISTERS:
                                ;       CALLS:

022676                          BFSEQ:  LET R1 := #CMDSEQ               ;INIT SEQ TABLE ADDRESS.
022676  012701  003460                                                          MOV     #CMDSEQ,
022702                                  WHILE (R2) NE #END DO           ;WHILE THERE ARE MORE COMMANDS:
022702                                                                                  50440$:
022702  021227  177777                                                          CMP     (R2),#EN
022706  001402                                                          BEQ     50441$
022710                                    LET (R1)+ := (R2)+            ;MOVE COMMANDS TO SEQ TABLE.
022710  012221                                                          MOV     (R2)+,(R
022712                                  ENDDO
022712  000773                                                          BR      50440$
022714                                                                                  50441$:
022714                                  LET (R1) := #END                ;STORE END OF SEQUENCE CODE.
022714  012711  177777                                                          MOV     #END,(R1
022720  000207                          RTS     PC                      ;RETURN.
                                ;       BASIC FUNCTION COMMAND SEQUENCE
022722  140004                  BFSEQ0: .WORD   SCH                     ;SET CHAR. 200.         (1)
022724  000200                                  200
022726  000001                                  1
022730  000000                                  0
022732  100013                                  DRI                     ;DRIVE INIT.            (2)
022734  000001                                  1
022736  000001                                  1
022740  000000                                  0
022742  140004                                  SCH                     ;SET CHAR. 20           (3)
022744  000020                                  20
022746  000001                                  1
022750  000000                                  0
022752  100017                                  GES                     ;GET STATUS.            (4)
022754  000001                                  1
022756  000001                                  1
022760  000000                                  0
022762  140004                                  SCH                     ;SET CHAR. 40.          (5)
022764  000040                                  40
022766  000001                                  1
022770  000000                                  0
022772  177777                          .WORD   END
                                ;
022774  102010                  BFSEQ1:         RWD                     ;REWIND TWICE.          (6)
022776  000001                                  1
023000  000002                                  2
023002  000000                                  0
023004  177777                          .WORD   END
                                ;
023006  104105                  BFSEQ2:         WTV                     ;WRITE/VERIFY PAT 1.    (7)
023010  004000                                  DATCNT
023012  000001                                  1
```

```
6529  023014  000001                                  1
6530  023016  104105                                  WTV             ;WTV PAT 2.         (8)
6531  023020  004000                                  DATCNT
6532  023022  000001                                  1
6533  023024  000002                                  2
6534  023026  104105                                  WTV             ;WTV PAT 3.         (9)
6535  023030  004000                                  DATCNT
6536  023032  000001                                  1
6537  023034  000003                                  3
6538  023036  104105                                  WTV             ;WTV PAT 4.         (10)
6539  023040  004000                                  DATCNT
6540  023042  000001                                  1
6541  023044  000004                                  4
6542  023046  104105                                  WTV             ;WTV PAT 5.         (11)
6543  023050  004000                                  DATCNT
6544  023052  000001                                  1
6545  023054  000005                                  5
6546  023056  104105                                  WTV             ;WTV PAT 6.         (12)
6547  023060  004000                                  DATCNT
6548  023062  000001                                  1
6549  023064  000006                                  6
6550  023066  104105                                  WTV             ;WTV PAT 0.         (13)
6551  023070  004000                                  DATCNT
6552  023072  000001                                  1
6553  023074  000000                                  0
6554  023076  177777                          .WORD   END
6555
6556  023100  100011                  BFSEQ3:         WTM             ;WRITE TAPE MARK.   (14)
6557  023102  000001                                  1
6558  023104  000001                                  1
6559  023106  000000                                  0
6560  023110  104005                                  WRT             ;WRITE 10 RECORDS.  (15)
6561  023112  004000                                  DATCNT
6562  023114  000010                                  10
6563  023116  000001                                  1
6564  023120  100411                                  ERS             ;ERASE 10 TIMES.    (16)
6565  023122  000001                                  1
6566  023124  000010                                  10
6567  023126  000000                                  0
6568  023130  100011                                  WTM             ;WRITE TAPE MARK.   (17)
6569  023132  000001                                  1
6570  023134  000001                                  1
6571  023136  000000                                  0
6572  023140  101011                                  WTR             ;WTM RETRY          (18)
6573  023142  000001                                  1
6574  023144  000001                                  1
6575  023146  000000                                  0
6576  023150  177777                          .WORD   END
6577
6578  023152  105410                  BFSEQ4:         SFR             ;SPACE 2 FILES REV. (19)
6579  023154  000002                                  2
6580  023156  000001                                  1
6581  023160  000000                                  0
6582  023162  105010                                  SFF             ;SPACE 2 FILES FWD. (20)
6583  023164  000002                                  2
6584  023166  000001                                  1
```

M12


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6585  023170  000000                                  0
6586  023172  105410                                  SFR             ;SPACE 2 FILES REV.     (21)
6587  023174  000001                                  1
6588  023176  000002                                  2
6589  023200  000000                                  0
6590  023202  105010                                  SFF             ;SPACE 2 FILES FWD.     (22)
6591  023204  000001                                  1
6592  023206  000002                                  2
6593  023210  000000                                  0
6594  023212  177777                          .WORD   END
6595
6596  023214  102010                  BFSEQ5:         RWD             ;REWIND.                (23)
6597  023216  000001                                  1
6598  023220  000001                                  1
6599  023222  000000                                  0
6600  023224  104010                                  SRF             ;SPACE 7 RECORDS FWD.   (24)
6601  023226  000007                                  7
6602  023230  000001                                  1
6603  023232  000000                                  0
6604  023234  104410                                  SRR             ;SPACE 7 RECORDS REV.   (25)
6605  023236  000007                                  7
6606  023240  000001                                  1
6607  023242  000000                                  0
6608  023244  104010                                  SRF             ;SPACE 7 RECORDS FWD.   (26)
6609  023246  000001                                  1
6610  023250  000007                                  7
6611  023252  000000                                  0
6612  023254  104410                                  SRR             ;SPACE 7 RECORDS REV.   (27)
6613  023256  000001                                  1
6614  023260  000007                                  7
6615  023262  000000                                  0
6616  023264  177777                          .WORD   END
6617
6618  023266  102010                  BFSEQ6:         RWD             ;REWIND.                (28)
6619  023270  000001                                  1
6620  023272  000001                                  1
6621  023274  000000                                  0
6622  023276  104005                                  WRT             ;WRITE.                 (29)
6623  023300  004000                                  DATCNT
6624  023302  000001                                  1
6625  023304  000001                                  1
6626  023306  105005                                  WRR             ;WRITE RETRY.           (30)
6627  023310  004000                                  DATCNT
6628  023312  000001                                  1
6629  023314  000001                                  1
6630  023316  177777                          .WORD   END
6631
6632  023320  104401                  BFSEQ7:         RDR             ;READ REV.              (31)
6633  023322  004000                                  DATCNT
6634  023324  000001                                  1
6635  023326  000001                                  1
6636  023330  105401                                  RNR             ;READ NEXT REV.         (32)
6637  023332  004000                                  DATCNT
6638  023334  000001                                  1
6639  023336  000001                                  1
6640  023340  125401                                  RNF             ;READ NEXT FWD.         (33)
```

```
6641  023342  004000                              DATCNT
6642  023344  000001                              1
6643  023346  000001                              1
6644  023350  177777                      .WORD   END
6645
6646  023352  104001              BFSEQ8:         RDF             ;READ FWD.              (34)
6647  023354  004000                              DATCNT
6648  023356  000001                              1
6649  023360  000001                              1
6650  023362  105001                              RPF             ;READ PREVIOUS FWD.     (35)
6651  023364  004000                              DATCNT
6652  023366  000001                              1
6653  023370  000001                              1
6654  023372  125001                              RPR             ;READ PREVIOUS REV.     (36)
6655  023374  004000                              DATCNT
6656  023376  000001                              1
6657  023400  000001                              1
6658  023402  177777                      .WORD   END
6659
6660  023404  101012              BFSEQ9: .WORD   CLN             ;CLEAN.                 (37)
6661  023406  000001                              1
6662  023410  000001                              1
6663  023412  000000                              0
6664  023414  102010                              RWD             ;REWIND                 (38)
6665  023416  000001                              1
6666  023420  000001                              1
6667  023422  000000                              0
6668  023424  177777                      .WORD   END             ;END OF SEQUENCE.
6669
6670  023426  104105              BFSE10:         WTV             ;WRITE/VERIFY EVEN LENGTH.  (39)
6671  023430  000012                              12
6672  023432  000001                              1
6673  023434  000000                              0
6674  023436  104105                              WTV             ;WRITE/VERIFY ODD LENGTH.   (40)
6675  023440  000011                              11
6676  023442  000001                              1
6677  023444  000000                              0
6678  023446  177777                      .WORD   END
6679                                      .EVEN
6680
6681  023450                              ENDTST
6682  023450                      L10017:
6683  023450  104401                                                      TRAP    C$ETST
```

```
                                        .SBTTL  TEST 2: DATA RELIABILITY.

                                        ;**
                                        ; TEST TO CHECK THE DATA RELIABILITY OF THE TS04.
                                        ;
023452                                          BGNTST
023452                                  T2::

                                                LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
023452  112737  000001  003441                                                    MOVB    #1,RANDO
                                                LET EXPBOT :B= #0               ;CLEAR EXPECT BOT FLAG.
023460  105037  003440                                                          CLRB    EXPBOT
                                                LET R2 := #DATCNT - #1          ;SET UP THE RECORD LENGTH MASK.
023464  012702  004000                                                          MOV     #DATCNT,
023470  005302                                                                  DEC     R2
                                                LET LENMSK := COMP R2           ;ALLOW MAXIMUM BUFFER.
023472  010237  003356                                                          MOV     R2,LENMS
023476  005137  003356                                                          COM     LENMSK
                                                JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
023502  004737  006444                          IFB STAFLG NE #0 THEN           ;IF STARTING THEN:
023506                                                                          TSTB    STAFLG
023506  105737  003452                                                          BEQ     5044$
023512  001404
                                                  JSR   PC,SETRW                ;CMD2=REWIND
023514  004737  006470                              LET STAFLG :B= #0            ;CLR START FLAG.
023520                                                                          CLRB    STAFLG
023520  105037  003452                          ENDIF
023524                                                                  5044$:
023524                                          LET (R1)+ := #WTV               ;CMD3 = WRITE/ VERIFY.
023524                                                                          MOV     #WTV,(R1
023524  012721  104105                          LET (R1)+ := #DATCNT            ;SET BRF TO MAX FOR PATTERN GENERATION.
023530                                                                          MOV     #DATCNT,
023530  012721  004000                          LET R2 := COMP #RNOPSC
023534                                                                          MOV     #RNOPSC,
023534  012702  177740                                                          COM     R2
023540  005102                                  LET (R1)+ := R2                 ;31 OPERATIONS.
023542                                                                          MOV     R2,(R1)+
023542  010221                                  LET (R1)+ := #RANP              ;RANDOM PATTERN.
023544                                                                          MOV     #RANP,(R
023544  012721  000007                          REPEAT                          ;REPEAT TO EOT:
023550                                                                  5044$:
023550                                            WHILE R1 LT #SEQEND DO        ;FILL SEQ TBL WITH RANDOM CMDS.
023550                                                                  5044$:
023550  020127  003550                                                          CMP     R1,#SEQE
023554  002012                                                                  BGE     5044$
023556
                                                    LET RANS := RANS + RANB
023556  063737  003360  003362                                                  ADD     RANB,RAN
                                                    LET R2 := RANS CLR.BY 177741  ;R2 = RANDOM # (0   3e).
023564                                                                          MOV     RANS,R2
023564  013702  003562                                                          BIC     #177741,
023570  042702  177741
023574  004772  023732                              JSR PC,@RANCMD(R2)          ;SET UP A RANDOM CMD + BRF.
023600                                            ENDDO
023600  000763                                                                  BR      5044$
023602                                                                  5044$:
023602                                          LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
023602  012711  177777                                                          MOV     #END,(R1
023606  004737  006510                          JSR   PC,EXALL                  ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.
```

```
023612                                  LET R1 :+ #CMDSEQ           ;INIT CMD SEQ TBL POINTER.
023612  012701  003460                                                                        MOV     #CMDSEQ,
023616                                  UNTIL R2 NE #0              ;REPEAT UNTIL EOT IS REACHED
023616  005702                                                                                TST     R2
023620  001753                                                                                BEQ     50443$
023622                                  LET ALLEOT :B+ ALLEOT + #1  ;FLAG ALL UNITS @ EOT
023622  105237  003450                                                                        INCB    ALLEOT
023626  000240                          NOP
023630  000240                          NOP
023632  000240                          NOP
023634  004737  025156                  JSR     PC,T5WEOT           ;WRITE ONE RECORD BEYOND EOT ON ALL UNIT
                                                                    ;SO THAT SHORTER READ STOP DISTANCE
                                                                    ;SHALL POSITION HEAD IN CLEAN IRG GAP
                                                                    ;READ REV THAT EXTRA REC TO RE-POSITION
023640  004737  023772                  JSR     PC,RANRD            ;SET UP READ REV/FWD CMDS.
023644                                  LET CMDSEQ+4 :+ COMP #RNOPSC ;# OF RECORDS FOR READ REV.
023644  012737  177740  003464                                                                MOV     #RNOPSC,
023652  005137  003464                                                                        COM     CMDSEQ+4
023656                                  LET CMDSEQ+14 :+ CMDSEQ+4   ;# OF RECORDS FOR READ FORWARD.
023656  013737  003464  003474                                                                MOV     CMDSEQ+4
023664                                  LET (R1) :+ #END            ;STORE END OF SEQUENSE CODE IN SEQ TABLE
023664  012711  177777                                                                        MOV     #END,(R1
023670  004737  006510                  JSR     PC,EXALL            ;GO EXECUTE READ REV/FWD OF LAST N RECOR
023674                                  LET ALLEOT :B+ #0           ;CLEAR ALL UNITS @ EOT FLAG
023674  105037  003450                                                                        CLRB    ALLEOT
023700                                  LET RPTFLG :B+ #1           ;REQUEST PERFORMANCE REPORT DURING REWIN
023700  112737  000001  003443                                                                MOVB    #1,RPTFL
023706                                  LET R1 :+ #CMDSEQ           ;INIT SEQ TBL POINTER.
023706  012701  003460                                                                        MOV     #CMDSEQ,
023712  004737  006470                  JSR PC,SETRW                ;STORE REWIND IN SEQ TBL.
023716                                  LET (R1) :+ #END            ;STORE END IN SEQ TBL.
023716  012711  177777                                                                        MOV     #END,(R1
023722  004737  006510                  JSR PC,EXALL                ;EXECUTE REWIND CMD ON ALL UNITS

023726                                  EXIT    TST
023726  104432                                                                                TRAP    C$EXIT
023730  000174                                                                                .WORD   L10034-.
```

```
                                        ;       ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
                                        ;       THE DATA RELIABILITY TEST.
                                        ;
023732  024060                          RANCMD: RANWV                   ;WRITE/VERIFY.
023734  024046                                  RANWR                   ;WRITE.
023736  024046                                  RANWR                   ;WRITE.
023740  024046                                  RANWR                   ;WRITE.
023742  024046                                  RANWR                   ;WRITE.
023744  024046                                  RANWR                   ;WRITE.
023746  024046                                  RANWR                   ;WRITE.
023750  024046                                  RANWR                   ;WRITE.
023752  023772                                  RANRD                   ;READ.
023754  023772                                  RANRD                   ;READ.
023756  023772                                  RANRD                   ;READ.
023760  023772                                  RANRD                   ;READ
023762  023772                                  RANRD                   ;READ.
023764  023772                                  RANRD                   ;READ.
023766  023772                                  RANRD                   ;READ.
023770  023772                                  RANRD                   ;READ.
                                        ;       SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:      R2
                                        ;       CALLS:
023772                                  RANRD:  LET (R1)+ := @RDR               ;STORE READ REV CMD.
023772  012721  104401                                                                  MOV     @RDR,(R1
023776                                          LET (R1)+ := @DATCNT            ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
023776  012721  004000                                                                  MOV     @DATCNT,
024002                                          LET RANB := RANB + RANS
024002  063737  003362  003360                                                          ADD     RANS,RAN
024010                                          LET R2 := RANB CLR,BY @RNOPSC
024010  013702  003360                                                                  MOV     RANB,R2
024014  042702  177740                                                                  BIC     @RNOPSC,
024020                                          LET (R1)+ := R2         ;SET RANDOM # OF OPERATIONS.
024020  010221                                                                          MOV     R2,(R1)+
024022                                          LET (R1)+ := @RANP      ;RANDOM PATTERN.
024022  012721  000007                                                                  MOV     @RANP,(R
024026                                          LET (R1)+ := @RDF       ;STORE READ FWD CMD.
024026  012721  104001                                                                  MOV     @RDF,(R1
024032                                          LET (R1)+ := @DATCNT    ;SET BRF TO MAX TO READ RANDOM LENGTHS.
024032  012721  004000                                                                  MOV     @DATCNT,
024036                                          LET (R1)+ := R2         ;SET RANDOM # OF OPERATIONS.
024036  010221                                                                          MOV     R2,(R1)+
024040                                          LET (R1)+ := @RANP      ;RANDOM PATTERN.
024040  012721  000007                                                                  MOV     @RANP,(R
024044  000207                                  RTS PC
```

```
                                        ;       SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

024046                                  RANWR:  LET (R1)+ := #WRT               ;STORE WRITE CMD.
024046  012721  104005                                                                  MOV     #WRT,(R1
024052  004737  024072                          JSR PC,RANW                       ;STORE BRF, # OF OPERATIONS, PATTERN.
024056  000207                                  RTS PC


                                        ;       SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
                                        ;       INPUTS:
                                        ;       OUTPUTS:
                                        ;       REGISTERS:
                                        ;       CALLS:

024060                                  RANWV:  LET (R1)+ := #WTV               ;STORE WRITE/VERIFY CMD.
024060  012721  104105                                                                  MOV     #WTV,(R1
024064  004737  024072                          JSR PC,RANW                       ;STORE BRF, # OF OPERATIONS, PATTERN.
024070  000207                                  RTS     PC
```

```
6858
6859                                    ;       SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
6860                                    ;       SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
6861                                    ;       INPUTS:
6862                                    ;       OUTPUTS:
6863                                    ;       REGISTERS:      R2
6864                                    ;       CALLS:
6865
6866  024072                            RANW:   LET (R1)+ := #DATCNT            ;SET BRF TO MAX FOR PATTERN GENERATION.
6867  024072  012721  004000                                                                  MOV     #DATCNT,
6868                                                                            ;RANDOM BRF WILL BE GENERATED FOR EACH P
6869  024076                                    LET RANB := RANB + RANS
6870  024076  063737  003362  003360                                                          ADD     RANS,RAN
6871  024104                                    LET R2 := RANB CLR.BY #RNOPSC
6872  024104  013702  003360                                                                  MOV     RANB,R2
6873  024110  042702  177740                                                                  BIC     #RNOPSC,
6874  024114                                    LET (R1)+ := R2               ;SET RANDOM # OF OPERATIONS.
6875  024114  010221                                                                          MOV     R2,(R1)+
6876  024116                                    LET (R1)+ := #RANP            ;RANDOM PATTERN.
6877  024116  012721  000007                                                                  MOV     #RANP,(R
6878  024122  000207                           RTS PC                        ;RETURN.
6879
6880                                            .EVEN
6881
6882  024124                                    ENDTST
6883  024124                            L10034:
6884  024124  104401                                                                          TRAP    C$ETST
6885
```

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

                                        ;++
                                        ; TEST TO WRITE RECORDS FROM BOT TO EOT.
                                        ;--

                                                BGNTST
                                        T3::

                                                LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
024126  112737  000001  003441                                                          MOVB    #1,RANDO
                                                LET EXPBOT :B= #0               ;CLEAR EXPECT BOT FLAG.
024134  105037  003440                                                                 CLRB    EXPBOT
                                                LET R2 := #DATCNT - #1          ;SET UP THE RECORD LENGTH MASK.
024140  012702  004000                                                                 MOV     #DATCNT,
024144  005302                                                                         DEC     R2
                                                LET LENMSK := COMP R2           ;ALLOW MAXIMUM BUFFER.
024146  010237  003356                                                                 MOV     R2,LENMS
024152  005137  003356                                                                 COM     LENMSK
024156  004737  006444                        JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
024162  004737  006470                        JSR PC,SETRW                    ;CMD2=REWIND
024166                                          LET STAFLG :B= #0             ;CLEAR START FLAG
024166  105037  003452                                                                 CLRB    STAFLG
024172                                          REPEAT                          ;REPEAT TO EOT.
024172                                                                                  50446$:
024172                                            WHILE R1 LT #SEQEND DO        ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
024172                                                                                  50447$:
024172  020127  003550                                                                 CMP     R1,#SEQE
024176  002003                                                                         BGE     50450$
024200  004737  024046                              JSR PC,RANWR                ;STORE A WRITE CMD IN SEQUENCE TABLE.
024204                                            ENDDO
024204  000772                                                                         BR      50447$
024206                                                                                  50450$:
024206                                          LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
024206  012711  177777                                                                 MOV     #END,(R1
024212  004737  006510                          JSR   PC,EXALL                  ;EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
024216                                          LET R1 := #CMDSEQ               ;INIT SEQ TBL POINTER.
024216  012701  003460                                                                 MOV     #CMDSEQ,
024222                                        UNTIL R2 NE #0                    ;REPEAT UNTIL EOT IS REACHED
024222  005702                                                                         TST     R2
024224  001762                                                                         BEQ     50446$
024226                                        LET ALLEOT :B= ALLEOT + #1        ;SET ALL UNITS @ EOT FLAG
024226  105237  003450                                                                 INCB    ALLEOT
024232  000240                                NOP
024234  000240                                NOP
024236  000240                                NOP
024240  004737  025156                        JSR     PC,T5WEOT                 ;WRITE ONE RECORD BEYOND EOT ON ALL UNIT
                                                                                ;SO THAT SHORTER READ STOP DISTANCE
                                                                                ;SHALL POSITION HEAD IN CLEAN IRG GAP
                                                                                ;READ REV THAT EXTRA REC TO RE-POSITION
024244                                        LET ALLEOT :B= #0                 ;CLEAR ALL UNITS @ EOT FLAG
024244  105037  003450                                                                 CLRB    ALLEOT
024250  004737  006470                        JSR PC,SETRW                    ;STORE REWIND IN SEQ TBL.
024254                                          LET (R1) := #END                ;STORE END IN SEQ TBL.
024254  012711  177777                                                                 MOV     #END,(R1
024260  004737  006510                        JSR PC,EXALL                    ;EXECUTE REWIND CMD ON ALL UNITS
```

```
6942
6943  024264                                  EXIT    TST
6944  024264  104432                                                  TRAP    C$EXIT
6945  024266  000002                                                  .WORD   L10035-.
6946
6947                                          .EVEN
6948
6949  024270                                  ENDTST
6950  024270                            L10035:
6951  024270  104401                                                  TRAP    C$ETST
6952
```

```
                                        .SBTTL  TEST 4:  READ COMPATABILITY/READ UTILITY.

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

                                                BGNTST
                                        T4::

                                                LET RANDOM :B= #1               ;SET THE RANDOM OPERATIONS FLAG.
024272  112737  000001  003441                                                  MOVB    #1,RANDO
                                                LET EXPBOT :B= #1               ;SET EXPECT BOT FLAG.
024300  112737  000001  003440                                                  MOVB    #1,EXPBO
024306  004737  006444                          JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
024312  004737  006470                          JSR PC,SETRW                    ;CMD2=REWIND.
024316                                          LET STAFLG :B= #0               ;CLEAR START FLAG
024316  105037  003452                                                          CLRB    STAFLG
024322                                          LET (R1)+ := #RDF               ;CMD3 = READ FORWARD.
024322  012721  104001                                                          MOV     #RDF,(R1
024326                                          LET (R1)+ := #DATCNT            ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
024326  012721  004000                                                          MOV     #DATCNT,
024332                                          LET (R1)+ := #77777             ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
024332  012721  077777                                                          MOV     #77777,(
024336                                          LET (R1)+ := #RANP              ;PATTERN = RANDOM.
024336  012721  000007                                                          MOV     #RANP,(R
024342                                          LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
024342  012711  177777                                                          MOV     #END,(R1
024346  004737  006510                          JSR     PC,EXALL                ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNIT
024352                                          LET ALLEOT :B= ALLEOT + #1      ;FLAG TO ALLOW ALL UNITS AT EOT TO READ
024352  105237  003450                                                          INCB    ALLEOT
024356                                          LET R1 := #CMDSEQ               ;INIT CMD SEQ TBL POINTER.
024356  012701  003460                                                          MOV     #CMDSEQ,
024362                                          LET (R1)+ := #RDR               ;CMD1 = READ REVERSE.
024362  012721  104401                                                          MOV     #RDR,(R1
024366                                          LET (R1)+ := #DATCNT            ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
024366  012721  004000                                                          MOV     #DATCNT,
024372                                          LET (R1)+ := #77777             ;RECORD COUNT = MAX FOR WHOLE TAPE.
024372  012721  077777                                                          MOV     #77777,(
024376                                          LET (R1)+ := #RANP              ;PATTERN = RANDOM.
024376  012721  000007                                                          MOV     #RANP,(R
024402                                          LET (R1) := #END                ;STORE END OF SEQUENCE CODE IN TABLE.
024402  012711  177777                                                          MOV     #END,(R1
024406  004737  006510                          JSR     PC,EXALL                ;GO EXECUTE READ REV. OF ENTIRE TAPE.
024412                                          LET ALLEOT :B= #0               ;CLEAR ALL UNITS @ EOT FLAG
024412  105037  003450                                                          CLRB    ALLEOT

                                                EXIT    TST
024416                                                                          TRAP    C$EXIT
024420  000002                                                                  .WORD   L10036-.

                                                .EVEN

                                                ENDTST
024422                                  L10036:
024422
024422  104401                                                                  TRAP    C$ETST
```

```
7009                                            .SBTTL  TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
7010
7011                                            ;++
7012                                            ; TEST TO EXECUTE  OPERATOR SELECTED COMMAND SEQUENCE.
7013                                            ;--
7014
7015  024424                                            BGNTST
7016  024424                                    T5::
7017
7018  024424                                            LET RANDOM :B= #0               ;CLEAR RAMDOM MODE FLAG.
7019  024424  105037  003441                                                            CLRB    RANDOM
7020  024430                                            LET EXPBOT :B= #1               ;SET EXPECT BOT FLAG.
7021  024430  112737  000001  003440                                                    MOVB    #1,EXPBO
7022  024436                                            LET IRE :B= PIRE                ;MOVE INHIBIT RFC ERROR REPORT FLAG.
7023  024436  113737  002214  003445                                                    MOVB    PIRE,IRE
7024  024444  004737  006444                           JSR PC,SETCH                    ;CMD 1 = SET CHARACTERISTIC.
7025  024450                                            LET CMDSEQ+2 := CHAR            ;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
7026  024450  013737  002216  003462                                                    MOV     CHAR,CMD
7027  024456                                            LET R2 := #CMDD                 ;R2 POINTS TO CMD2 IN SOFT P TABLE.
7028  024456  012702  002220                                                          MOV     #CMDD,R2
7029  024462  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 2 FROM P TBL TO SEQ TBL.
7030  024466  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 3 FROM P TBL TO SEQ TBL.
7031  024472  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 4 FROM P TBL TO SEQ TBL.
7032  024476  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 5 FROM P TBL TO SEQ TBL.
7033  024502  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 6 FROM P TBL TO SEQ TBL.
7034  024506  004737  025134                           JSR     PC,PTCMDS               ;MOVE CMD 7 FROM P TBL TO SEQ TBL.
7035  024512  004737  025134                           JSR     PC,PTCMDS               ;MOVE END CMD FROM P TBL TO SEQ TBL.
7036  024516                                            LET JLOOP := #0                 ;CLEAR JMP CMD LOOP COUNT.
7037  024516  005037  003370                                                            CLR     JLOOP
7038  024522                                            LET STAFLG :B= #0               ;CLEAR START FLAG
7039  024522  105037  003452                                                            CLRB    STAFLG
7040  024526                                            LET R1 := #CMDSEQ               ;INIT SEQUENCE TABLE POINTER.
7041  024526  012701  003460                                                            MOV     #CMDSEQ,
7042  024532                                    3$:     WHILE (R1) NE #END DO           ;WHILE THERE ARE CMDS LEFT IN SEQUENCE T
7043  024532                                                                                    50451$:
7044  024532  021127  177777                                                            CMP     (R1),#EN
7045  024536  001574                                                                   BEQ     50452$
7046  024540  022711  000040                             CMP   #JMP.C,(R1)             ;IS THIS A JUMP CMD?
7047  024544  001024                                      BNE   6$                      ;BR IF NOT.
7048  024546                                              LET R1 := R1 + #2             ;POINT TO BRF.
7049  024546  062701  000002                                                            ADD     #2,R1
7050  024552  012137  003372                             MOV   (R1)+,JLOC              ;SAVE BRF (LOCATION).
7051  024556  022137  003370                             CMP (R1)+,JLOOP               ;HAS LOOP COUNT BE SATISFIED?
7052  024562  001003                                      BNE   1$                      ;IF NOT, JMP AGAIN.
7053  024564                                              LET R1 := R1 + #2             ;IF SO, ADJUST SEQ POUNTER
7054  024564  062701  000002                                                            ADD     #2,R1
7055  024570  000760                                     BR    3$                      ;AND GO TO NEXT COMMAND.
7056  024572                                    1$:       LET JLOOP := JLOOP + #1       ;UPDATE THE LOOP COUNT.
7057  024572  005237  003370                                                            INC     JLOOP
7058  024576                                              LET R1 := #CMDSEQ             ;INIT CMD SEQ TABLE POINTER.
7059  024576  012701  003460                                                            MOV     #CMDSEQ,
7060  024602  005337  003372                   2$:       DEC   JLOC                    ;DECR LOCATION COUNTER.
7061  024606  001751                                     BEQ   3$                      ;IF THIS IS THE RIGHT LOCATION TO JMP TO
7062  024610                                              LET R1 := R1 + #10            ;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
7063  024610  062701  000010                                                            ADD     #10,R1
7064  024614  000772                                     BR    2$                      ;DO IT AGAIN.
```

```
7065  024616  022711  000020                  6$:     CMP   #DLY.C,(R1)             ;DELAY?
7066  024622  001026                                  BNE   4$                      ;BR IF NOT.
7067  024624                                          LET R1 := R1 + #4             ;R1 = LOCATION OF N COUNT.
7068  024624  062701  000004                                                                ADD     #4,R1
7069  024630                                          LET TIME2 := (R1)             ;SAVE N COUNT.
7070  024630  011137  003366                                                                MOV     (R1),TIM
7071  024634                                  7$:     DELAY 1                       ;GO TO SUPER-WAIT 1 MSEC.
7072  024634  012727  000001                                                                MOV     #1,(PC)+
7073  024640  000000                                                                .WORD   0
7074  024642  013727  002116                                                                MOV     L$DLY,(P
7075  024646  000000                                                                .WORD   0
7076  024650  005367  177772                                                                DEC     -6(PC)
7077  024654  001375                                                                BNE     .-4
7078  024656  005367  177756                                                                DEC     -22(PC)
7079  024662  001367                                                                BNE     .-20
7080  024664  005337  003366                          DEC   TIME2
7081  024670  001361                                  BNE   7$
7082  024672                                          LET R1 := R1 + #4             ;POINT TO NEXT CMD.
7083  024672  062701  000004                                                                ADD     #4,R1
7084  024676  000715                                  BR    3$                      ;GO CHECK NEXT CMD.
7085  024700  004737  007452                  4$:     JSR   PC,SETUP                ;GO SETUP THE COMMAND BLOCK.
7086  024704                                          WHILE NCNT LT NCNT1 DO        ;WHILE THERE ARE RECORDS REMAINING:
7087  024704                                                                                  50453$:
7088  024704  023737  003340  003342                                                        CMP     NCNT,NCN
7089  024712  002103                                                                BGE     50454$
7090  024714  004737  007344                    JSR PC,CMDAC                        ;STORE CMD ASCII IN ERROR MSG.
7091  024720  004737  007004                    JSR PC,EXSUB                        ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATU
7092  024724                                    IF CMDWRD EQ #GES THEN              ;IF CMD IS GET STATUS THEN:
7093  024724  023727  003346  100017                                                        CMP     CMDWRD,#
7094  024732  001002                                                                BNE     50455$
7095  024734  004737  015776                      JSR PC,PRXST                      ;PRINT EXTENDED STATUS REGISTERS.
7096  024740                                    ENDIF
7097  024740                                                                                  50455$:
7098  024740  004737  016060                    JSR PC,CKHAE                        ;CHECK HALT AFTER EACH CMD FLAG.
7099  024744                                    LET R2 := #1                        ;SET ALL UNITS AT BOT/EOT.
7100  024744  012702  000001                                                                MOV     #1,R2
7101  024750  004737  015452                    JSR PC,FIRSTU                       ;FIND FIRST UNIT.
7102  024754                                    WHILE DEVTBL(R5) NE #END DO         ;WHILE THERE ARE MORE UNITS-
7103  024754                                                                                  50456$:
7104  024754  026527  002532  177777                                                        CMP     DEVTBL(R
7105  024762  001426                                                                BEQ     50457$
7106  024764                                      IF #MOD.CO SETIN CMDWRD THEN      ;IF CMD IS REVERSE THEN:
7107  024764  032737  000400  003346                                                        BIT     #MOD.CO,
7108  024772  001406                                                                BEQ     50460$
7109  024774                                        IF #X0.BOT NOTSETIN EOTFLG(R5) THEN  ;IF NOT AT BOT THEN:
7110  024774  032765  000002  003426                                                        BIT     #X0.BOT,
7111  025002  001001                                                                BNE     50461$
7112  025004                                          LET R2 := #0                          ;CLEAR EOT/BOT FLAG.
7113  025004  005002                                                                CLR     R2
7114  025006                                        ENDIF
7115  025006                                                                                  50461$:
7116  025006                                      ELSE                              ;ELSE IF CMD IS NOT REVERSE:
7117  025006  000411                                                                BR      50460$
7118  025010                                                                                  50460$:
7119  025010                                        IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
7120  025010  032765  000001  003426                                                        BIT     #X0.EOT,
```

```
7121  025016  001404                                                                    BEQ     50463$
7122  025020  032737  000001  003346                                                    BIT     #CMD.CO,
7123  025026  001001                                                                    BNE     50464$
7124  025030                                                                        50463$:
7125                                                                          ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
7126  025030                                  LET R2 := #0                      ;CLEAR EOT/BOT FLAG.
7127  025030  005002                                                                    CLR     R2
7128  025032                                ENDIF
7129  025032                                                                        50464$:
7130  025032                              ENDIF
7131  025032                                                                        50462$:
7132  025032  004737  015520              JSR PC,NEXTU                      ;FIND NEXT UNIT
7133  025036                            ENDDO                               ;
7134  025036  000746                                                                    BR      50456$
7135  025040                                                                        50457$:
7136  025040                            IF R2 EQ #1 THEN                  ;IF ALL UNIT ARE AT EOT/BOT THEN:
7137  025040  020227  000001                                                           CMP     R2,#1
7138  025044  001016                                                                   BNE     50465$
7139  025046                              LET NCNT1 := NCNT + #1          ;FORCE TERMINATION OF COMMAND.
7140  025046  013737  003340  003342                                                   MOV     NCNT,NCN
7141  025054  005237  003342                                                          INC     NCNT1
7142  025060                              LET ALLEOT :B= ALLEOT + #1 ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VER
7143  025060  105237  003450                                                          INCB    ALLEOT
7144  025064                              IF CMDLG EQ #2 THEN             ;WHEN WRITING IS CURRENT COMMAND
7145  025064  023727  003354  000002                                                   CMP     CMDLG,#2
7146  025072  001002                                                                   BNE     50466$
7147  025074  004737  025156                JSR PC,T5WEOT                 ;GO WRITE/READ REV ONE RECORD BEYOND EOT
7148  025100                              ENDIF
7149  025100                                                                        50466$:
7150  025100                            ELSE
7151  025100  000402                                                                   BR      50467$
7152  025102                                                                        50465$:
7153  025102                              LET ALLEOT :B= #0 ;WHEN NOT ALL @EOT, CLEAR FLAG
7154  025102  105037  003450                                                          CLRB    ALLEOT
7155  025106                              ENDIF
7156  025106                                                                        50467$:
7157  025106                              LET NCNT := NCNT + #1           ;UPDATE RECORD COUNT.
7158  025106  005237  003340                                                          INC     NCNT
7159  025112                              LET PCMDWD := CMDWRD            ;SAVE PREVIOUS COMMAND WORD.
7160  025112  013737  003346  003352                                                   MOV     CMDWRD,P
7161  025120                            ENDDO
7162  025120  000671                                                                   BR      50453$
7163  025122                                                                        50454$:
7164  025122  004737  014402              JSR   PC,VFYDAT                   ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
7165                                                                          ;VERIFY THE LAST N RECORDS OF DATA.
7166  025126                            ENDDO
7167  025126  000601                                                                   BR      50451$
7168  025130                                                                        50452$:
7169
7170  025130                            EXIT    TST
7171  025130  104432                                                                  TRAP    C$EXIT
7172  025132  000130                                                                  .WORD   L10037-.
7173
7174
7175
7176
```

```
7177
7178
7179                                    ;       SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
7180                                    ;       THE COMMAND SEQUENCE TABLE.
7181                                    ;       INPUTS:         R2 = POINTER TO SOFT "P" TABLE
7182                                    ;       OUTPUTS:
7183                                    ;       REGISTERS:      R3.
7184                                    ;       CALLS:
7185
7186  025134                            PTCMDS: LET R3 := (R2)+ - #1 SHIFT +1   ;R3 = COMMAND TABLE INDEX.
7187  025134  012203                                                                    MOV     (R2)+,R3
7188  025136  005303                                                                    DEC     R3
7189  025140  006303                                                                    ASL     R3
7190  025142                                    LET (R1)+ := CMDTBL(R3)         ;MOVE COMMAND WORD.
7191  025142  016321  003562                                                           MOV     CMDTBL(R
7192  025146                                    LET (R1)+ := (R2)+              ;MOVE # OF BYTES.
7193  025146  012221                                                                   MOV     (R2)+,(R
7194  025150                                    LET (R1)+ := (R2)+              ;MOVE # OF OPERATIONS.
7195  025150  012221                                                                   MOV     (R2)+,(R
7196  025152                                    LET (R1)+ := (R2)+              ;MOVE PATTERN CODE.
7197  025152  012221                                                                   MOV     (R2)+,(R
7198  025154  000207                                    RTS PC
```

```
7199
7200                                    ;       SUBROUTINE TO WRITE THEN READ REVERSE ONE RECORD BEYOND EOT
7201                                    ;       INPUTS:
7202                                    ;       OUTPUTS:
7203                                    ;       REGISTERS:
7204                                    ;       CALLS:          CMDAC,EXSUB,CKHAE
7205
7206  025156  000240                    T5WEOT: NOP
7207  025160  000240                            NOP
7208  025162  004737  007004                    JSR PC,EXSUB            ;WRITE ONE RECORD BEYOND EOT
7209  025166  004737  016060                    JSR PC,CKHAE            ;SO THAT READ SHORTER STOP DISTANCE
7210                                                                    ;SHALL POSITION HEAD IN CLEAN IRG GAP
7211  025172                                    LET PCMDWD := CMDWRD    ;REPOSITION TAPE
7212  025172  013737  003346  003352                                                            MOV     CMDWRD,P
7213  025200                                    LET CMDWRD := #RDR      ;BEFORE EXTRA RECORD
7214  025200  012737  104401  003346                                                            MOV     #RDR,CMD
7215  025206                                    LET CMDLG := #4         ;BY READING REVERSE
7216  025206  012737  000004  003354                                                            MOV     #4,CMDLG
7217  025214                                    LET CMDPKT := CMDWRD CLR.BY #BRF.C
7218  025214  013737  003346  002310                                                            MOV     CMDWRD,C
7219  025222  042737  004000  002310                                                            BIC     #BRF.C,C
7220  025230                                    LET CMDSAV := CMDPKT    ;THAT RECORD TO ALLOW
7221  025230  013737  002310  003350                                                            MOV     CMDPKT,C
7222  025236                                    LET CMDPKT+CP.ADL := DATARD     ;NEXT COMMAND IN THE
7223  025236  013737  003336  002312                                                            MOV     DATARD,C
7224  025244  004737  007344                    JSR PC,CMDAC            ;TABLE TO BE EXECUTED
7225  025250  004737  007004                    JSR PC,EXSUB
7226  025254  004737  016060                    JSR PC,CKHAE
7227  025260  000207                            RTS PC
7228
7229
7230                                            .EVEN
7231
7232  025262                                    ENDTST
7233  025262                            L10037:
7234  025262  104401                                                            TRAP    C$ETST
7235
7236  025264                                    ENDMOD
```

```
                                        .TITLE PARAMETER CODING
                                        .SBTTL  HARDWARE PARAMETER CODING SECTION
025264                                          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.
                                        ;--
025264                                          BGNHRD
025264  000024                                                                    .WORD   L10040-L$HARD
025266                                  L$HARD::
025266                                          GPRMA   TS4ADR,0,0,160002,177564,YES
025266  000031                                                                    .WORD   T$CODE
025270  025312                                                                    .WORD   TS4ADR
025272  160002                                                                    .WORD   T$LOLIM
025274  177564                                                                    .WORD   T$HILIM
025276                                          GPRMD   TS4VCT,2,0,777,60,776,YES
025276  001032                                                                    .WORD   T$CODE
025300  025327                                                                    .WORD   TS4VCT
025302  000777                                                                    .WORD   777
025304  000060                                                                    .WORD   T$LOLIM
025306  000776                                                                    .WORD   T$HILIM
025310                                          EXIT HRD
025310  013004                                                                    .WORD   T$CODE
                                                .NLIST  BEX
025312  051524  051123  040440        TS4ADR: .ASCIZ  /TS4 ADDRESS/
025327    126   041505  047524        TS4VCT: .ASCIZ  /VECTOR/
                                                .LIST   BEX
                                                .EVEN
025336                                          ENDHRD
                                                                                  .EVEN
025336                                  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.
                                ;--

025336                                  BGNSFT
025336  000501                                                          .WORD L10041-L$S
025340                          L$SOFT::


025340                                  GPRML   CLRM,0,1,YES
025340  000130                                                          .WORD   T$CODE
025342  026102                                                          .WORD   CLRM
025344  000001                                                          .WORD   1
025346                                  GPRML   RRVM,0,400,YES
025346  000130                                                          .WORD   T$CODE
025350  026121                                                          .WORD   RRVM
025352  000400                                                          .WORD   400
025354                                  GPRML   HAEM,2,1,YES
025354  001130                                                          .WORD   T$CODE
025356  026150                                                          .WORD   HAEM
025360  000001                                                          .WORD   1
025362                                  GPRML   RCVERM,2,400,YES
025362  001130                                                          .WORD   T$CODE
025364  026174                                                          .WORD   RCVERM
025366  000400                                                          .WORD   400
025370                                  GPRML   IRECM,4,1,YES
025370  002130                                                          .WORD   T$CODE
025372  026225                                                          .WORD   IRECM
025374  000001                                                          .WORD   1
025376                                  XFERT   NEXTSP
025376  004024                                                          .WORD   T$CODE
025400                                  GPRML   BADTM,4,400,YES
025400  002130                                                          .WORD   T$CODE
025402  026246                                                          .WORD   BADTM
025404  000400                                                          .WORD   400
025406                          NEXTSP: GPRML   DINTM,6,1,YES
025406  003130                                                          .WORD   T$CODE
025410  026276                                                          .WORD   DINTM
025412  000001                                                          .WORD   1
025414                                  GPRML   IREM,6,400,YES
025414  003130                                                          .WORD   T$CODE
025416  026321                                                          .WORD   IREM
025420  000400                                                          .WORD   400
025422                                  GPRML   CHGM,10,1,YES
025422  004130                                                          .WORD   T$CODE
025424  026352                                                          .WORD   CHGM
025426  000001                                                          .WORD   1
025430                                  XFERF   ENDSP1
025430  127044                                                          .WORD   T$CODE
```

```
7333  025432                GPRMD   CHARM,14,0,377,0,777,YES
7334  025432  006032                .WORD   T$CODE
7335  025434  026376                .WORD   CHARM
7336  025436  000377                .WORD   377
7337  025440  000000                .WORD   T$LOLIM
7338  025442  000777                .WORD   T$HILIM
7339  025444                GPRMD   CMD2M,16,D,37,1,33,YES
7340  025444  007052                .WORD   T$CODE
7341  025446  026423                .WORD   CMD2M
7342  025450  000037                .WORD   37
7343  025452  000001                .WORD   T$LOLIM
7344  025454  000033                .WORD   T$HILIM
7345  025456                GPRMD   BPCRM,20,D,-1,1,DATCNT,YES
7346  025456  010052                .WORD   T$CODE
7347  025460  026431                .WORD   BPCRM
7348  025462  177777                .WORD   -1
7349  025464  000001                .WORD   T$LOLIM
7350  025466  004000                .WORD   T$HILIM
7351  025470                GPRMD   NUMBM,22,D,-1,1,77777,YES
7352  025470  011052                .WORD   T$CODE
7353  025472  026443                .WORD   NUMBM
7354  025474  177777                .WORD   -1
7355  025476  000001                .WORD   T$LOLIM
7356  025500  077777                .WORD   T$HILIM
7357  025502                GPRMD   PATTM,24,D,17,0,10,YES
7358  025502  012052                .WORD   T$CODE
7359  025504  026463                .WORD   PATTM
7360  025506  000017                .WORD   17
7361  025510  000000                .WORD   T$LOLIM
7362  025512  000010                .WORD   T$HILIM
7363  025514                GPRMD   CMD3M,26,D,37,1,33,YES
7364  025514  013052                .WORD   T$CODE
7365  025516  026476                .WORD   CMD3M
7366  025520  000037                .WORD   37
7367  025522  000001                .WORD   T$LOLIM
7368  025524  000033                .WORD   T$HILIM
7369  025526                GPRMD   BPCRM,30,D,-1,1,DATCNT,YES
7370  025526  014052                .WORD   T$CODE
7371  025530  026431                .WORD   BPCRM
7372  025532  177777                .WORD   -1
7373  025534  000001                .WORD   T$LOLIM
7374  025536  004000                .WORD   T$HILIM
7375  025540                GPRMD   NUMBM,32,D, 1,1,77777,YES
7376  025540  015052                .WORD   T$CODE
7377  025542  026443                .WORD   NUMBM
7378  025544  177777                .WORD   -1
7379  025546  000001                .WORD   T$LOLIM
7380  025550  077777                .WORD   T$HILIM
7381  025552                GPRMD   PATTM,34,D,17,0,10,YES
7382  025552  016052                .WORD   T$CODE
7383  025554  026463                .WORD   PATTM
7384  025556  000017                .WORD   17
7385  025560  000000                .WORD   T$LOLIM
7386  025562  000010                .WORD   T$HILIM
7387  025564                GPRMD   CMD4M,36,D,37,1,33,YES
7388  025564  017052                .WORD   T$CODE
```

```
7389  025566  026504                                                    .WORD   CMD4M
7390  025570  000037                                                    .WORD   37
7391  025572  000001                                                    .WORD   T$LOLIM
7392  025574  000033                                                    .WORD   T$HILIM
7393  025576                  GPRMD   BPCRM,40,D,-1,1,DATCNT,YES
7394  025576  020052                                                    .WORD   T$CODE
7395  025600  026431                                                    .WORD   BPCRM
7396  025602  177777                                                    .WORD   -1
7397  025604  000001                                                    .WORD   T$LOLIM
7398  025606  004000                                                    .WORD   T$HILIM
7399  025610                  GPRMD   NUMBM,42,D,-1,1,77777,YES
7400  025610  021052                                                    .WORD   T$CODE
7401  025612  026443                                                    .WORD   NUMBM
7402  025614  177777                                                    .WORD   -1
7403  025616  000001                                                    .WORD   T$LOLIM
7404  025620  077777                                                    .WORD   T$HILIM
7405  025622                  GPRMD   PATTM,44,D,17,O,10,YES
7406  025622  022052                                                    .WORD   T$CODE
7407  025624  026463                                                    .WORD   PATTM
7408  025626  000017                                                    .WORD   17
7409  025630  000000                                                    .WORD   T$LOLIM
7410  025632  000010                                                    .WORD   T$HILIM
7411  025634                  GPRMD   CMD5M,46,D,37,1,33,YES
7412  025634  023052                                                    .WORD   T$CODE
7413  025636  026512                                                    .WORD   CMD5M
7414  025640  000037                                                    .WORD   37
7415  025642  000001                                                    .WORD   T$LOLIM
7416  025644  000033                                                    .WORD   T$HILIM
7417  025646                  GPRMD   BPCRM,50,D,-1,1,DATCNT,YES
7418  025646  024052                                                    .WORD   T$CODE
7419  025650  026431                                                    .WORD   BPCRM
7420  025652  177777                                                    .WORD   -1
7421  025654  000001                                                    .WORD   T$LOLIM
7422  025656  004000                                                    .WORD   T$HILIM
7423  025660                  GPRMD   NUMBM,52,D,-1,1,77777,YES
7424  025660  025052                                                    .WORD   T$CODE
7425  025662  026443                                                    .WORD   NUMBM
7426  025664  177777                                                    .WORD   -1
7427  025666  000001                                                    .WORD   T$LOLIM
7428  025670  077777                                                    .WORD   T$HILIM
7429  025672                  GPRMD   PATTM,54,D,17,O,10,YES
7430  025672  026052                                                    .WORD   T$CODE
7431  025674  026463                                                    .WORD   PATTM
7432  025676  000017                                                    .WORD   17
7433  025700  000000                                                    .WORD   T$LOLIM
7434  025702  000010                                                    .WORD   T$HILIM
7435  025704                  XPFR    ENDSP2
7436  025704  002004                                                    .WORD   T$CODE
7437  025706  ENDSP1: XPFR    ENDSP
7438  025706  075004                                                    .WORD   T$CODE
7439  025710  ENDSP2: GPRMD   CMD6M,56,D,37,1,33,YES
7440  025710  027052                                                    .WORD   T$CODE
7441  025712  026520                                                    .WORD   CMD6M
7442  025714  000037                                                    .WORD   37
7443  025716  000001                                                    .WORD   T$LOLIM
7444  025720  000033                                                    .WORD   T$HILIM
```

```
7445  025722                    GPRMD   BPCRM,60,D,-1,1,DATCNT,YES
7446  025722  030052                    .WORD   T$CODE
7447  025724  026431                    .WORD   BPCRM
7448  025726  177777                    .WORD   -1
7449  025730  000001                    .WORD   T$LOLIM
7450  025732  004000                    .WORD   T$HILIM
7451  025734                    GPRMD   NUMBM,62,D,-1,1,77777,YES
7452  025734  031052                    .WORD   T$CODE
7453  025736  026443                    .WORD   NUMBM
7454  025740  177777                    .WORD   -1
7455  025742  000001                    .WORD   T$LOLIM
7456  025744  077777                    .WORD   T$HILIM
7457  025746                    GPRMD   PATTM,64,D,17,0,10,YES
7458  025746  032052                    .WORD   T$CODE
7459  025750  026463                    .WORD   PATTM
7460  025752  000017                    .WORD   17
7461  025754  000000                    .WORD   T$LOLIM
7462  025756  000010                    .WORD   T$HILIM
7463  025760                    GPRMD   CMD7M,66,D,37,1,33,YES
7464  025760  033052                    .WORD   T$CODE
7465  025762  026526                    .WORD   CMD7M
7466  025764  000037                    .WORD   37
7467  025766  000001                    .WORD   T$LOLIM
7468  025770  000033                    .WORD   T$HILIM
7469  025772                    GPRMD   BPCRM,70,D,-1,1,DATCNT,YES
7470  025772  034052                    .WORD   T$CODE
7471  025774  026431                    .WORD   BPCRM
7472  025776  177777                    .WORD   -1
7473  026000  000001                    .WORD   T$LOLIM
7474  026002  004000                    .WORD   T$HILIM
7475  026004                    GPRMD   NUMBM,72,D,-1,1,77777,YES
7476  026004  035052                    .WORD   T$CODE
7477  026006  026443                    .WORD   NUMBM
7478  026010  177777                    .WORD   -1
7479  026012  000001                    .WORD   T$LOLIM
7480  026014  077777                    .WORD   T$HILIM
7481  026016                    GPRMD   PATTM,74,D,17,0,10,YES
7482  026016  036052                    .WORD   T$CODE
7483  026020  026463                    .WORD   PATTM
7484  026022  000017                    .WORD   17
7485  026024  000000                    .WORD   T$LOLIM
7486  026026  000010                    .WORD   T$HILIM
7487  026030                    GPRMD   CMD8M,76,D,37,1,33,YES
7488  026030  037052                    .WORD   T$CODE
7489  026032  026534                    .WORD   CMD8M
7490  026034  000037                    .WORD   37
7491  026036  000001                    .WORD   T$LOLIM
7492  026040  000033                    .WORD   T$HILIM
7493  026042                    GPRMD   BPCRM,100,D,-1,1,DATCNT,YES
7494  026042  040052                    .WORD   T$CODE
7495  026044  026431                    .WORD   BPCRM
7496  026046  177777                    .WORD   -1
7497  026050  000001                    .WORD   T$LOLIM
7498  026052  004000                    .WORD   T$HILIM
7499  026054                    GPRMD   NUMBM,102,D,-1,1,77777,YES
7500  026054  041052                    .WORD   T$CODE
```

```
7501  026056  026443                                                    .WORD   NUMBM
7502  026060  177777                                                    .WORD   -1
7503  026062  000001                                                    .WORD   T$LOL.IM
7504  026064  077777                                                    .WORD   T$HIL.IM
7505  026066                          GPRMD   PATTM,104,D,17,0,10,YES
7506  026066  042052                                                    .WORD   T$CODE
7507  026070  026463                                                    .WORD   PATTM
7508  026072  000017                                                    .WORD   17
7509  026074  000000                                                    .WORD   T$LOL.IM
7510  026076  000010                                                    .WORD   T$HIL.IM
7511  026100                  ENDSP:
7512  026100                          XFER    JMPMSG
7513  026100  176004                                                    .WORD   T$CODE
```

```
7514
7515                                                    .NLIST  BEX
        026102  046103  040505  020122          CLRM:   .ASCIZ  /CLEAR COUNTERS/
        026121     122  051505  052105          RRVM:   .ASCIZ  /RESET RANDOM VARIABLES/
        026150  040510  052114  040440          HAEM:   .ASCIZ  /HALT AFTER EACH CMD/
        026174  051120  047111  020124          RCVERM: .ASCIZ  /PRINT RECOVERABLE ERRORS/
        026225     111  044116  041111          IRECM:  .ASCIZ  /INHIBIT RECOVERY/
        026246  040502  020104  040524          BADTM:  .ASCIZ  /BAD TAPE SPOT DETECTION/
        026276  044504  040523  046102          DINTM:  .ASCIZ  /DISABLE INTERRUPTS/
        026321     111  044116  041111          IREM:   .ASCIZ  /INHIBIT RFC ERROR REPORT/
        026352  044103  047101  042507          CHGM:   .ASCIZ  /CHANGE CMD SEQUENCE/
        026376  044103  051101  041501          CHARM:  .ASCIZ  /CHARACTERISTICS CODE/
        026423     103  042115  031057          CMD2M:  .ASCIZ  "CMD/2"
        026431     102  043122  041440          BPCRM:  .ASCIZ  /BRF COUNT/
        026447     043  047440  020106          NUMBM:  .ASCIZ  /# OF OPERATIONS/
        026463     120  052101  042524          PATTM:  .ASCIZ  /PATTERN/
                                                    .LIST   BEX
7516            026474                              .EVEN
7517
7518    026474                                  JMPMSG:
7519    026474                                          EXIT SFT
7520    026474  023004                                                          .WORD   T$CODE
7521
7522                                                    .NLIST  BEX
        026476  046503  027504  000063          CMD3M:  .ASCIZ  "CMD/3"
        026504  046503  027504  000064          CMD4M:  .ASCIZ  "CMD/4"
        026512  046503  027504  000065          CMD5M:  .ASCIZ  "CMD/5"
        026520  046503  027504  000066          CMD6M:  .ASCIZ  "CMD/6"
        026526  046503  027504  000067          CMD7M:  .ASCIZ  "CMD/7"
        026534  046503  027504  000070          CMD8M:  .ASCIZ  "CMD/8"
                                                    .LIST   BEX
7523                                                .EVEN
7524
7525    026542                                          ENDSFT
7526                                                                            .EVEN
7527    026542                                  L10041:
7528
7529                                            ;*******************************************************************************
7530                                            ;*******************************************************************************
7531                                            ;       PATCH AREA
7532
7533    026542  000100                          PATCH:: .BLKW   64.
7534                                            ;*******************************************************************************
7535                                            ;*******************************************************************************
7536
7537    026742                                          LASTAD
7538                                                                            .EVEN
7539    026742  026756                                                          .WORD T$FREE
7540    026744  000004                                                          .WORD T$SIZE
7541    026746                                  L$LAST::
7542    026746                                          ENDMOD
```

```
                                        .SBTTL  HARD CODED P-TBL
                                        ;++
                                        ;DIAG IS PRE-PARAMETERIZED PER TBL
                                        ;--
                                                BGNSETUP 1
                                                  BGNPTAB
026746  000000                                                          .WORD   0
026750  000002                                                          .WORD   L10044-.
026752                                  L10042:
026752  172522                                    172522
026754  000224                                    224
026756                                            ENDPTAB
026756                                  L10044:
026756                                          ENDSETUP

000001                                  .END
```

```
ACK.C = 100000 G
ADR   = 000020 G
ALLEOT  003450 G
ASSEMB= 000010
ATTNM   004335 G
AUDRPM  004645 G
AUTODM  021522
BADTM   026246
BADTSW  002206 G
BFSEQ   022676
BFSEQ0  022722
BFSEQ1  022774
BFSEQ2  023006
BFSEQ3  023100
BFSEQ4  023152
BFSEQ5  023214
BFSEQ6  023266
BFSEQ7  023320
BFSEQ8  023352
BFSEQ9  023404
BFSE10  023426
BGNFLG= 003404
BINC    014366
BIT0  = 000001 G
BIT00 = 000001 G
BIT01 = 000002 G
BIT02 = 000004 G
BIT03 = 000010 G
BIT04 = 000020 G
BIT05 = 000040 G
BIT06 = 000100 G
BIT07 = 000200 G
BIT08 = 000400 G
BIT09 = 001000 G
BIT1  = 000002 G
BIT10 = 002000 G
BIT11 = 004000 G
BIT12 = 010000 G
BIT13 = 020000 G
BIT14 = 040000 G
BIT15 = 100000 G
BIT2  = 000004 G
BIT3  = 000010 G
BIT4  = 000020 G
BIT5  = 000040 G
BIT6  = 000100 G
BIT7  = 000200 G
BIT8  = 000400 G
BIT9  = 001000 G
BOE   = 000400 G
BORERS  013576 G
BPCRM   026431
BRCPK   002324 G
BRFCNT  003344 G
BRF.C = 004000 G
BTADDR  002544 G
BTMSG1  013372
BTMSG2  013457
BTMSG3  013527
BTPT    003436 G
BTRPT   016544
BTC     002774 G
BT1     003046 G
BT2     003120 G
BT3     003172 G
CHAR    002216 G
CHARM   026376
CHGFLG  002212 G
CHGM    026352
CHKERR  011456 G
CH.EAI= 000040 G
CH.ERI= 000020 G
CH.ESS= 000200 G
CKDATA  015036 G
CKDCNT  015446
CKDFF   015450
CKHAE   016060 G
CKHRTN  016146
CLN   = 101012 G
CLRERR  011154 G
CLRFLG  002202 G
CLRM    026102
CMDAC   007344 G
CMDASC  003650 G
CMDD    002220 G
CMDLG   003354 G
CMDPKM  004102 G
CMDPKT  002310 G
CMDSAV  003350 G
CMDSEQ  003460 G
CMDSE2  003470 G
CMDTBL  003562 G
CMDWRD  003346 G
CMD.C0= 000001 G
CMD.C1= 000002 G
CMD.C2= 000004 G
CMD.C3= 000010 G
CMD.C4= 000020 G
CMD2M   026423
CMD3M   026476
CMD4M   026504
CMD5M   026512
CMD6M   026520
CMD7M   026526
CMD8M   026534
CNTBGN= 002554
CNTEND= 003324
CNTLEN= 000550 G
CODFLM  003772 G
COUNTE= 050404
CP.ADH= 000004 G
CP.ADL= 000002 G
CP.CMD= 000000 G
CP.CNT= 000006 G
CRLF    005213 G
CRLFSP  005216 G
CTCC    003376 G
CVC.C = 040000 G
C$AU  = 000052
C$AUTO= 000061
C$BRK = 000022
C$BSEG= 000004
C$BSUB= 000002
C$CEFG= 000045
C$CLCK= 000062
C$CLEA= 000012
C$CLOS= 000035
C$CLP1= 000006
C$CVEC= 000036
C$DCLN= 000044
C$DODU= 000051
C$DRPT= 000024
C$DU  = 000053
C$EDIT= 000003
C$ERDF= 000055
C$ERHR= 000056
C$ERRO= 000060
C$ERSF= 000054
C$ERSO= 000057
C$ESCA= 000010
C$ESEG= 000005
C$ESUB= 000003
C$ETST= 000001
C$EXIT= 000032
C$GETB= 000026
C$GETW= 000027
C$GMAN= 000043
C$GPHR= 000042
C$GPLO= 000030
C$GPRI= 000040
C$INIT= 000011
C$INLP= 000020
C$MANI= 000050
C$MEM = 000031
C$MSG = 000023
C$OPEN= 000034
C$PNTB= 000014
C$PNTF= 000017
C$PNTS= 000016
C$PNTX= 000015
C$QIO = 000077
C$RDBU= 000007
C$REFG= 000047
C$RESF= 000033
C$REVI= 000003
C$RFLA= 000021
C$RPT = 000025
C$SEFG= 000046
C$SPRI= 000041
C$SVEC= 000037
C$TPRI= 000013
DATARD  003336 G
DATAWT  003334 G
DATCNT= 004000 G
DEVTBL  002532 G
DFPTBL  002174 G
DFTSCH= 000040 G
DIA   = 100006 G
DIABLK= 003334 G
DIACNT= 000020 G
DIAGMC= 000000
DINT    002210 G
DINTM   026276
DLY   = 000020 G
DLY.C = 000020 G
DRI   = 100013 G
DROPDM  004616 G
DROPED  003446 G
DROPN   015774
DROPU   015554 G
DROPUA  015704
DRORTN  015762
DTAERM  005224 G
DTAER2  004677 G
DTAER3  004746 G
DTAER4  005010 G
DTAER5  005031 G
EF.CON= 000036 G
EF.NEW= 000035 G
EF.PWR= 000034 G
EF.RES= 000037 G
EF.STA= 000040 G
EINC    014374
END   = 177777 G
ENDERF= 003416
ENDFLG= 003452
ENDSP   026100
ENDSP1  025706
ENDSP2  025710
EOTFLG  003426 G
ERCVER  002205 G
ERLOG   003412 G
ERRREC  003415 G
ERS   = 100411 G
ERSFLG  003451 G
EVL   = 000004 G
EXALL   006510 G
EXARTN  007002
EXCRTN  010634
EXCUTE  010326 G
EXPBOT  003440 G
EXSUB   007004 G
E$END = 002100
E$LOAD= 000035
FATSM   004373 G
FIRSTU  015452 G
FMT.C0= 000040 G
FMT.C1= 000100 G
FTLCNT  003314 G
FUNRM   004353 G
F$AU  = 000015
F$AUTO= 000020
F$BGN = 000040
F$CLEA= 000007
F$DU  = 000016
F$END = 000041
F$HARD= 000004
F$HW  = 000013
F$INIT= 000006
F$JMF = 000050
F$MOD = 000000
F$MSG = 000011
F$PROT= 000021
F$PWR = 000017
F$RPT = 000012
F$SEG = 000003
F$SOFT= 000005
F$SRV = 000010
F$SUB = 000002
F$SW  = 000014
F$TEST= 000001
GCMDA   007416 G
GENPAT  010030 G
GES   = 100017 G
GETSTM  005157 G
GIT     010322
GOWAIT  010636 G
GSCPK   002320 G
G$CNTO= 000200
G$DELM= 000372
G$DISP= 000005
G$EXCP= 000400
G$HILI= 000000
G$LOLI= 000001
G$NO  = 000000
```

```
G$OFFS= 000400          JMP   = 000040 G      L$SPC   002056 G      MSGPKT  002334 G      PRIO1 = 000040 G
G$OFSI= 000376          JMPMSG  026474        L$SPCP  002020 G      MSGPKO  002352 G      PRIO2 = 000100 G
G$PRMA= 000001          JMP.C = 000040 G      L$SPTP  002024 G      MSGPK1  002370 G      PRIO3 = 000140 G
G$PRMD= 000002          J$JMP = 000167        L$STA   002030 G      MSGPK2  002406 G      PRIO4 = 000200 G
G$PRML= 000000          LENMSK  003356 G      L$SW    002202 G      MSGPK3  002424 G      PRIO5 = 000240 G
G$RADA= 000140          LOE   = 040000 G      L$TEST  002114 G      MS.RFC= 000004 G      PRIO6 = 000300 G
G$RADB= 000000          LOG     014102 G      L$TIML  002014 G      MS.XS0= 000006 G      PRIO7 = 000340 G
G$RADD= 000040          LOT   = 000010 G      L$UNIT  002012 G      MS.XS1= 000010 G      PRXST   015776 G
G$RADL= 000120          L$ACP   002110 G      L10000  002200        MS.XS2= 000012 G      PTCMDS  025134
G$RADO= 000020          L$APT   002036 G      L10001  002310        MS.XS3= 000014 G      PWRFLG  003453 G
G$XFER= 000004          L$AU    021770 G      L10002  005370        NCMD.C= 177740 G      RANB    003360 G
G$YES = 000010          L$AUT   002070 G      L10003  006314        NCNT    003340 G      RANBC = 153624 G
HAE     002204 G        L$AUTO  021232 G      L10004  006322        NCNT1   003342 G      RANCMD  023732
HAEM    026150          L$CCP   002106 G      L10005  006330        NEXTSP  025406        RANDOM  003441 G
HALTM   004042 G        L$CLEA  021654 G      L10006  006336        NEXTU   015520 G      RANP  = 000007 G
HELP  = 000000          L$CO    002032 G      L10007  006344        NINUSE= 177774 G      RANRD   023772
HOE   = 100000 G        L$DEPO  002011 G      L10010  017674        NOINTM  004421 G      RANS    003362 G
HRDCNT  003304 G        L$DESC  002136 G      L10012  021230        NRDYM   021616        RANSC = 032561 G
IBE   = 010000 G        L$DESP  002076 G      L10013  021520        NSSRM   004271 G      RANW    024072
IDU   = 000040 G        L$DEVP  002060 G      L10014  021714        NUMBM   026443        RANWR   024046
IER   = 020000 G        L$DISP  002124 G      L10015  021766        NURTY1  005073 G      RANWV   024060
IE.C  = 000200 G        L$DLY   002116 G      L10016  022062        OFLINM  005127 G      RCVERM  026174
INIT10  017704          L$DTP   002040 G      L10017  023450        ONEFIL= 000001        RDF   = 104001 G
INIT15  020132          L$DTYP  002034 G      L10020  022216        OPFLAG  003456 G      RDR   = 104401 G
INIT16  020152          L$DU    021716 G      L10021  022242        OPP.C = 020000 G      RECCNT  003324 G
INTFLG  003416 G        L$DUT   002072 G      L10022  022262        O$APTS= 000000        RECLOG  003411 G
INTPRI= 000340 G        L$DVTY  002164 G      L10023  022302        O$AU  = 000001        RECRED  006312
IRE     003445 G        L$EF    002052 G      L10024  022322        O$BGNR= 000001        RECTAP  006346 G
IREC    002211 G        L$ENVI  002044 G      L10025  022342        O$BGNS= 000001        RECUD   011310 G
IRECM   026225          L$ETP   002102 G      L10026  022362        O$DU  = 000001        REPEAT= 050224
IREM    026321          L$EXP1  002046 G      L10027  022402        O$ERRT= 000000        RERM    004550 G
ISR   = 000100 G        L$EXP4  002064 G      L10030  022422        O$GNSW= 000001        RETRY = 050222
IXE   = 004000 G        L$EXP5  002066 G      L10031  022442        O$POIN= 000001        RETRYC  003404 G
I$AU  = 000041          L$HARD  025266 G      L10032  022500        O$SETU= 000001        REWRT   013752
I$AUTO= 000041          L$HIME  002120 G      L10033  022664        PASCNT  003254 G      RFBC    002654 G
I$CLN = 000041          L$HPCP  002016 G      L10034  024124        PATCH   026542 G      RFCERM  004254 G
I$DU  = 000041          L$HPTP  002022 G      L10035  024270        PATERN  003374 G      RFREC   002754 G
I$HRD = 000041          L$HW    002174 G      L10036  024422        PATR0   010114 G      RFUNR   002764 G
I$INIT= 000041          L$ICP   002104 G      L10037  025262        PATR1   010152 G      RLEXM   004310 G
I$MOD = 000041          L$INIT  017704 G      L10040  025336        PATR2   010172 G      RNF   = 125401 G
I$MSG = 000041          L$LADP  002026 G      L10041  026542        PATR3   010202 G      RNOPSC= 177740 G
I$PROT= 000040          L$LAST  026746 G      L10042  026752        PATR4   010226 G      RNR   = 105401 G
I$PTAB= 000041          L$LOAD  002100 G      L10044  026756        PATR5   010240 G      RNTM    004504 G
I$PWR = 000041          L$LUN   002074 G      MBR   = 100012 G      PATR6   010252 G      RPF   = 105001 G
I$RPT = 000041          L$MREV  002050 G      MEMOM   021126        PATR7   010272 G      RPR   = 125001 G
I$SEG = 000041          L$NAME  002000 G      MISCFG  003455 G      PATR8   010324 G      RPTCNT  003406 G
I$SETU= 000041          L$PRIO  002042 G      MOD.C0= 000400 G      PATTBL  010072        RPTFLG  003443 G
I$SFT = 000041          L$PROT  017676 G      MOD.C1= 001000 G      PATTM   026463        RPT1A   017013
I$SRV = 000041          L$PRT   002112 G      MOD.C2= 002000 G      PCMDWD  003352 G      RPT1B   017067
I$SUB = 000041          L$REPP  002062 G      MOD.C3= 004000 G      PIRE    002214 G      RPT1C   017140
I$TST = 000041          L$REV   002010 G      MOVMSG  011224 G      PNT   = 001000 G      RPT1D   017211
JLOC    003372 G        L$RPT   016150 G      MSGCNT= 000016 G      PRI   = 002000 G      RPT1E   017437
JLOOP   003370 G        L$SOFT  025340 G      MSGPKA  002502 G      PRIOO = 000000 G      RPT1F   017515
```

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RPT1G   017366          TCC5    012552 G        T$PTAB= 010043          URERM   004572 G        $F$LOO= 000200
RPT1I   017563          TCC6    012650 G        T$PTHV= 000001          VFEXC   014504 G        $F$NAM= 000160
RPT1J   017467          TCC7    012700 G        T$PTNU= 000001          VFISU   014750 G        $F$NO  = 000403
RPT1K   017554          TC2RTN  012062          T$SAVL= 177777          VFYCNT  003274 G        $F$OR  = 000320
RRANV   002203 G        TIME1   003364 G        T$SEGL= 177777          VFYDAT  014402 G        $F$RTN= 000300
RRBC    002614 G        TIME2   003366 G        T$SIZE= 000004          VFYFLG  003442 G        $F$SEL= 000140
RRECL = 000020 G        TOERM   004207 G        T$SUBN= 000000          VFY.C = 000100 G        $F$THE= 000330
RRREC   002734 G        TOOMM   004460 G        T$TAGL= 177777          WLKZRO  010206          $F$TRU= 000404
RRUNR   002744 G        TRAPD4  003454 G        T$TAGN= 010045          WRBC    002554 G        $F$UNT= 000130
RRVM    026121          TRAP4   021646 G        T$TEMP= 000000          WRECL = 000020 G        $F$WHI= 000120
RTLE    012716 G        TSAM    004436 G        T$TEST= 000005          WRR   = 105005 G        $F$YES= 000402
RTLRTN  013042          TSBA  = 002452 G        T$TSTM= 177777          WRREC   002714          $IFLEV= 177777
RWCPK   002330 G        TSC.FC= 177717 G        T$TSTS= 000001          WRT   = 104005 G        $ISK0  = 000001
RWD   = 102010 G        TSC.TC= 177761 G        T$$AU = 010016          WRTY    013044 G        $ISK1  = 000001
RWERR   003413 G        TSDB    002452 G        T$$AUT= 010013          WRTYCT  003244 G        $ISK2  = 000001
R5SAVE  003400 G        TSSR    002462 G        T$$CLE= 010014          WRTYER  003410 G        $ISK3  = 000001
SCCNT   003264 G        TSSREG  003402 G        T$$DAT= 010044          WRTYFG  003407 G        $ISK4  = 000001
SCERM   004230 G        TSVCT   002472 G        T$$DU = 010015          WRUNR   002724 G        $ISK5  = 000001
SCH   = 140004 G        TS.A16= 000400 G        T$$HAR= 010040          WSSR    011170 G        $ISK6  = 000001
SCHBK   002442 G        TS.A17= 001000 G        T$$HW = 010000          WTM   = 100011 G        $LOCTA= 177777
SCHCNT= 000010 G        TS.NBA= 002000 G        T$$INI= 010012          WTR   = 101011 G        $LSTCN= 177777
SEQEND  003550 G        TS.NXM= 004000 G        T$$MSG= 010003          WTV   = 104105 G        $LSTIN= 000001
SETCH   006444 G        TS.OFL= 00010( G        T$$PC = 000001          WTVERM  004164 G        $LSTST= 177777
SETRW   006470 G        TS.RMR= 010000 G        T$$PRO= 010011          WTYBRF  013370          $LSTTA= 000001
SETUP   007452 G        TS.SC = 100000 G        T$$PTA= 010043          WTYCMD  013364          $MCALL= 000000
SFF   = 105010 G        TS.SPE= 020000 G        T$$RPT= 010010          WTYWRD  013366          $NESTL= 177777
SFPTBL  002202 G        TS.SSR= 000200 G        T$$SOF= 010041          X$ALWA= 000000          $NSK0  = 000120
SFR   = 105410 G        TS.UPE= 040000 G        T$$SRV= 010007          X$FALS= 000040          $NSK1  = 000120
SRF   = 104010 G        TS4ADR  025312          T$$SUB= 010033          X$OFFS= 000400          $NSK2  = 000110
SRR   = 104410 G        TS4CL   002522 G        T$$SW = 010001          X$TRUE= 000020          $NSK3  = 000110
STAERM  005372 G        TS4INT  002512 G        T$$TES= 010037          XO.BOT= 000002 G        $NSK4  = 000110
STAER1  005704          TS4IN0  006316 G        T1      022064 G        XO.EOT= 000001 G        $NSK5  = 000110
STAER2  006062          TS4IN1  006324 G        T1SWB   003447 G        XO.LET= 020000 G        $NSK6  = 000110
STAER3  006141          TS4IN2  006332 G        T1.1    022074          XO.ONL= 000100 G        $SAVLE= 177777
STAER4  006177          TS4IN3  006340 G        T1.10   022424          XO.RLL= 010000 G        $SSK0  = 050452
STAER5  006217          TS4VCT  025327          T1.11   022444          XO.RLS= 040000 G        $TAGLE= 177777
STAER6  006026          T$ARGC= 000003          T1.12   022530          XO.TMK= 100000 G        $TAGNU= 050470
STAER7  005776          T$CODE= 023004          T1.2    022220          X2.OPM= 100000 G        $TEMP  = 000402
STAFLG  003452 G        T$ERRN= 000001          T1.3    022244          X3.DCK= 000010 G        $TSK0  = 050451
SVCGBL= 000000          T$EXCP= 000000          T1.4    022264          X3.RNY= 157400 G        $TSK1  = 050452
SVCINS= 000001          T$FLAG= 000041          T1.5    022304          ZROPAT  010156          $TSK2  = 050453
SVCSUB= 000000          T$FREE= 026756          T1.6    022324          $BGNLE= 177777          $TSK3  = 050454
SVCTAG= 000000          T$GMAN= 000000          T1.7    022344          $ERFLG= 000400          $TSK4  = 050467
SVCTST  000000          T$HILI= 000010          T1.8    022364          $F$AND= 000310          $TSK5  = 050466
SWBFLG  003444 G        T$LAST= 000001          T1.9    022404          $F$BAD= 000401          $TSK6  = 050462
SWB.C = 010000 G        T$LOLI= 000000          T2      023452 G        $F$BLA= 000170          $TSK7  = 050464
S$LSYM= 010000          T$LSYM= 010000          T3      024126 G        $F$CAS= 000150          $$ARGC= 000000
TCCRA   011700          T$LTNO= 000005          T4      024272 G        $F$DEC= 000220          $$BYTE= 000403
TCC0    011720 G        T$NEST= 177777          T5      024424 G        $F$DO  = 000340          $$CASE= 000000
TCC1    011736 G        T$NSO  = 000000         T5WEOT  025156          $F$FAL= 000405          $$DST  = 000000
TCC2    011754 G        T$NS1  = 000005         UAM   = 000200 G        $F$GOO= 000400          $$ELOC= 000402
TCC3    012064 G        T$NS2  = 000002         UN    = 100417 G        $F$IF  = 000110          $$ERFL= 000000
TCC4    012102 G        T$PCNT= 000000          UNREC   003414 G        $F$INC= 000210          $$FLAG= 000001
```

```
$$FROM= 000000         $$REG = 177777         $$RTN2= 000000         $$TGS1= 000000         $$$TAG= 050000
$$LOC = 025072         $$RETU= 000000         $$SRC = 000000         $$TGS2= 000000         .     = 026756
$$LOCN= 000000         $$RTN1= 000000         $$TGSV= 000000         $$TO  = 000000

. ABS.  026756     000

 ERRORS DETECTED:  0

 CZTSHD,CZTSHD/SOL/EQ:ONEFILE=SVC.SML,SPMAC.SML,CZTSHD.P11
 RUN-TIME: 132 138 .8 SECONDS
 RUN-TIME RATIO: 347/271=1.2
 CORE USED:  31K  (62 PAGES)
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CZTSHD.P11	06-APR....B1	CZTSHD.P11	06-APR....B5	CZTSHD.P11	06-APR....B9	CZTSHD.P11	06-APR....B13
CZTSHD.P11	06-APR....C1	CZTSHD.P11	06-APR....C5	CZTSHD.P11	06-APR....C9	CZTSHD.P11	06-APR....C13
CZTSHD.P11	06-APR....D1	CZTSHD.P11	06-APR....D5	CZTSHD.P11	06-APR....D9	CZTSHD.P11	06-APR....D13
CZTSHD.P11	06-APR....E1	CZTSHD.P11	06-APR....E5	CZTSHD.P11	06-APR....E9	CZTSHD.P11	06-APR....E13
CZTSHD.P11	06-APR....F1	CZTSHD.P11	06-APR....F5	CZTSHD.P11	06-APR....F9	CZTSHD.P11	06-APR....F13
CZTSHD.P11	06-APR....G1	CZTSHD.P11	06-APR....G5	CZTSHD.P11	06-APR....G9	CZTSHD.P11	06-APR....G13
CZTSHD.P11	06-APR....H1	CZTSHD.P11	06-APR....H5	CZTSHD.P11	06-APR....H9	CZTSHD.P11	06-APR....H13
CZTSHD.P11	06-APR....I1	CZTSHD.P11	06-APR....I5	CZTSHD.P11	06-APR....I9	CZTSHD.P11	06-APR....I13
CZTSHD.P11	06-APR....J1	CZTSHD.P11	06-APR....J5	CZTSHD.P11	06-APR....J9	CZTSHD.P11	06-APR....J13
CZTSHD.P11	06-APR....K1	CZTSHD.P11	06-APR....K5	CZTSHD.P11	06-APR....K9	CZTSHD.P11	06-APR....K13
CZTSHD.P11	06-APR....L1	CZTSHD.P11	06-APR....L5	CZTSHD.P11	06-APR....L9	CZTSHD.P11	06-APR....L13
CZTSHD.P11	06-APR....M1	CZTSHD.P11	06-APR....M5	CZTSHD.P11	06-APR....M9	CZTSHD.P11	06-APR....M13
CZTSHD.P11	06-APR....N1	CZTSHD.P11	06-APR....N5	CZTSHD.P11	06-APR....N9	CZTSHD.P11	06-APR....N13
CZTSHD.P11	06-APR....B2	CZTSHD.P11	06-APR....B6	CZTSHD.P11	06-APR....B10	CZTSHD.P11	06-APR....B14
CZTSHD.P11	06-APR....C2	CZTSHD.P11	06-APR....C6	CZTSHD.P11	06-APR....C10	CZTSHD.P11	06-APR....C14
CZTSHD.P11	06-APR....D2	CZTSHD.P11	06-APR....D6	CZTSHD.P11	06-APR....D10	CZTSHD.P11	06-APR....D14
CZTSHD.P11	06-APR....E2	CZTSHD.P11	06-APR....E6	CZTSHD.P11	06-APR....E10	CZTSHD.P11	06-APR....E14
CZTSHD.P11	06-APR....F2	CZTSHD.P11	06-APR....F6	CZTSHD.P11	06-APR....F10	CZTSHD.P11	06-APR....F14
CZTSHD.P11	06-APR....G2	CZTSHD.P11	06-APR....G6	CZTSHD.P11	06-APR....G10	CZTSHD.P11	06-APR....G14
CZTSHD.P11	06-APR....H2	CZTSHD.P11	06-APR....H6	CZTSHD.P11	06-APR....H10	CZTSHD.P11	06-APR....H14
CZTSHD.P11	06-APR....I2	CZTSHD.P11	06-APR....I6	CZTSHD.P11	06-APR....I10	CZTSHD.P11	06-APR....I14
CZTSHD.P11	06-APR....J2	CZTSHD.P11	06-APR....J6	CZTSHD.P11	06-APR....J10	CZTSHD.P11	06-APR....J14
CZTSHD.P11	06-APR....K2	CZTSHD.P11	06-APR....K6	CZTSHD.P11	06-APR....K10	CZTSHD.P11	06-APR....K14
CZTSHD.P11	06-APR....L2	CZTSHD.P11	06-APR....L6	CZTSHD.P11	06-APR....L10	CZTSHD.P11	06-APR....L14
CZTSHD.P11	06-APR....M2	CZTSHD.P11	06-APR....M6	CZTSHD.P11	06-APR....M10	CZTSHD.P11	06-APR....M14
CZTSHD.P11	06-APR....N2	CZTSHD.P11	06-APR....N6	CZTSHD.P11	06-APR....N10		
CZTSHD.P11	06-APR....B3	CZTSHD.P11	06-APR....B7	CZTSHD.P11	06-APR....B11		
CZTSHD.P11	06-APR....C3	CZTSHD.P11	06-APR....C7	CZTSHD.P11	06-APR....C11		
CZTSHD.P11	06-APR....D3	CZTSHD.P11	06-APR....D7	CZTSHD.P11	06-APR....D11		
CZTSHD.P11	06-APR....E3	CZTSHD.P11	06-APR....E7	CZTSHD.P11	06-APR....E11		
CZTSHD.P11	06-APR....F3	CZTSHD.P11	06-APR....F7	CZTSHD.P11	06-APR....F11		
CZTSHD.P11	06-APR....G3	CZTSHD.P11	06-APR....G7	CZTSHD.P11	06-APR....G11		
CZTSHD.P11	06-APR....H3	CZTSHD.P11	06-APR....H7	CZTSHD.P11	06-APR....H11		
CZTSHD.P11	06-APR....I3	CZTSHD.P11	06-APR....I7	CZTSHD.P11	06-APR....I11		
CZTSHD.P11	06-APR....J3	CZTSHD.P11	06-APR....J7	CZTSHD.P11	06-APR....J11		
CZTSHD.P11	06-APR....K3	CZTSHD.P11	06-APR....K7	CZTSHD.P11	06-APR....K11		
CZTSHD.P11	06-APR....L3	CZTSHD.P11	06-APR....L7	CZTSHD.P11	06-APR....L11		
CZTSHD.P11	06-APR....M3	CZTSHD.P11	06-APR....M7	CZTSHD.P11	06-APR....M11		
CZTSHD.P11	06-APR....N3	CZTSHD.P11	06-APR....N7	CZTSHD.P11	06-APR....N11		
CZTSHD.P11	06-APR....B4	CZTSHD.P11	06-APR....B8	CZTSHD.P11	06-APR....B12		
CZTSHD.P11	06-APR....C4	CZTSHD.P11	06-APR....C8	CZTSHD.P11	06-APR....C12		
CZTSHD.P11	06-APR....D4	CZTSHD.P11	06-APR....D8	CZTSHD.P11	06-APR....D12		
CZTSHD.P11	06-APR....E4	CZTSHD.P11	06-APR....E8	CZTSHD.P11	06-APR....E12		
CZTSHD.P11	06-APR....F4	CZTSHD.P11	06-APR....F8	CZTSHD.P11	06-APR....F12		
CZTSHD.P11	06-APR....G4	CZTSHD.P11	06-APR....G8	CZTSHD.P11	06-APR....G12		
CZTSHD.P11	06-APR....H4	CZTSHD.P11	06-APR....H8	CZTSHD.P11	06-APR....H12		
CZTSHD.P11	06-APR....I4	CZTSHD.P11	06-APR....I8	CZTSHD.P11	06-APR....I12		
CZTSHD.P11	06-APR....J4	CZTSHD.P11	06-APR....J8	CZTSHD.P11	06-APR....J12		
CZTSHD.P11	06-APR....K4	CZTSHD.P11	06-APR....K8	CZTSHD.P11	06-APR....K12		
CZTSHD.P11	06-APR....L4	CZTSHD.P11	06-APR....L8	CZTSHD.P11	06-APR....L12		
CZTSHD.P11	06-APR....M4	CZTSHD.P11	06-APR....M8	CZTSHD.P11	06-APR....M12		
CZTSHD.P11	06-APR....N4	CZTSHD.P11	06-APR....N8	CZTSHD.P11	06-APR....N12		