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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZTCC-A-D
PRODUCT NAME: TC3 - TC11 TEST 3
DATE: MAY 1, 1972
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: L. R. KOLLER

THIS MAINDEC OBSOLETES MAINDEC-11-D3CC

TC3 - TC11 TEST 3 IS PART 3 OF A FIVE PROGRAM PACKAGE
USED TO TEST THE TC11 DECTAPE CONTROL.

1. ABSTRACT

TC3 - TC11 TEST 3 IS PART 3 OF A FIVE PROGRAM PACKAGE USED TO TEST THE TC11 DECTAPE CONTROL. TC3 TESTS AND EXERCISES THE TC11 CONTROL AND FROM ONE TO EIGHT SELECTED TRANSPORTS. TC3 CONCENTRATES ON TESTING FOR CORRECT OPERATION OF THE UP TO SPEED BIT (UPS), ABILITY TO READ BLOCK NUMBERS AND DETECT END ZONES, EXERCISES RNUM COMMAND READING FORWARD AND REVERSE BLOCK NUMBERS, EXERCISES THE WDATA (WRITE DATA) AND RDATA (READ DATA) COMMANDS BOTH FORWARD AND REVERSE, AND WITH SINGLE, DOUBLE, AND 4 BLOCK TRANSFERS.

ALL EXECUTION TIMES QUOTED ARE TYPICAL OF A 11/20 SYSTEM.
EXECUTION TIMES IN OTHER PDP-11 SYSTEMS WILL VARY.

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP-11 SYSTEM (4K CORE).
B. ASR33/35 TELETYPE.
C. TC11 DECTAPE CONTROL AND AT LEAST ONE TU56 DUAL TRANSPORT.

THE TELETYPE AND TC11 CONTROL MUST HAVE THEIR STANDARD PERIPHERAL ADDRESSES, INTERRUPT LEVELS, AND INTERRUPT VECTOR ADDRESSES. REFER TO SECTION 7.2 IF YOUR SYSTEM DOES NOT HAVE STANDARD PERIPHERAL ADDRESSES.

2.2 STORAGE

THIS PROGRAM USES LOCATIONS 000000 THROUGH 017500.

3. LOADING PROCEDURE

THIS PROGRAM'S OBJECT TAPE IS PUNCHED IN ABSOLUTE FORMAT.
THE ABS LOADER IS USED TO LOAD THE PROGRAM.

4. USE PROCEDURE

A. LOAD UNITS TO BE TESTED WITH STANDARD FORMAT DECTAPE. SET TO REMOTE/WRITE ENABLE.
B. WRTM AND WALL SWITCHES MUST BE OFF.
C. LOAD ADDRESS 000200.
D. PRESS START.
E. THE PROGRAM IDENTIFIES ITSELF, TYPES SETUP INSTRUCTIONS, AND HALTS.
F. PERFORM SETUP (STEPS A AND B), SET UNITS TO BE TESTED IN SR7 THROUGH SR0 AND PRESS CONT. (SR7 FOR UNIT7, SR6 FOR UNIT6, ETC.).
G. THE PROGRAM TYPES SR OPTIONS MESSAGE, SET DESIRED SR OPTIONS IF ANY. NORMAL SR IS 000000. PRESS CONT.

THIS PROGRAM'S SR OPTIONS ARE:

```
SR15 = 1          HALT ON ERROR
SR14 = 1          ENTER SCOPE MODE
SR13 = 1          INHIBIT ERROR PRINTOUT
SR11 = 1          INHIBIT ITERATION
SR10 = 1          HALT AT END OF TEST CURRENTLY EXECUTING
SR9  = 1          SELECT THE TEST SPECIFIED BY SR7 THROUGH SR0
SR7 THROUGH SR0 - NUMBER OF TEST TO BE SELECTED
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SECTION 7.1 GIVES A COMPLETE EXPLANATION OF SR OPTIONS.

H. THE PROGRAM BEGINS EXECUTION.
I. AT THE END OF EACH PASS THE TELETYPE BELL RINGS ONCE, AND THE CHARACTER "*" IS TYPED.
J. REFER TO SECTION 6.2 IF ERROR PRINTOUTS OCCUR.

EXECUTION TIME:

A. ONE NORMAL ERROR FREE PASS TAKES APPROXIMATELY 43 MINUTES.
B. ONE SINGLE ITERATION PASS (SR11=1) TAKES ABOUT 15 MINUTES.

******NOTE******

THE SINGLE ITERATION PASS IS A CONVENIENT WAY TO QUICKLY DETERMINE IF ANY SOLID PROBLEMS EXIST. FOR A THOROUGH TEST, THE NORMAL ITERATION PASS SHOULD BE RUN.

4.1 RESTART PROCEDURE

TO RESTART THE PROGRAM WITHOUT GENERATING THE INITIAL PRINTOUTS PROCEED AS FOLLOWS: (TRANSPORT UNDER TEST REMAINS THE SAME)

A. LOAD ADDRESS 001000
B. PERFORM STEP F OF PREVIOUS PROCEDURE.
C. PRESS START.
D. GO TO STEP H OF PREVIOUS PROCEDURE.

5. PROGRAM AND/OR OPERATOR ACTION

5.1 NORMAL HALTS

LOC 002444 — COMMON HALT. THIS HALT IS CONTAINED IN A SUBROUTINE THAT IS CALLED BY THOSE PARTS OF THE PROGRAM THAT REQUIRE THAT THE PROCESSOR STOP. THIS HALT NORMALLY OCCURS UPON COMPLETION OF NON-ERROR PRINTOUTS. THE CONSOLE DATA LIGHTS DISPLAY THE ADDRESS OF INSTRUCTION THAT GENERATED THE HALT REQUEST.

LOC 001774 — ROUTINE END HALT. THIS HALT OCCURS UPON COMPLETION OF THE CURRENT TEST ROUTINE IF SRID IS SET. THE CONSOLE DATA LIGHTS DISPLAY THE NUMBER OF THE TEST JUST COMPLETED.

5.2 NORMAL PRINTOUTS

ALL NON-ERROR PRINTOUTS ARE NORMAL PRINTOUTS. INSTRUCTION, TITLE, AND USER ERROR PRINTOUTS ARE NORMAL PRINTOUTS.

6. ERRORS

ERRORS ARE REPORTED IN THIS PROGRAM BY THE FOLLOWING METHODS:

A. UNCONDITIONAL ERROR HALTS, OR
B. ERROR PRINTOUT FOLLOWED BY OPTIONAL ERROR HALT.

6.1 UNCONDITIONAL ERROR HALTS

AN UNCONDITIONAL ERROR HALT WILL OCCUR AT THE ADDRESSES LISTED BELOW IF THROUGH HARDWARE OR SOFTWARE FAILURE, PROGRAM CONTROL IS TRANSFERRED TO AN UNEXPECTED AREA BETWEEN 000000 AND 000176.

000002 RESERVED AREA
000006 ERROR TRAP
000012 RESERVED INSTRUCTION TRAP
000016 DEBUG TRAP
000022 IOT TRAP
000026 POWER FAIL TRAP
000040 THROUGH 000176 - SYSTEM SOFTWARE AND INTERRUPT VECTOR AREA, EXCEPT FOR TC11 AND TTY VECTORS.

TO FIND OUT WHERE THE PROGRAM WAS AT THE TIME THE FAILURE OCCURRED.

A. EXAMINE CONTENTS OF REGISTER 6. (ADDRESS 177706).
B. TRANSFER THE CONTENTS OF REG 6 TO THE SR, LOAD ADDRESS AND EXAMINE.
C. THE DATA SHOWN IN THE DATA LIGHTS IS THE VALUE OF THE PC WHEN THE FAILURE OCCURRED.
D. LOCATE IN PROGRAM LISTING THE DISPLAYED PC VALUE.

(6.1 CONT'D)

E. THE INSTRUCTION THAT IMMEDIATELY PRECEDES THE ONE REFFRENCED BY THE DISPLAYED PC VALUE IS THE INSTRUCTION THAT WAS/WAS BEING EXECUTED WHEN THE FAILURE OCCURRED.

AN UNCONDITIONAL ERROR HALT FAILURE IS AN ABNORMAL CONDITION INDICATING A HARDWARE FAILURE, OR MOST UNLIKELY, A PROGRAM FAILURE. THIS PROGRAM ASSUMES THAT THE PROCESSOR IS IN OPERATING CONDITION IN ORDER TO PERFORM ITS TESTS. ANY FURTHER STEPS REQUIRED TO DIAGNOSE AN AN UNCONDITIONAL ERROR HALT ARE NOT WITHIN THE SCOPE OF THIS PROGRAM.

6.2 ERROR PRINTOUTS

ERROR PRINTOUTS ARE GENERATED BY THE "ERRN" SUBROUTINE. THE "ERRN" SUBROUTINE IS CALLED BY AN "ERRORN" STATEMENT IN THE PROGRAM LISTING. AN ERROR PRINTOUT LOOKS AS FOLLOWS:

T XXX PC OYYYYY ICNT ZZZZ. UNIT W
UP TO 2 ADDITIONAL LINES OF ERROR INFORMATION.

WHERE:

T XXX IS THE NUMBER OF FAILING ROUTINE (OCTAL).
PC OYYYYY IS THE ADDRESS OF ERROR CALL.
ICNT ZZZZ. IS THE ITERATION COUNT AT TIME OF FAILURE.
UNITW IS THE UNIT IN USE AT TIME OF FAILURE.

AFTER THE PRINTOUT IS COMPLETED, THE PROGRAM WILL HALT AT COMMON ERROR HALT AT LOC 002460 IF SR15 IS SET.

WHEN AN ERROR PRINTOUT OCCURS:

A. LOOK UP THE ADDRESS REFERENCED BY PC OYYYYY IN THE LISTING.
B. OPPOSITE THE PC VALUE AN "ERRORN" STATEMENT WILL BE FOUND, AND IN THE COMMENTS SECTION, A DESCRIPTION OF THE ERROR.
C. AT THE BEGINNING OF THE TEST ROUTINE A DESCRIPTION OF THE TEST WILL BE FOUND.

UP TO 2 LINES OF ADDITIONAL ERROR INFORMATION MAY APPEAR ON AN ERROR PRINTOUT. SOME OF THE ITEMS THAT MAY APPEAR ARE:

A. SUBROUTINE NAME, APPEARS WHEN ERROR CALL IS MADE FROM A SUBROUTINE.
B. FPC XXXXXX. (FROM PC), ADDRESS THE SUBROUTINE WAS CALLED FROM.
C. BLKRQ XXXX. BLKRQ REPRESENTS THE INITIAL BLOCK NUMBER USED WHEN AN OPERATION WAS INITIATED. (IN A 2 OR MORE BLOCK TRANSFER, BLKRQ REPRESENTS THE INITIAL BLOCK NUMBER. EVEN THOUGH A FAILURE MAY NOT HAVE OCCURRED UNTIL A SUBSEQUENT BLOCK.
D. IN A DATA ERROR PRINTOUT THE "WORD #" THAT FAILED REPRESENTS THE POSITION OF THE WORD IN THE READ BUFFER, AND IT IS NOT MEANT TO DESCRIBE THE WORD'S POSITION IN A DECTAPE BLOCK.

7. MISCELLANEOUS

7.1 SR OPTIONS

THE STANDARD SR OPTIONS ARE DESCRIBED HERE.

SR15 HALT ON ERROR. WITH SR15 SET TO A 1, THE PROGRAM WILL HALT AFTER AN ERROR OCCURS. PRESSING CONT WILL CAUSE PROGRAM TO RESUME OPERATION.

SR14 SCOPE. THIS OPTION CAUSES THE PROGRAM TO REMAIN IN THE CURRENT TEST ROUTINE. WHEN THE OPTION IS REMOVED, THE PROGRAM WILL COMPLETE THE CURRENT ROUTINE, AND WILL THEN GO ON TO THE NEXT ROUTINE.

SR13 INHIBIT ERROR PRINTOUT. THIS OPTION IF SET, WILL REMOVE ALL ERROR PRINTOUTS.

*****NOTE*****

SCOPE MODE OPERATION IS ACHIEVED BY LOCKING THE PROGRAM IN THE CURRENT ROUTINE, INHIBITING ERROR PRINTOUTS, AND BYPASSING ERROR HALTS.

SR11 INHIBIT ITERATION. SETTING THIS OPTION WILL CAUSE THE PROGRAM TO EXECUTE EACH TEST ONLY ONCE, INSTEAD OF THE NORMAL NUMBER OF ITERATIONS SELECTED FOR EACH TEST. TWO POSSIBLE USES OF THIS OPTION ARE:

A. QUICK PASS. EACH TEST IS RUN ONLY ONCE.
B. TO SKIP OVER A FAILING ROUTINE.

SR10 HALT AT END OF CURRENT ROUTINE. WITH THE OPTION SET, THE PROGRAM WILL HALT AT THE END OF EACH TEST, AND DISPLAY IN DATA LIGHTS THE NUMBER OF THE TEST JUST COMPLETED. THREE POSSIBLE USES OF THIS OPTION ARE:

A. TO STEP THROUGH THE PROGRAM ONE ROUTINE AT A TIME.
B. WHEN THE PROGRAM HAS BEEN RUNNING FOR A WHILE, TO FIND OUT HOW FAR IT HAS PROGRESSED.
C. IN CASE OF A BLOW UP, ETC., TO STEP THROUGH ONE TEST AT A TIME UNTIL THE FAILURE REOCCURS. THE ROUTINE FOLLOWING THE PREVIOUSLY COMPLETED ROUTINE WOULD BE THE FAILING ROUTINE.

SR9 SELECT ROUTINE. WITH SR9 SET, THE PROGRAM WILL GO AND EXECUTE THE ROUTINE INDICATED BY SR7 THROUGH SR0, AFTER THE CURRENT ROUTINE HAS BEEN COMPLETED. IF THE OPTION IS REMOVED, THE PROGRAM WILL PROCEED TO EXECUTE THE ROUTINES FOLLOWING THE SELECTED ROUTINE.

7.2 TESTING TC11 AT NON-STANDARD ADDRESSES AND/OR VECTORS

THIS PROGRAM CAN TEST THE TC11 AT NON-STANDARD ADDRESSES AND VECTORS PROVIDED THOSE ADDRESSES AND VECTORS ARE PROVIDED TO THE PROGRAM AS FOLLOWS:

A. AFTER LOADING PROGRAM REFER TO PROGRAM LISTING AND CHANGE LOCATIONS 001004 THROUGH 001020 TO REFLECT THE NEW TC11 ADDRESSES AND VECTORS.

B. IF THE TELETYPE IS ALSO AT NON STANDARD ADDRESSES, CHANGE LOCATIONS 001022 AND 001024 ALSO.

C. PROCEED TO USE THE PROGRAM, OR

D. USING STANDARD DUMP ROUTINES, DUMP OUT THE ENTIRE PROGRAM IN ABSOLUTE FORMAT TO HAVE AN OBJECT TAPE THAT REFLECTS YOUR SYSTEM, OR

E. DUMP OUT ONLY LOCATIONS 001004 THROUGH 001024 IN ABSOLUTE FORMAT, AND LOAD IT ALSO AFTER LOADING THE MAIN PROGRAM.

8. DESCRIPTION

THIS PROGRAM IS ORGANIZED INTO THREE MAIN SECTIONS:

A. CONTROL ROUTINE,
B. TEST ROUTINES,
C. COMMON SUBROUTINES

8.1 CONTROL ROUTINE

THE CONTROL ROUTINE ASSUMES CONTROL WHEN THE PROGRAM IS STARTED. IT HAS THE FOLLOWING FUNCTIONS:

A. CONTROLS SEQUENCE OF TEST ROUTINES.
B. HONORS AND ACTS ON SR OPTIONS.

THE CONTROL ROUTINE IS CALLED FROM A TEST ROUTINE BY THE "SCOPE" STATEMENT.

3.2 TEST ROUTINES

THE ACTUAL TESTING IS PERFORMED BY A SET OF TEST ROUTINES THAT ARE NUMBERED SEQUENTIALLY FROM 0 TO 36 (OCTAL). EACH TEST ROUTINE IS PRECEDED BY A TEST HEADER THAT IS USED BY THE CONTROL ROUTINE IN ORDER TO PROPERLY SEQUENCE THROUGH THE TESTS. THE HEADER LOOKS AS FOLLOWS: (EXAMPLE)

```
;*********************************************************************
T20:    20              ;ROUTINE NUMBER 20.                          *
        T21             ;ADDRESS OF NEXT ROUTINE                     *
        100.            ;TEST ITERATION COUNT                        *
        BAGA            ;SCOPE ENTRY POINT                           *
;*********************************************************************
```

THE FIRST 2 ITEMS ARE SELF EXPLANATORY. THE TEST ITERATION COUNT INDICATES TO THE CONTROL ROUTINE THE NUMBER OF TIMES THE TEST SHOULD BE PERFORMED BEFORE GOING ON TO THE NEXT ROUTINE.

THE SCOPE ENTRY POINT INDICATES TO THE CONTROL ROUTINE THE ADDRESS IT SHOULD RETURN TO AFTER THE FIRST ITERATION. THE ADDRESS MAY NOT NECCESARILY POINT TO THE FIRST INSTRUCTION OF THE TEST.

3.3 COMMON SUBROUTINES

ALL SUBROUTINES NEEDED BY EITHER THE CONTROL ROUTINE OR TEST ROUTINES ARE GROUPED TOGETHER. THE MOST SIGNIFICANT SUBROUTINE IS THE "ERR " SUBROUTINE, WHICH IS CALLED BY AN "ERRORN" STATEMENT AND TYPES THE TEST NUMBER AND PC VALUE WHEN A FAILURE OCCURS.

```
                        !
                                        .LIST   SEQ,LD,BIN,ME
                                        .NLIST  MC,MD
                                        .ABS
                                ;
000000                                  .=0
000000  000002                        .+2                     ;UNASSIGNED TRAP
000002  000000                        HALT
000004  000006                MACHER: .+2                     ;SP OVERFLOW, BUS ERROR TRAP
000006  000000                        HALT
000010  000012                        .+2                     ;RESERVED INSTRUCTION TRAP
000012  000000                        HALT
000014  002320                TRCV:   SV5S                    ;TRACE TRAP
000016  000340                        PRTY7
000020  002350                IOTV:   RS5S                    ;TRAP TO CALL IOX
000022  000340                        PRTY7
000024  000026                        .+2                     ;POWER FAIL TRAP
000026  000000                        HALT
000030  002120                EMTV:   EMTINT                  ;EMT TRAP
000032  000340                        PRTY7
000034  000036                TRPV:   .+2                     ;TRAP TRAP. SIMILAR TO EMT
000036  000000                        HALT
                                ;LOC 40 THROUGH 376 FILLED WITH .+2 AND HALT.
                                        .LIST
                                ;EQUATE STATEMENTS
                                        SR=177570
                                        PSW=177776
                                        SPBOT=1000
                                        NOP=240
                                        OPEN=0
                                        MANUAL=BIT15
                                        BIT15=100000
                                        BIT14=40000
                                        BIT13=20000
                                        BIT12=10000
                                        BIT11=4000
                                        BIT10=2000
                                        BIT9=1000
                                        BIT8=400
                                        BIT7=200
                                        BIT6=100
                                        BIT5=40
                                        BIT4=20
                                        BIT3=10
                                        BIT2=4
                                        BIT1=2
                                        BIT0=1
                                        R0=%0
                                        R1=%1
                                        R2=%2
                                        R3=%3
                                        R4=%4
                                        R5=%5
                                        R6=%6
                                        R7=%7
```

```
000007          PC=%7
005746          PUSH=005746
024646          PUSH2=024646
005726          POPSP=005726
022626          POPSP2=022626
000340          PRTY7=340
000300          PRTY6=300
000240          PRTY5=240
000200          PRTY4=200
000140          PRTY3=140
000100          PRTY2=100
000040          PRTY1=40
000000          PRTY0=0
000007          BELL=007
177777          TLAST=-1
000003          TRC=3
000040          I=40
177777          X=-1
100000          A=BIT15
040000          B=BIT14
020000          C=BIT13
000000          V0=0
000004          V1=4
000010          V2=10
000014          V3=14
000020          V4=20
000024          V5=24
000030          V6=30
000034          V7=34
020000          MAINT=BIT13
010000          DINH=BIT12
004000          REV=BIT11
000000          FWD=0
000000          U0=0
000400          U1=BIT8
001000          U2=BIT9
001400          U3=BIT9!BIT8
002000          U4=BIT10
002400          U5=BIT10!BIT8
003000          U6=BIT10!BIT9
003400          U7=BIT10!BIT9!BIT8
000100          IE=BIT6
000000          SAT=0
000002          RNUM=BIT1
000004          RDATA=BIT2
000006          RALL=BIT2!BIT1
000010          SST=BIT3
000012          WRTM=BIT3!BIT1
000014          WDATA=BIT3!BIT2
000016          WALL=BIT3!BIT2!BIT1
000001          DO=BIT0
000200          UPS=BIT7
010000          ILO=BIT12
004000          SELE=BIT11
000000          EMTX=0
000003          SAVSS=3
```

```
                    000004                          RSTSS=4
                    000200                          .=200
000200  000167  001044                              JMP     START           ;GO TO START OF PROGRAM.
                    001000                          .=1000
001000  000167  000562                              JMP     GETRDY          ;BYPASS INITIAL PRINTOUTS.
001004  177340                      TCST:   177340                          ;TC11 STATUS REGISTER.
001006  177342                      TCCM:   177342                          ;TC11 COMMAND REGISTER.
001010  177344                      TCWC:   177344                          ;TC11 WORD COUNT REGISTER.
001012  177346                      TCBA:   177346                          ;TC11 BUS ADDRESS REGISTER.
001014  177350                      TCDT:   177350                          ;TC11 DATA REGISTER.
001016  000214                      TCVTR:  214                             ;TC11 INTERRUPT VECTOR
001020  000300                      TCLVL:  PRTY6                           ;TC11 INTERRUPT PRIORITY LEVEL.
001022  177564                      TPS:    177564                          ;LSP CSR
001024  177566                      TPB:    177566                          ;LSP BUFFER
001026  000000                      ICTR:   OPEN                            ;CONTAINS CURRENT ITERATION COUNT
001030  000000                      ICNT:   OPEN                            ;CONTAINS ACCUMULATED ITERATION COUNT.
001032  007016                      KSTART: TO                              ;CONTAINS STARTING ROUTINE ADDR.
001034  000000                      SCOPTR: OPEN                            ;CONTAINS CURRENT SCOPE POINTER.
001036  000000                      RTNNO:  OPEN
001040  000000                      NXTST:  OPEN
001042  000000                      CURTST: OPEN
001044  000000                      CTRA:   OPEN
001046  000000                      CTRB:   OPEN
001050  000000                      TCCMT:  OPEN
001052  000000                      TCSTT:  OPEN
001054  000000                      TCDTT:  OPEN
001056  000000                      TCWCT:  OPEN
001060  000000                      TCBAT:  OPEN
001062  000000                      SLKRQ:  OPEN
001064  000000                      UNIT:   OPEN
001066  000000                      UNITN:  OPEN
001070  000000                      UNITS:  OPEN
001072  000000                      COMND:  OPEN
001074  000000                      TEMP:   OPEN
001076  000000                      FPC:    OPEN
001100  000005                      ERRLIM: 5
001102                              EMTTAB:
001102  001704                              .WORD   CHAINN          ;POINTER FOR EMT CALL SCOPE
                                            .LIST
001104  002414                              .WORD   SRSETT          ;POINTER FOR EMT CALL SRESET
                                            .LIST
001106  002140                              .WORD   SV03            ;POINTER FOR EMT CALL SAV03
                                            .LIST
001110  002240                              .WORD   RS03            ;POINTER FOR EMT CALL RST03
                                            .LIST
001112  002170                              .WORD   SV05            ;POINTER FOR EMT CALL SAV05
                                            .LIST
001114  002270                              .WORD   RS05            ;POINTER FOR EMT CALL RST05
                                            .LIST
001116  002160                              .WORD   SV05S           ;POINTER FOR EMT CALL SAV05S
                                            .LIST
001120  002264                              .WORD   RS05S           ;POINTER FOR EMT CALL RST05S
                                            .LIST
001122  003044                              .WORD   TYP             ;POINTER FOR EMT CALL TYPE
                                            .LIST
001124  002464                              .WORD   ERR             ;POINTER FOR EMT CALL ERROR
```

```
                                                .LIST
001126  002474                                  .WORD   ERRN            ;POINTER FOR EMT CALL ERRORN
                                                .LIST
001130  002436                                  .WORD   CHLT            ;POINTER FOR EMT CALL CHALT
                                                .LIST
001132  002452                                  .WORD   EHLT            ;POINTER FOR EMT CALL EHALT
                                                .LIST
001134  002374                                  .WORD   STTCV           ;POINTER FOR EMT CALL SVECTR
                                                .LIST
001136  003142                                  .WORD   DLY             ;POINTER FOR EMT CALL DELAY
                                                .LIST
001140  003532                                  .WORD   STCOM           ;POINTER FOR EMT CALL SETCOM
                                                .LIST
001142  003514                                  .WORD   STATS           ;POINTER FOR EMT CALL STATUS
                                                .LIST
001144  003626                                  .WORD   STPDT           ;POINTER FOR EMT CALL STOPDT
                                                .LIST
001146  003636                                  .WORD   CKER            ;POINTER FOR EMT CALL CKERR
                                                .LIST
001150  003654                                  .WORD   CKERZ           ;POINTER FOR EMT CALL CKERRZ
                                                .LIST
001152  003720                                  .WORD   SDTRG           ;POINTER FOR EMT CALL SAVDTR
                                                .LIST
001154  003772                                  .WORD   RWIND           ;POINTER FOR EMT CALL REWIND
                                                .LIST
001156  003762                                  .WORD   WINDD           ;POINTER FOR EMT CALL WIND
                                                .LIST
001160  004046                                  .WORD   NOINTR          ;POINTER FOR EMT CALL NOINT
                                                .LIST
001162  004070                                  .WORD   RNDBK           ;POINTER FOR EMT CALL RNDBLK
                                                .LIST
001164  004144                                  .WORD   RDBK1           ;POINTER FOR EMT CALL RNDBK1
                                                .LIST
001166  004636                                  .WORD   SRCHFF          ;POINTER FOR EMT CALL SRCHF
                                                .LIST
001170  004644                                  .WORD   SRCHRR          ;POINTER FOR EMT CALL SRCHR
                                                .LIST
001172  004574                                  .WORD   WNGBK           ;POINTER FOR EMT CALL WRNGBK
                                                .LIST
001174  002722                                  .WORD   RNGEN           ;POINTER FOR EMT CALL RNDNUM
                                                .LIST
001176  004620                                  .WORD   CFPC            ;POINTER FOR EMT CALL CNVFPC
                                                .LIST
001200  005314                                  .WORD   WDATF           ;POINTER FOR EMT CALL WDATAF
                                                .LIST
001202  005342                                  .WORD   WDATR           ;POINTER FOR EMT CALL WDATAR
                                                .LIST
001204  005324                                  .WORD   RDATF           ;POINTER FOR EMT CALL RDATAF
                                                .LIST
001206  005352                                  .WORD   RDATR           ;POINTER FOR EMT CALL RDATAR
                                                .LIST
001210  004472                                  .WORD   CWCBA           ;POINTER FOR EMT CALL CKWCBA
                                                .LIST
001212  004402                                  .WORD   CLEARR          ;POINTER FOR EMT CALL CLEAR
                                                .LIST
001214  004422                                  WORD    FILLL           ;POINTER FOR EMT CALL FILL
```

```
                                        .LIST
001216  004444                          .WORD   BINFLL          ;POINTER FOR EMT CALL BINFIL
                                        .LIST
001220  004250                          .WORD   DATCK           ;POINTER FOR EMT CALL DATCHK
                                        .LIST
001222  004240                          .WORD   DTCKI           ;POINTER FOR EMT CALL DATCKI
                                        .LIST
001224  003200                          .WORD   INBINN          ;POINTER FOR EMT CALL INBIN
                                        .LIST
001226  003232                          .WORD   GTBIN1          ;POINTER FOR EMT CALL GETBN1
                                        .LIST
001230  003744                          .WORD   PRENDZ          ;POINTER FOR EMT CALL PRMEND
                                        .LIST
001232  005370                          .WORD   RDTFX           ;POINTER FOR EMT CALL RDATFX
                                        .LIST
001234  003000                          .WORD   INRNDN          ;POINTER FOR EMT CALL INRND
                                        .LIST
001236  003016                          .WORD   RNDFLL          ;POINTER FOR EMT CALL RNDFIL
                                        .LIST
001240  005400                          .WORD   SQDRV           ;POINTER FOR EMT CALL SEQDRV
                                        .LIST
001242  005422                          .WORD   SELDRR          ;POINTER FOR EMT CALL SELDRV
                                        .LIST
001244  003276                          .WORD   OACNVV          ;POINTER FOR EMT CALL OACNV
                                        .LIST
001246  003404                          .WORD   BDCNVV          ;POINTER FOR EMT CALL BDCNV
                                        .LIST
001250  012706  001000          START:  MOV     #SPBOT,R6       ;SET BOTTOM OF SP STACK.
001254  005067  177556                  CLR     RTNNO
001260  104010                          TYPE                    ;TYPE TITLE.
001262  005551                          PGTIT
001264  005737  000042                  TST     @#42            ;PROGRAM LOADED VIA MONITOR?
001270  001524                          BEQ     STRTA           ;BR IF NOT.
                                ;ROUTINE TO DETERMINE TRANSPORTS AVAILABLE FOR TEST.
001272  012767  000402  001370          MOV     #402,ERRND
001300  112767  000376  177562          MOVB    #376,UNITS      ;ASSUME DRIVES 1-7 AVAILABLE.
001306  012700  000010                  MOV     #8.,R0          ;SET UP TO TEST 8 TIMES.
001312  005267  000010          DTRMN:  INC     SQDRV1
001316  042767  177770  000002          BIC     #177770,SQDRV1
001324  104060                          SELDPV                  ;SELECT A TRANSPORT.
001326  000000                  SQDRV1: OPEN                    ;TRANSPORT #.
001330  000431                          BR      DTRMNA          ;UNIT NOT AVAILABLE RETURN.
001332  104017                          SETCOM                  ;REWIND TO REVERSE END ZONE.
001334  004002                          RNUM+REV
001336  000437                          BR      DTRMNB          ;ERROR RETURN.
001340  005777  177442                  TST     @TCCM           ;WAIT.
001344  100375                          BPL     .-4
001346  005777  177432                  TST     @TCST           ;END ZONE?
001352  100031                          BPL     DTRMNB          ;BR IF NOT.
001354  012777  013350  177430          MO      #WBUF,@TCBA     ;SET CURRENT ADDR.
001362  012777  177777  177420          M       #-1,@TCWC       ;SET WORD COUNT.
001370  104017                          S_ COM                  ;YES. ISSUE WRITE DATA COMMAND.
001372  000015                          WDATA+FWD+DO
001374  000420                          BR      DTRMNB          ;ERROR RETURN.
001376  032777  100200  177402          BIT     #BIT15+BIT7,@TCCM       ;WAIT FOR ERROR/READY.
001404  001774                          BEQ     .-6
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                                                TST     @TCCM           ;ERROR?
                                                BMI     DTRMNB          ;BR IF YES.
                                        DTRMNA: STOPDT                  ;STOP DECTAPE.
                                                DEC     R0              ;DONE 8 TIMES?
                                                BNE     DTRMN           ;BR IF NOT.
                                                TSTB    UNITS           ;ANY UNITS AVAILABLE?
                                                BNE     DTRMNC          ;BR IF YES.
                                                TYPE                    ;TYPE NON AVAILABLE MESSAGE.
                                                NOUNIT
                                                BR      CHNC            ;GO EXIT.
                                        DTRMNB: BIT     #BIT12+BIT11,@TCST      ;ILO OR SELE ERROR?
                                                BEQ     DTRMNA          ;BR IF NOT.
                                                MOV     SQDRV1,R1
                                                BICB    UNTAB(1),UNITS  ;DESELECT NON AVAILABLE TRANSPORT.
                                                BR      DTRMNA
                                        DTRMNC: TYPE                    ;TYPE UNITS TO BE TESTED.
                                                GOOD
                                                MOV     #1,CPENA
                                                MOV     #7,CTRB         ;CHECK UP TO 7 UNITS.
                                                SELDRV                  ;SELECT DRIVE.
                                        CPENA:  OPEN                    ;UNIT TO BE SELECTED.
                                                BR      CPENB           ;UNIT NOT AVAILABLE.
                                                MOV     UNITN,R0        ;SUCCESS.
                                                MOVB    GTAB(0),GTAPES  ;GET ASCII # FOR GOOD TAPE.
                                                TYPE                    ;TYPE # OF UNIT TO TEST.
                                                GTAPES
                                        CPENB:  INC     CPENA           ;UPDATE TO NEXT DRIVE.
                                                DEC     CTRB            ;CHECKED ALL DRIVES?
                                                BNE     CPENA-2         ;BR IF NOT.
                                                BR      GETRDY          ;YES.
                                        STRTA:  TYPE                    ;TYPE UNIT SELECT INSTRUCTIONS.
                                                INST1
                                                CHALT                   ;WAIT FOR USER.
                                                MOVE    SR,UNITS        ;GET UNITS TO TEST.
                                                BEQ     STRTA           ;BR IF NO UNITS SELECTED.
                                                TYPE                    ;TYPE SR OPTION MESSAGE.
                                                ASETSR
                                                CHALT                   ;COMMON HALT.
                                        GETRDY: MOV     #1002,ERRND     ;ALLOW ERROR PRINTOUTS.
                                                MOV     KSTART,NXTST    ;ADDR OF 1ST ROUTINE TO NXTST
                                        GTRDYX: MOV     #6,MACHER       ;RESET MACHER TRAP.
                                                MOV     #PRTY7,PSW      ;SET PRIORITY 7.
                                                MOV     #SPBOT,R6       ;SET BOTTOM OF STACK.
                                                SRESET                  ;ISSUE RESET.
                                                INBIN                   ;INITIALIZE BINARY COUNT.
                                                SVECTR                  ;PRESET DT INTERRUPT VECTOR TO 0.
                                                0
                                        GTRDYA: JSR     R7,FORWD        ;ROLL FORWARD TO "NEXT" ROUTINE.
                                        GTRDYB: BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
                                                BNE     GTRDYC          ;BRANCH IF SELECT ROUTINE SWITCH IS SET.
                                        GORUN:  SEQDRV                  ;SELECT SEQUENTIAL DRIVE.
                                                JMP     @CURTST         ;GO RUN CURRENT ROUTINE.
                                        GTRDYC: CMPB    RTNNO,SR        ;COMPARE RTNNO TO SR.
                                                BEQ     GORUN           ;BRANCH IF ROUTINE  FOUND.
                                        GTRDYD: CMP     #-1,NXTST       ;NO. CHECK FOR LAST ROUTINE.
                                                BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE.
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                                                TYPE                    ;TYPE INCORRECT RTN SELECTED.
                                                AINCRT
                                                CHALT                   ;COMMON HALT.
                                                BR      GETRDY          ;START OVER.
                                        CHAINN: STOPDT
001706  012706  001000                          MOV     #SPBOT,R6       ;RESET STACK.
001712  005267  177112                          INC     ICNT            ;INCREMENT ITERATION COUNT.
001716  001002                                  BNE     CHNAC           ;BR IF RESULT NOT 0.
001720  005167  177104                          COM     ICNT            ;RESULT 0. RESET ICNT TO -1.
001724  032767  040000  175636        CHNAC:    BIT     #BIT14,SR       ;CHECK FOR SCOPE OPTION.
001732  001403                                  BEQ     CHNA            ;BRANCH IF SCOPE SW NOT SET.
001734  104057                          CHNAB:  SEQDRV                  ;SELECT SEQUENTIAL DRIVE.
001736  000177  177072                          JMP     @SCOPTR         ;RETURN TO ROUTINE.
001742  032767  004000  175620        CHNA:     BIT     #BIT11,SR       ;TEST INHIBIT ITERATION SWITCH
001750  001003                                  BNE     CHNAA           ;BRANCH IF INHIBIT ITERATION SW SET.
001752  005367  177050                          DEC     ICTR            ;DECREMENT ITERATION COUNT.
001756  001366                                  BNE     CHNAB           ;BRANCH IF COUNT NOT 0.
001760  032767  002000  175602        CHNAA:    BIT     #BIT10,SR       ;ROUTINE END HALT SW SET? (SR10)
001766  001403                                  BEQ     CHNB            ;BRANCH IF NOT SET.
001770  016700  177042                          MOV     RTNNO,R0        ;TEST # TO R0.
001774  000000                                  HALT                    ;ROUTINE END HALT. TEST # IN LIGHTS.
001776  032767  001000  175564        CHNB:     BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
002004  001270                                  BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
002006  022767  177777  177024                  CMP     #-1,NXTST       ;LAST TEST?
002014  001272                                  BNE     GTRDYX          ;BRANCH IF NOT LAST TEST.
002016  104010                                  TYPE                    ;TYPE PROGRAM END BELL.
002020  006017                                  APGEND
002022  013700  000042                CHNC:     MOV     @#42,R0         ;GET CONTENTS OF 42.
002026  001410                                  BEQ     HERE            ;BR IF ZERO.
002030  000005                                  RESET                   ;NON-ZERO. ISSUE RESET.
002032  004710                          LOGIC:  JSR     PC,(0)          ;RETURN TO MONITOR.
002034  000240  000240  000240                  .WORD   NOP,NOP,NOP
002042  105767  177022                          TSTB    UNITS           ;ANY UNITS AVAILABLE FOR TESTING?
002046  001765                                  BEQ     CHNC            ;BR IF NOT.
002050  000646                          HERE:   BR      GETRDY          ;GO REPEAT PROGRAM.
002052  016705  176762                FORWD:    MOV     NXTST,R5        ;ADDR OF NEXT ROUTINE TO R5.
002056  012567  176754                          MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
002062  012567  176752                          MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE.
002066  012567  176734                          MOV     (5)+,ICTR       ;GET ITERATION COUNT.
002072  012567  176736                          MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
002076  010567  176740                FORWDA:   MOV     R5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST.
002102  012767  000001  176720                  MOV     #1,ICNT         ;PRESET ICNT TO 1.
002110  016767  176722  175452                  MOV     RTNNO,SR        ;DISPLAY ROUTINE #.
002116  000207                                  RTS     R7              ;EXIT FORWD SUBROUTINE.
                        ;EMT INTERPRETER ROUTINE.
002120  010046                          EMTINT:   MOV     R0,-(6)         ;PUSH R0.
002122  016600  000002                          MOV     2(6),R0         ;GET EMT PC.
002126  014000                                  MOV     -(0),R0         ;GET EMT CALL
002130  006300                                  ASL     R0              ;TIMES 2.
002132  016000  171102                          MOV     EMTTAB-10000(0),R0      ;FORM EMT ADDR.
002136  000200                                  RTS     R0              ;GO TO EMT RTN. RESTORE R0.
                        ;SAVE REGS 0 TO 3 SUBROUTINE.
002140  012666  177766                SV03:     MOV     (6)+,-10.(6)    ;MOVE PC UPSTACK.
002144  012666  177766                          MOV     (6)+,-10.(6)    ;MOVE STATUS UPSTACK.
002150  012767  000002  000046                  MOV     #RTI,SV05C
002156  000415                                  BR      SV05B
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                                        ;SUB TO SAVE REGS 0 TO 5 AND PLACE EMT PC IN R5.
002160  012767  000240  000036  SV05S:  MOV     #NOP,SV05C
002166  000403                        BR      SV05A
                                        ;SUB TO SAVE REGS 0 TO 5.
002170  012767  000002  000026  SV05:   MOV     #RTI,SV05C
002176  012666  177762          SV05A:  MOV     (6)+,-14.(6)    ;MOVE PC AND PSW UPSTACK.
002202  012666  177762                  MOV     (6)+,-14.(6)
002206  010546                        MOV     R5,-(6)
002210  010446                        MOV     R4,-(6)
002212  010346                  SV05B:  MOV     R3,-(6)
002214  010246                        MOV     R2,-(6)
002216  010146                        MOV     R1,-(6)
002220  010046                        MOV     R0,-(6)
002222  006446                        PUSH2
002224  000002                  SV05C:  RTI                     ;RTI OR NOP.
002226  016605  000020                MOV     16.(6),R5       ;EMT PC TO R5.
002232  010504                        MOV     R5,R4
002234  005744                        TST     -(4)
002236  000002                        RTI                     ;EXIT.
                                        ;RESTORE REGS 0 TO 3 SUBROUTINE.
002240  022626                  RS03:   POPSP2
002242  012600                        MOV     (6)+,R0         ;RESTORE REGS 0 TO 4.
002244  012601                        MOV     (6)+,R1
002246  012602                        MOV     (6)+,R2
002250  012603                        MOV     (6)+,R3
002252  016646  177766                MOV     -10.(6),-(6)    ;MOVE PC AND PSW DOWN STACK.
002256  016646  177766                MOV     -10.(6),-(6)
002262  000002                        RTI                     ;EXIT.
                                        ;SUB TO SET R5 IN EMT PC AND RESTORE REGS 0 TOS.
002264  010566  000020          RS05S:  MOV     R5,16.(6)       ;SET EMT PC TO R5 CONTENTS.
                                        ;SUB TO RESTORE REGS 0 TO 5.
002270  022626                  RS05:   POPSP2
002272  012600                        MOV     (6)+,R0
002274  012601                        MOV     (6)+,R1
002276  012602                        MOV     (6)+,R2
002300  012603                        MOV     (6)+,R3
002302  012604                        MOV     (6)+,R4
002304  012605                        MOV     (6)+,R5
002306  016646  177762                MOV     -14.(6),-(6)    ;MOVE PC AND PSW DOWNSTACK.
002312  016646  177762                MOV     -14.(6),-(6)
002316  000002                        RTI                     ;EXIT.
002320  012666  177772          SV5S:   MOV     (6)+,-6(6)      ;PC AND PSW UPSTACK.
002326  012666  177772                  MOV     (6)+,-6(6)
002332  010546                        MOV     R5,-(6)         ;SAVE R5.
002334  010446                        MOV     R4,-(6)         ;SAVE R4.
002336  006446                        PUSH2
002340  016605  000010                MOV     8.(6),R5        ;EMT PC TO R5.
002344  010504                        MOV     R5,R4           ;EMT PC TO R4.
002346  005744                        TST     -(4)
002350  000002                        RTI                     ;EXIT EMT SUB.
002352  010566  000010          RS5S:   MOV     R5,8.(6)        ;R5 TO EMT PC.
002356  022626                        POPSP2
002360  012604                        MOV     (6)+,R4         ;RESTORE R4.
002362  012605                        MOV     (6)+,R5         ;RESTORE R5.
002364  016646  177772                MOV     -6(6),-(6)
002370  016646  177772                MOV     -6(6),-(6)
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002372  000002                          RTI                             ;EXIT.
                        ;ROUTINE TO SET TC11 INTERRUPT VECTOR AND PRIORITY
002374  104006          STTCV:  SAVOSS
002376  016701  176414          MOV     TCVTR,R1                ;VECTOR TO R1.
002402  012521                  MOV     (5)+,(1)+               ;SET DESIRED VECTOR.
002404  016721  176410          MOV     TCLVL,(1)+              ;SET TC11 PRIORITY.
002410  104007                  RSTOSS
002412  000002                  RTI
                        ;ROUTINE TO ISSUE RESET.
002414  010046          SRSETT: MOV     R0,-(6)                 ;PUSH R0.
002416  012700  052525          MOV     #52525,R0               ;DATA TO R0.
002422  005100                  COM     R0                      ;COMPLEMENT (R0).
002424  010067  177770          MOV     R0,SRSETT+4             ;(R0) TO SRSETT+4.
002430  000005                  RESET                           ;ISSUE RESET. (R0)
002432  012600                  MOV     (6)+,R0                 ;RESTORE R0.
002434  000002                  RTI                             ;DISPLAYED. EXIT.
                        ;COMMON HALT ROUTINE
002436  104006          CHLT:   SAVOSS
002440  010500                  MOV     R5,R0                   ;DEVELOP ADDR OF CALLER.
002442  005740                  TST     -(0)
002444  000000                  HALT                            ;HALT CALL ADDR IN DATA LIGTHS.
002446  104007                  RSTOSS
002450  000002                  RTI                             ;EXIT.
                        ;CONDITIONAL ERROR HALT ROUTINE.
002452  005767  175112  EHLT:   TST     SR                      ;CHECK FOR HALT ON ERROR.
002456  100001                  BPL     EHLTA                   ;BRANCH IF NO HALT DESIRED.
002460  000000                  HALT                            ;HALT.
002462  000002          EHLTA:  RTI                             ;IN DATA LIGHTS.
002464  012767  000406  000204  ERR:    MOV     #406,ERRNB      ;SET UP FOR SINGLE ERR MSG.
002472  000403                  BR      ERRN+6
002474  012767  000240  000174  ERRN:   MOV     #NOP,ERRNB      ;SET UP FOR MULTIPLE ERR MSGS.
002502  104021                  STOPDT                          ;ALL STOP.
002504  010467  176366          MOV     R4,FPC                  ;CONVERT CALL ADDR OF SUB CALLING.
002510  104061                  OACNV                           ;CONVERT IT TO ASCII.
002512  001076                  FPC
002514  006720                  AFPC
002516  000006                  6
002520  000003                  SAVSS                           ;SAVE REG SS
002522  010567  000146          MOV     R5,ERRB                 ;DETERMINE CALLING ADDR.
002526  162767  000002  000140  SUB     #2,ERRB
002534  104061                  OACNV                           ;CONVERT CALLING ADDR TO ASCII.
002536  002674                  ERRB
002540  005477                  APC
002542  000006                  6
002544  104061                  OACNV                           ;CONVERT TEST # TO ASCII.
002546  001036                  RTNNO
002550  005467                  ATNUMB
002552  000003                  3
002554  104062                  BDCNV                           ;CONVERT ICNT TO DECIMAL ASCII.
002556  001030                  ICNT
002560  005513                  AICNT
002562  000005                  5
002564  104061                  OACNV                           ;CONVERT UNIT # TO ASCII.
002566  001066                  UNITN
002570  005527                  AUNIT
002572  000001                  1
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002574  104061                              OACNV                       ;CONVERT BLKRQ TO ASCII.
002576  001062                              BLKRQ
002600  006207                              ABLKRQ
002602  000006                              6
002604  104061                              OACNV                       ;CONVERT TCST TO ASCII.
002606  001052                              TCSTT
002610  006140                              ATCST
002612  000006                              6
002614  104061                              OACNV                       ;CONVERT TCCM TO ASCII.
002616  001050                              TCCMT
002620  006123                              ATCCM
002622  000006                              6
002624  104061                              OACNV                       ;CONVERT TCDT TO ASCII.
002626  001054                              TCDTT
002630  006065                              ATCDT
002632  000006                              6
002634  104061                              OACNV                       ;CONVERT TCWC TO ASCII.
002636  001056                              TCWCT
002640  006031                              ATCWC
002642  000006                              6
002644  104061                              OACNV                       ;CONVERT TCBA TO ASCII.
002646  001060                              TCBAT
002650  006047                              ATCBA
002652  000006                              6
002654  012767  005464  000012              MOV     #EMD,ERRB           ;TYPE ERR HEADER MSG IF NOT INHIBITED.
002662  032767  020000  174700  ERRNA:      BIT     #BIT13,SR           ;INHIBIT ERR PRINT?
002670  001002                  ERRND:      BNE     ERRNB               ;BR TO INHIBIT.
002672  104010                              TYPE                        ;TYPE MSG.
002674  000000                  ERRB:       OPEN                        ;DESIRED MSG ADDR GOES HERE.
002676  000240                  ERRNB:      NOP                         ;NOP FOR MULT MSG.OR 406 FOR SINGLE MSG.
002700  012567  177770                      MOV     (5)+,ERRB           ;GET ADDR OF NEXT MSG.
002704  022767  177777  177762              CMP     #-1,ERRB            ;TERMINATOR?
002712  001363                              BNE     ERRNA               ;GO TYPE IF NOT TERMINATOR.
002714  104014                  ERRNC:      EHALT                       ;END OF MSGS. HALT IF REQUIRED.
002716  000004                              RSTSS                       ;RESTORE REG SS.
002720  000002                              RTI                         ;EXIT EMT SUB.
                                ;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.
002722  104006                  RNGEN:      SAV0SS                      ;SAVE REGS 0-SS.
002724  016700  000044                      MOV     RP1,R0
002730  006100                              ROL     R0
002732  006100                              ROL     R0
002734  066700  000036                      ADD     RP2,R0
002740  010067  000030                      MOV     R0,RP1
002744  006100                              ROL     R0
002746  006100                              ROL     R0
002750  066700  000022                      ADD     RP2,R0
002754  006100                              ROL     R0
002756  006100                              ROL     R0
002760  010067  000012                      MOV     R0,RP2
002764  016725  000004                      MOV     RP1,(5)+            ;STORE # AT LOC FOLLOWING SUB CALL.
002770  104007                              RST0SS                      ;RESTORE REGS 0-SS.
002772  000002                              RTI                         ;EXIT EMT SUB.
002774  001233                  RP1:        1233
002776  007622                  RP2:        7622
                                ;EMT SUB TO INITIALIZE RANDOM NUMBER SUBROUTINE.
003000  012767  001233  177766  INRNDN: MOV     #1233,RP1
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003006  012767  007622  177762          MOV     #7622,RP2
003014  000002                          RTI                     ;EXIT.
                                ;EMT SUB TO FILL AREA WITH RANDOM NUMBERS.
003016  104006                  RNDFLL: SAVOSS
003020  012500                          MOV     (5)+,R0         ;STARTING ADDR TO R0.
003022  012501                          MOV     (5)+,R1         ;COUNT TO R1.
003024  104035                  RNDFLA: RNDNUM                  ;GET RANDOM NUMBER.
003026  000000                  RNDFLB: OPEN                    ;RANDOM NUMBER IS STORED HERE.
003030  016720  177772                  MOV     RNDFLB,(0)+     ;STORE NUMBER PER R0.
003034  005301                          DEC     R1              ;DONE?
003036  001372                          BNE     RNDFLA          ;BR IF NOT.
003040  104007                          RSTOSS
003042  000002                          RTI                     ;EXIT EMT SUB.
                                ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
003044  104006                  TYP:    SAVOSS
003046  012500                          MOV     (5)+,R0         ;ADDRESS OF MESSAGE TO R0.
003050  112001                  TYPA:   MOVB    (0)+,R1         ;GET CHARACTER
003052  001006                          BNE     TYPC            ;BRANCH IF NOT TERMINATOR..
003054  112701  000177                  MOVB    #177,R1         ;OUTPUT RUBOUT.
003060  004767  000020                  JSR     %7,TYPD
003064  104007                          RSTOSS
003066  000002                          RTI                     ;TERMINATOR CHAR. DONE. EXIT.
003070  122701  000045          TYPC:   CMPB    #45,R1          ;CHECK FOR"%".
003074  001411                          BEQ     TYPF            ;BRANCH IF"%"
003076  004767  000002                  JSR     R7,TYPD         ;TYPE CHAR IN TYPDAT
003102  000762                          BR      TYPA
003104  110177  175714          TYPD:   MOVB    R1,@TPB         ;OUTPUT CHARACTER TO PRINTER
003110  105777  175706                  TSTB    @TPS            ;WAIT FOR DONE FLAG.
003114  100375                          BPL     .-4
003116  000207                          RTS     R7              ;EXIT
003120  112701  000015          TYPF:   MOVB    #15,R1          ;MOVE CARRIAGE RETURN CODE TO TYPDAT
003124  004767  177754                  JSR     R7,TYPD         ;GO TYPE CHAR.
003130  112701  000012          TYPG:   MOVB    #12,R1          ;MOVE LF CODE TO TYPDAT.
003134  004767  177744                  JSR     R7,TYPD         ;GO TYPE CHAR.
003140  000743                          BR      TYPA
                                ;SUBROUTINE TO DELAY
        003146                          DLYR0=DLY+4
        003160                          DLYR1=DLYA+4
003142  012727  000372  000000  DLY:    MOV     #250.,#0        ;DELAY COUNT TO DLYR0.
003150  005067  174622                  CLR     PSW             ;SET PRIORITY 0.
003154  012727  001750  000000  DLYA:   MOV     #1000.,#0       ;1 MSEC COUNT TO DLYR1.
003162  005367  177772          DLYB:   DEC     DLYR1           ;DECREMENT 1 MSEC COUNT.
003166  001375                          BNE     DLYB            ;BR IF NOT 0.
003170  005367  177752                  DEC     DLYR0           ;DECREMENT DELAY COUNT.
003174  001367                          BNE     DLYA            ;BR IF NOT DONE DELAYING.
003176  000002                          RTI                     ;EXIT.
                                ;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
003200  012767  177777  000016  INBINN: MOV     #-1,RIND        ;SET ALL VARIABLES
003206  016767  000012  000012          MOV     RIND,PT0
003214  016767  000004  000006          MOV     RIND,PT1
003222  000002                          RTI                     ;EXIT.
003224  000000                  RIND:   OPEN
003226  000000                  PT0:    OPEN
003230  000000                  PT1:    OPEN
                                ;SPECIAL BINARY COUNT PATTERN SUBROUTINE. EXITS WITH BIN CHAR IN R0
003232  016767  177770  177770  GTBIN1: MOV     PT0,PT1         ;PREVIOUS BIN CHAR TO PT1
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  993  003240  005167  177764                  COM     PT1
  994  003244  005167  177754                  COM     RIND
  995  003250  001002                          BNE     .+6
  996  003252  005267  177752                  INC     PT1
  997  003256  016767  177746  177748          MOV     PT1,PTO         ;SAVE BIN CHAR IN PTO
  998  003264  000003                          SAV5S
  999  003266  016725  177736                  MOV     PT1,(5)+        ;
 1000  003272  000004                          RST5S
 1001  003274  000002                          RTI                     ;EXIT.
 1002                                  ;OCTAL TO ASCII CONVERT ROUTINE
 1003  003276  104006                  OACNVV: SAV05S                  ;SAVE REGS.
 1004          003302                          OACNVX=.+2
 1005  003300  013527  000000                  MOV     @(5)+,#0        ;GET OCTAL VALUE.
 1006  003304  012501                          MOV     (5)+,R1         ;GET DESTINATION ADDR.
 1007  003306  012502                          MOV     (5)+,R2         ;GET CONVERT COUNT.
 1008  003310  060201                          ADD     R2,R1           ;DEVELOP ADDR TO STORE 1ST CHAR.
 1009  003312  016703  177764          OACNVA: MOV     OACNVX,R3
 1010  003316  042703  177770                  BIC     #177770,R3      ;ISOLATE LEAST SIGNIFICANT DIGIT.
 1011  003322  062703  000060                  ADD     #60,R3          ;CONVERT DIGIT TO ASCII.
 1012  003326  110341                          MOVB    R3,-(1)         ;STORE ASCII CHARACTER.
 1013  003330  042767  000007  177744          BIC     #7,OACNVX
 1014  003336  006067  177740                  ROR     OACNVX
 1015  003342  006067  177734                  ROR     OACNVX
 1016  003346  006067  177730                  ROR     OACNVX
 1017  003352  005302                          DEC     R2              ;DONE ALL DIGITS?
 1018  003354  001356                          BNE     OACNVA          ;BRANCH IF NOT DONE.
 1019  003356  104007                          RST05S                  ;RESTORE REGS.
 1020  003360  000002                          RTI                     ;DONE. EXIT.
 1021                          ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
 1022  003362  104002          BMOVE:  SAV03                           ;SAVE REGS.
 1023  003364  012501                  MOV     (5)+,R1                 ;GET"FROM"ADDRESS
 1024  003366  012502                  MOV     (5)+,R2                 ;GET"TO"ADDRESS
 1025  003370  012503                  MOV     (5)+,R3                 ;GET COUNT
 1026  003372  112122          BMOVA:  MOVB    (1)+,(2)+               ;MOVE BYTE
 1027  003374  005303                  DEC     R3                      ;DECREMENT COUNT
 1028  003376  001375                  BNE     BMOVA                   ;BRANCH IF NOT DONE.
 1029  003400  104003                  RST03                           ;RESTORE REGS.
 1030  003402  000205                  RTS     R5                      ;DONE EXIT
 1031                          ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
 1032  003404  104006          BDCNVV: SAV05S                          ;SAVE REGS.
 1033  003406  013501                  MOV     @(5)+,R1                ;GET BINARY VALUE.
 1034  003410  012700  003506          MOV     #DECVAL,R0              ;ADDR OF DECVAL TO R0.
 1035  003414  012702  003474          MOV     #TENPWR,R2              ;ADDR OF 10 POWER TO R2.
 1036  003420  012703  000005          MOV     #5,R3                   ;SET UP FOR 5 CONVERSIONS.
 1037  003424  005004          BDCNVA: CLR     R4                      ;CLEAR RESULT.
 1038  003426  161201          BDCNVB: SUB     (2),R1                  ;10 POWER FROM VALUE.
 1039  003430  103402                  BCS     BDCNVC                  ;BR IF UNSUCCESSFUL.
 1040  003432  005204                  INC     R4                      ;;1 TO RESULT.
 1041  003434  000774                  BR      BDCNVB                  ;DO IT AGAIN.
 1042  003436  061201          BDCNVC: ADD     (2),R1                  ;RESTORE SUBTRACTED VALUE.
 1043  003440  062704  000060          ADD     #60,R4  ;CONVERT RESULT TO ASCII.
 1044  003444  110420                  MOVB    R4,(0)+                 ;STORE RESULT.
 1045  003446  005722                  TST     (2)+                    ;UPDATE 10 POWER ADDR.
 1046  003450  005303                  DEC     R3                      ;DONE 5 TIMES?
 1047  003452  001364                  BNE     BDCNVA                  ;BR IF NOT.
 1048  003454  012501                  MOV     (5)+,R1                 ;GET ADDR TO STORE ASCII.
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1049  003456  012502                          MOV     (5)+,R2         ;GET # OF DIGITS REQUIRED.
1050  003460  060201                          ADD     R2,R1           ;START WITH LSD.
1051  003462  114041                  BDCNVD: MOVB    -(0),-(1)       ;TRANSFER CHARACTER.
1052  003464  005302                          DEC     R2              ;DONE?
1053  003466  001375                          BNE     BDCNVD          ;BR IF NOT.
1054  003470  104007                          RSTOSS                  ;RESTORE REGS.
1055  003472  000002                          RTI                     ;EXIT.
1056  003474  023420                  TENPWR: 10000.
1057  003476  001750                          1000.
1059  003500  000144                          100.
1059  003502  000012                          10.
1060  003504  000001                          1
1061  003506     040     040     040  DECVAL: .BYTE   040,040,040,040,040,040
1062  003511     040     040     040
1063                                  ;EMT SUB TO SAVE TCCM, TCST
1064  003514  017767  175264  175330  STATS:  MOV     @TCST,TCSTT     ;SAVE TCST.
1065  003522  017767  175260  175320          MOV     @TCCM,TCCMT     ;SAVE TCCM.
1066  003530  000002                          RTI                     ;EXIT EMT SUB.
1067                                  ;EMT SUB TO ISSUE DT COMMAND SPECIFIED AT CALL+2.
1068  003532  000003                  STCOM:  SAVSS
1069  003534  016767  175324  175330          MOV     UNIT,COMND      ;UNIT # TO COMND.
1070  003542  042767  174377  175322          BIC     #174377,COMND
1071  003550  052567  175316                  BIS     (5)+,COMND      ;SET DESIRED COMMAND IN COMND.
1072  003554  016777  175312  175224          MOV     COMND,@TCCM     ;ISSUE COMMAND.
1073  003562  032777  100200  175216          BIT     #BIT15!BIT7,@TCCM       ;READY AND ERROR BIT CLEAR?
1074  003570  001414                          BEQ     STCOMB          ;BR IF YES.
1075  003572  032767  000001  175272          BIT     #BIT0,COMND     ;WAS THE DO BIT SET IN COMND?
1076  003600  001410                          BEQ     STCOMB          ;BR IF NOT.
1077  003602  104020                          STATUS                  ;SAVE STATUS.
1078  003604  104012                          ERRORN                  ;ERROR. DO BIT FAILED TO CAUSE CLEARING
1079  003606  006713                          FPCMSG
1080  003610  006346                          STCMSG                  ;OF READY AND/OR ERROR BIT(S).
1081  003612  006115                          STAT
1082  003614  177777                          -1
1083  003616  000004                  STCOMA: RSTSS
1084  003620  000002                          RTI                     ;EXIT EMT SUB.
1085  003622  005725                  STCOMB: TST     (5)+            ;SET UP OK EXIT.
1086  003624  000774                          BR      STCOMA
1087                                  ;EMT SUB TO STOP ALL DECTAPES.
1088  003626  042777  000116  175152  STPDT:  BIC     #116,@TCCM      ;ISSUE SAT COMMAND.
1089  003634  000002                          RTI                     ;EXIT EMT SUB.
1090                                  ;EMT SUB TO CHECK FOR ERROR. (ENDZ IS CONSIDERED AN ERROR).
1091  003636  000003                  CKER:   SAVSS
1092  003640  104020                          STATUS                  ;SAVE STATUS.
1093  003642  005777  175140                  TST     @TCCM           ;ERROR BIT SET?
1094  003646  100416                          BMI     CKERZD          ;BR IF YES.
1095  003650  005725                          TST     (5)+            ;NO. SET UP OK EXIT.
1096  003652  000407                          BR      CKERZB
1097                                  ;EMT SUB TO CHECK FOR DECTAPE ERROR OR END ZONE.
1098  003654  000003                  CKERZ:  SAVSS
1099  003656  104020                          STATUS                  ;SAVE STATUS.
1100  003660  005777  175122                  TST     @TCCM           ;ERROR BIT SET?
1101  003664  100404                          BMI     CKERZC          ;BR IF YES.
1102  003666  005725                          TST     (5)+            ;NO. SET UP OK EXIT.
1103  003670  005725                  CKERZA: TST     (5)+
1104  003672  000004                  CKERZB: RSTSS
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 1105  003674  000002                          RTI                             ;EXIT EMT SUB.
 1106  003676  005777  175102          CKERZC: TST     @TCST                   ;ENDZ BIT SET?
 1107  003702  100772                          BMI     CKERZA                  ;BR IF YES.
 1108  003704  104012                  CKERZD: ERRORN                          ;DECTAPE ERROR.
 1109  003706  006713                          FPCMSG
 1110  003710  006167                          DTERR
 1111  003712  006115                          STAT
 1112  003714  177777                          -1
 1113  003716  000765                          BR      CKERZB
 1114                                  ;EMT SUB TO SAVE TCDT, TCBA, TCWC REGS.
 1115  003720  017767  175064  175130  SDTRG:  MOV     @TCWC,TCWCT             ;SAVE TCWC.
 1116  003726  017767  175062  175120          MOV     @TCDT,TCDTT             ;SAVE TCDT.
 1117  003734  017767  175052  175116          MOV     @TCBA,TCBAT             ;SAVE TCBA.
 1118  003742  000002                          RTI                             ;EXIT EMT SUB.
 1119                                  ;EMT SUB TO REPORT PREMATURE ENDZ DETECTION.
 1120  003744  000003                  PRENDZ: SAVSS
 1121  003746  104012                          ERRORN                          ;PREMATURE ENDZ DETECTED.
 1122  003750  006565                          EMSG6
 1123  003752  006200                          BLKSB
 1124  003754  006115                          STAT
 1125  003756  177777                          -1
 1126  003760  104000                          SCOPE
 1127                                  ;EMT SUB TO MOVE TAPE TO FORWARD END ZONE.
 1128  003762  012767  000002  000012  WINDC:  MOV     #RNUM!FWD,RWINDV        ;SET UP WIND.
 1129  003770  000403                          BR      RWINDA
 1130                                  ;EMT SUB TO MOVE TAPE TO REVERSE END ZONE.
 1131  003772  012767  004002  000002  RWIND:  MOV     #RNUM!REV,RWINDV        ;SET UP REWIND.
 1132  004000  104017                  RWINDA: SETCOM                          ;ISSUE WIND/REWIND.
 1133  004002  000000                  RWINDV: OPEN
 1134  004004  104000                          SCOPE                           ;SETCOM ERROR.
 1135  004006  005777  174774                  TST     @TCCM                   ;ERROR BIT SET?
 1136  004012  100375                          BPL     .-4                     ;BR IF NOT.
 1137  004014  104020                          STATUS                          ;YES. GET STATUS AND STOP.
 1138  004016  104021                          STOPDT
 1139  004020  005767  175026                  TST     TCSTT                   ;WAS ERROR DUE TO ENDZ?
 1140  004024  100407                          BMI     RWINDC                  ;BR IF YES.
 1141  004026  000003                          SAVSS
 1142  004030  104012                          ERRORN                          ;NO. DECTAPE ERROR.
 1143  004032  006713                          FPCMSG
 1144  004034  006167                          DTERR
 1145  004036  006115                          STAT
 1146  004040  177777                          -1
 1147  004042  104000                          SCOPE
 1148  004044  000002                  RWINDC: RTI                             ;EXIT.
 1149                                  ;EMT SUB TO HANDLE FAILURE TO INTERRUPT.
 1150  004046  000003 ..               NOINTR: SAVSS
 1151  004050  104020                          STATUS                          ;SAVE STATUS.
 1152  004052  104012                          ERRORN                          ;DECTAPE FAIL TO INTERRUPT.
 1153  004054  006713                          FPCMSG
 1154  004056  006150                          INTFAI
 1155  004060  006115                          STAT
 1156  004062  177777                          -1
 1157  004064  000004                          RSTSS
 1158  004066  000002                          RTI                             ;EXIT EMT SUB.
 1159                                  ;EMT SUB TO GENERATE RANDOM BLOCK #, AND STORE AT BLKRQ.
 1160  004070  026727  174756  001101  RNDBK:  CMP     BLKRQ,#577.             ;VALID # IN BLKRQ?
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1161  004076  101005                        BHI     RNDBKK          ;BR IF NOT.
1162  004100  032767  004000  173462        BIT     #BIT11,SR       ;RANDOM # DESIRED?
1163  004106  001401                        BEQ     RNDBKK          ;BR IF YES.
1164  004110  000002                        RTI                     ;NO. RETAIN SAME BLOCK#.
1165  004112  104035              RNDBKK:   RNDNUM                  ;GET RANDOM NUMBER.
1166  004114  000000              RNDBKA:   OPEN                    ;RANDOM NUMBER GOES HERE.
1167  004116  042767  176000  177770        BIC     #176000,RNDBKA
1168  004124  026727  177764  001101        CMP     RNDBKA,#1101    ;NUMBER A VALID BLOCK NUMBER?
1169  004132  101356                        BHI     RNDBK           ;BR IF NOT.
1170  004134  016767  177754  174720        MOV     RNDBKA,BLKRQ    ;YES. NUMBER TO BLKRQ.
1171  004142  000002                        RTI                     ;EXIT EMT SUB.
1172                                ;EMT SUB TO GENERATE RANDOM BLOCK# AND STORE AT BLKRQ.
1173                                ;THE NUMBER MUST NOT BE >574, OR <3.
1174  004144  026727  174712  001076  RDBK1:  CMP     BLKRQ,#574.     ;SEE IF CURRENT BLK# IS VALID.
1175  004152  101011                        BHI     RDBK1A          ;IF # IS HIGH GENERATE ANOTHER.
1176  004154  026727  174702  000002        CMP     BLKRQ,#2        ;IS # <3?
1177  004162  101405                        BLOS    RDBK1A          ;IF # IS <3 GENERATE ANOTHER.
1178  004164  032767  004000  173376        BIT     #BIT11,SR       ;VALID #. RANDOM NUMBER CHANGE?
1179  004172  001401                        BEQ     RDBK1A          ;BR IF RANDOM # IS DESIRED.
1180  004174  000002                        RTI                     ;NO. KEEP SAME NUMBER.
1181  004176  104035              RDBK1A:   RNDNUM                  ;GET RANDOM NUMBER.
1182  004200  000000              RDBK1B:   OPEN                    ;RANDOM # IS STORED HERE.
1183  004202  042767  176000  177770        BIC     #176000,RDBK1B
1184  004210  026727  177764  000002        CMP     RDBK1B,#2       ;IS # <3?
1185  004216  101767                        BLOS    RDBK1A          ;IF # IS <3 GET ANOTHER.
1186  004220  026727  177754  001076        CMP     RDBK1B,#574.    ;# LARGER THAN 574.?
1187  004226  101363                        BHI     RDBK1A          ;BR IF LARGER.
1188  004230  016767  177744  174624        MOV     RDBK1B,BLKRQ    ;NEW NUMBER TO BLKRQ.
1189  004236  000002                        RTI                     ;EXIT.
1190                                ;EMT SUB TO CHECK EXPECTED DATA AGAINST ACTUAL DATA AND REPORT ERRORS.
1191  004240  012767  022041  000120  DTCKI:  MOV     #022041,DTCKBA  ;SET UP TO INCR EXP ADDR, DECR ACT ADDR.
1192  004246  000403                        BR      DATCKK
1193  004250  012767  022021  000110  DATCK:  MOV     #022021,DTCKBA  ;SET UP TO INCR BOTH DATA ADDRESSES.
1194  004256  104006              DATCKK:   SAVOSS
1195  004260  012500                        MOV     (5)+,R0         ;GET EXPECTED DATA ADDR.
1196  004262  012501                        MOV     (5)+,R1         ;GET ACTUAL DATA ADDR.
1197  004264  012502                        MOV     (5)+,R2         ;GET CHECK COUNT.
1198  004266  012767  000001  000104        MOV     #1,DATKNT       ;SET CURRENT WORD # TO 1.
1199  004274  016703  174600                MOV     ERRLIM,R3       ;ERROR LIMIT TO R3.
1200  004300  021011              DATCKA:   CMP     (0),(1)         ;COMPARE ACTUAL AND EXPECTED WORD.
1201  004302  001427                        BEQ     DATCKB          ;BR IF EQUAL (OK).
1202  004304  010067  000006                MOV     R0,EXPD
1203  004310  010167  000012                MOV     R1,ACTD
1204  004314  104061                        OACNV                   ;CONVERT EXPECTED DATA TO ASCII.
1205  004316  000000              EXPD:     OPEN
1206  004320  006323                        ADATSB
1207  004322  000006                        6
1208  004324  104061                        OACNV                   ;CONVERT ACTUAL DATA TO ASCII.
1209  004326  000000              ACTD:     OPEN
1210  004330  006337                        ADATWS
1211  004332  000006                        6
1212  004334  104062                        BDCNV                   ;CONVERT WORD # TO DECIMAL ASCII.
1213  004336  004400                        DATKNT
1214  004340  006310                        AWDCNT
1215  004342  000004                        4
1216  004344  104012                        ERRORN                  ;DATA ERROR.
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1217  004346  006713                        FPCMSG
1218  004350  006200                        BLKSB
1219  004352  006270                        DATERR
1220  004354  177777                        -1
1221  004356  005303                        DEC     R3              ;NTH ERROR?
1222  004360  001405                        BEQ     DATCKC          ;BR IF YES.
1223  004362  005267  000012    DATCKB: INC     DATKNT          ;INCREMENT WORD NUMBER.
1224  004366  000000    DTCKBA: OPEN                            ;UPDATE DATA ADDRESSES.
1225  004370  005302                        DEC     R2              ;DONE?
1226  004372  001342                        BNE     DATCKA          ;BR IF NOT DONE.
1227  004374  104007    DATCKC: RSTOSS                          ;DONE.
1228  004376  000002                        RTI                     ;EXIT.
1229  004400  000000    DATKNT: OPEN
1230                     ;EMT SUB TO CLEAR SPECIFIED AREA TO 0'S
1231  004402  104006    CLEARR: SAVOSS
1232  004404  012500                        MOV     (5)+,R0         ;GET STARTING ADDR.
1233  004406  012501                        MOV     (5)+,R1         ;GET COUNT.
1234  004410  005020                        CLR     (0)+            ;CLEAR WORD.
1235  004412  005301                        DEC     R1              ;DONE?
1236  004414  001375                        BNE     .-4             ;BR IF NOT DONE.
1237  004416  104007                        RSTOSS                  ;DONE
1238  004420  000002                        RTI                     ;EXIT.
1239
1240  004422  104006    FILLL:  SAVOSS
1241  004424  012500                        MOV     (5)+,R0         ;GET STARTING ADDR.
1242  004426  012502                        MOV     (5)+,R2         ;GET VALUE.
1243  004430  012501                        MOV     (5)+,R1         ;GET COUNT.
1244  004432  010220                        MOV     R2,(0)+         ;SET VALUE IN WORD.
1245  004434  005301                        DEC     R1              ;DONE?
1246  004436  001375                        BNE     .-4             ;BR IF NOT DONE.
1247  004440  104007                        RSTOSS                  ;DONE
1248  004442  000002                        RTI                     ;EXIT.
1249                     ;EMT SUB TO FILL AREA WITH BINARY COUNT PATTERN.
1250  004444  104006    BINFLL: SAVOSS
1251  004446  012500                        MOV     (5)+,R0         ;GET STARTING ADDR.
1252  004450  012501                        MOV     (5)+,R1         ;GET COUNT.
1253  004452  104052    BINFLA: GETBN1                          ;GET BINARY WORD.
1254  004454  000000    BINFLB: OPEN                            ;BINARY WORD IS STORED HERE.
1255  004456  016720  177772              MOV     BINFLB,(0)+     ;STORE WORD.
1256  004462  005301                        DEC     R1              ;DONE?
1257  004464  001372                        BNE     BINFLA          ;BR IF NOT DONE.
1258  004466  104007                        RSTOSS                  ;DONE.
1259  004470  000002                        RTI                     ;EXIT.
1260                     ;EMT SUB TO CHECK THAT WORD COUNT IS 0, AND THAT TCBA CONTENTS
1261                     ;MATCH THE EXPECTED CONTENTS.
1262  004472  000003    CWCBA:  SAV5S
1263  004474  012567  174374              MOV     (5)+,TEMP       ;GET EXPECTED TCBA CONTENTS.
1264  004500  104024                        SAVDTR                  ;SAVE TCWC AND TCBA.
1265  004502  005777  174302              TST     @TCWC           ;WORD COUNT 0?
1266  004506  001407                        BEQ     CWCBB           ;BR IF 0 (OK).
1267  004510  104012                        ERRORN                  ;WORD COUNT NOT 0. TYPE
1268  004512  006713                        FPCMSG                  ;CONTENTS OF TCWC AND TCBA.
1269  004514  006217                        WCNOT0
1270  004516  006023                        CTCWC
1271  004520  006041                        CTCBA
1272  004522  177777                        -1
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1273   004524  104000                          SCOPE
1274   004526  026777  174342  174256  CWCBB:  CMP     TEMP,@TCBA      ;TCBA AND EXPECTED TCBA SAME?
1275   004534  001415                          BEQ     CWCBC           ;BR IF YES (OK).
1276   004536  104051                          OACNV                   ;NO. CONVERT EXPECTED TCBA TO ASCII.
1277   004540  001074                          TEMP
1278   004542  006257                          ATCBAS
1279   004544  000006                          6
1280   004546  104012                          ERRORN                  ;TCBA DOES NOT MATCH EXPECTED
1281   004550  006713                          FPCMSG                  ;TCBA CONTENTS. TYPE EXPECTED TCBA,
1282   004552  006234                          INCTCB                  ;ACTUAL TCBA, AND TCWC.
1283   004554  006234                          INCTCB
1284   004556  006251                          TCBASB
1285   004560  006041                          CTCBA
1286   004562  006023                          CTCWC
1287   004564  177777                          -1
1288   004566  104000                          SCOPE
1289   004570  000004                  CWCBC:  RST5S
1290   004572  000002                          RTI                     ;EXIT.
1291                                  ;EMT SUB TO HANDLE WRONG BLOCK #'FOUND.
1292   004574  000003                  WNGBK:  SAV5S
1293   004576  104020                          STATUS                  ;SAVE STATUS.
1294   004600  104012                          ERRORN                  ;WRONG BLOCK NUMBER FOUND.
1295   004602  006713                          FPCMSG
1296   004604  006200                          BLKSB
1297   004606  006057                          CTCDT
1298   004610  006115                          STAT
1299   004612  177777                          -1
1300   004614  000004                          RST5S
1301   004616  000002                          RTI                     ;EXIT EMT SUB.
1302                                  ;EMT SUB TO CONVERT LOC A ROUTINE WAS CALLED FROM TO ASCII. (ADDR IN R4)
1303   004620  010467  174252          CFPC:   MOV     R4,FPC          ;R4 TO FPC.
1304   004624  104061                          OACNV                   ;CONVERT TO ASCII.
1305   004626  001076                          FPC
1306   004630  006720                          AFPC
1307   004632  000006                          6
1308   004634  000002                          RTI                     ;EXIT EMT SUB.
1309                                  ;EMT SUBS TO SEARCH FOR DESIRED BLOCK NUMBER. SRCHFF GETS FORWARD
1310                                  ;BLOCK NUMBERS. SRCHRR GETS REVERSE BLOCK NUMBERS.
1311   004636  105067  000327          SRCHFF: CLRB    DIRIND          ;SET FORWARD INDICATOR.
1312   004642  000403                          BR      SRCHA
1313   004644  112767  177777  000317  SRCHPR: MOVB    #-1,DIRIND      ;SET REVERSE INDICATOR.
1314   004652  012777  004736  174136  SRCHA:  MOV     #SRCHC,@TCVTR   ;SET INTERRUPT VECTOR TO SRCHC.
1315   004660  112767  000005  000302          MOVB    #5,REVCNT       ;SET MAX # OF REVERSALS ALLOWED.
1316   004666  052767  004000  000020          BIS     #REV,SRCHM      ;SET REV BIT IN SRCHM.
1317   004674  032777  004000  174104          BIT     #REV,@TCCM      ;REV BIT SET IN TCCM?
1318   004702  001003                          BNE     SRCHAA          ;BR IF YES.
1319   004704  042767  004000  000002          BIC     #REV,SRCHM      ;NO. CLEAR REV BIT FROM SRCHM.
1320   004712  104017                  SRCHAA: SETCOM                  ;START SEARCH.
1321   004714  000103                  SRCHM:  RNUM!IE!DO
1322   004716  000467                          BR      SREOUT          ;GO TO ERROR EXIT.
1323   004720  000402                          BR      SRCHB
1324   004722  005277  174060          SRCCON: INC     @TCCM           ;ISSUE DO TO ENABLE RNUM.
1325   004726  104016                  SRCHB:  DELAY                   ;TIME OUT INTERRUPT.
1326   004730  104016                          DELAY
1327   004732  104027                          NOINT                   ;FAILURE TO INTERRUPT.
1328   004734  000460                          BR      SREOUT          ;GO TO ERROR EXIT.
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 1329  004736  012716  004744          SRCHC:  MOV     #SRCHD,(6)      ;HERE WHEN INTERRUPT OCCURS.
 1330  004742  000002                  RTI                             ;EXIT TO SRCHD.
 1331  004744  022626                  SRCHD:  POPSP2                  ;RESTORE STACK.
 1332  004746  005777  174034                  TST     @TCCM           ;ERROR BIT SET?
 1333  004752  100003                  BPL     SRCHDA                  ;BR IF NOT.
 1334  004754  104023                  CKERRZ                          ;CHECK FOR ERROR/ENDZ.
 1335  004756  000447                  BR      SREOUT                  ;ERROR. GO TO ERROR EXIT.
 1336  004760  000454                  BR      SRCREV                  ;ENDZ. GO REVERSE DIRECTION.
 1337  004762  027767  174026  174072  SRCHDA: CMP     @TCDT,BLKRQ     ;COMPARE BLK# IN TCDT TO REQUIRED    .
 1338  004770  001431                  BEQ     SRCF                    ;BR IF BLK FOUND.
 1339  004772  003014                  BGT     SRCHE                   ;BR IF TCDT HIGH.
 1340  004774  032777  004000  174004          BIT     #BIT11,@TCCM    ;TCDT LOW. CHECK DIRECTION.
 1341  005002  001747                  BEQ     SRCCON                  ;BR IF GOING FWD. CONTINUE SAME DIRECTION.
 1342  005004  062777  000003  174002          ADD     #3,@TCDT        ;ADD 3 TO TCDT.
 1343  005012  027767  173776  174042          CMP     @TCDT,BLKRQ     ;LOWER BY 3 OR MORE?
 1344  005020  101440                  BLOS    SRCRVA                  ;GO REVERSE IF LOWER BY 3 OR MORE.
 1345  005022  000737                  BR      SRCCON                  ;NOT LOW ENOUGH. CONTINUE SAME DIRECTION.
 1346  005024  032777  004000  173754  SRCHE:  BIT     #BIT11,@TCCM    ;TCDT HIGH. CHECK DIRECTION.
 1347  005032  001333                  BNE     SRCCON                  ;BR IF IN REVERSE. CONTINUE DIRECTION.
 1348  005034  162777  000003  173752          SUB     #3,@TCDT        ;SUBTRACT 3 FROM TCDT.
 1349  005042  026777  174014  173744          CMP     BLKRQ,@TCDT     ;HIGHER BY 3 OR MORE?
 1350  005050  003430                  BLE     SRCRVB                  ;GO REVERSE IF HIGHER BY 3 OR MORE.
 1351  005052  000723                  BR      SRCCON                  ;NOT HIGH ENOUGH. CONTINUE DIRECTION.
 1352  005054  032777  004000  173724  SRCF:   BIT     #BIT11,@TCCM    ;TCDT EQUAL. CHECK DIRECTION.
 1353  005062  001007                  BNE     SRCHG                   ;BR IF IN REVERSE.
 1354  005064  105767  000101                  TSTB    DIRIND          ;GOING FORWARD. FWD BLK# WANTED?
 1355  005070  001314                  BNE     SRCCON                  ;BR IF FWD BLK# NOT WANTED.
 1356  005072  000003                  SRCOUT: SAV5S
 1357  005074  005725                          TST     (5)+            ;SET UP SUCCESS EXIT.
 1358  005076  000004                  SREOUT: RST5S
 1359  005100  000002                          RTI                     ;EXIT EMT SUB.
 1360  005102  105767  000063          SRCHG:  TSTB    DIRIND          ;GOING REV. REV BLK# WANTED?
 1361  005106  001371                  BNE     SRCOUT                  ;BR IF REV BLK# WANTED.
 1362  005110  000704                  BR      SRCCON                  ;NOT WANTED CONTINUE.
 1363  005112  032777  004000  173666  SRCREV: BIT     #BIT11,@TCCM    ;REV BIT SET?
 1364  005120  001404                  BEQ     SRCRVB                  ;BR IF NOT.
 1365  005122  042777  004000  173656  SRCRVA: BIC     #BIT11,@TCCM    ;IN REVERSE. SET TO FORWARD.
 1366  005130  000403                  BR      SRCRVC
 1367  005132  052777  004000  173646  SRCRVB: BIS     #BIT11,@TCCM    ;FORWARD. SET TO REVERSE.
 1368  005140  105367  000024          SRCRVC: DECB    REVCNT          ;FIFTH REVERSAL ISSUED?
 1369  005144  001266                  BNE     SRCCON                  ;BR IF NOT.
 1370  005146  104020                  STATUS                          ;YES. ERROR. SAVE STATUS.
 1371  005150  000003                  SAV5S
 1372  005152  104012                  ERRORN                          ;BLK# NOT FOUND WITHIN 5 TAPE REVERSALS.
 1373  005154  006713                  FPCMSG
 1374  005156  006200                  BLKSB
 1375  005160  006672                  SRCHER
 1376  005162  006115                  STAT
 1377  005164  000007                  -1
 1378  005166  000743                  BR      SREOUT          ;GO TO ERROR EXIT.
 1379  005170     000          REVCNT: .BYTE   OPEN
 1380  005171     000          DIRIND: .BYTE   OPEN
 1381                                  ;EMT SUBS TO WDATA, RDATA, FORWARD OR REVERSE.
 1382  005172  000003          WRDFR:  SAV5S
 1383  005174  012577  173610          MOV     (5)+,@TCWC      ;GET WORD COUNT AND SET IN TCWC
 1384  005200  017767  173604  000100  MOV     @TCWC,WRDFRG    ;2(WORD COUNT) TO WRDFRG.
```

```
                                        ASL     WRDFRG
                                        NEG     @TCWC                   ;IN 2'S COMPLEMENT FORM.
                                        MOV     (5)+,@TCBA              ;SET ADDR IN TCBA.
                                        ADD     @TCBA,WRDFRG            ;2(WORD COUNT)+TCBA=FINAL TCBA CONTENTS.
                                WRDFRA: OPEN                            ;SRCHF OR SRCHR CALL GOES HERE.
                                        SCOPE                           ;ERROR IN SRCHF OR SRCHR.
                                        MOV     #WRDFRC,@TCVTR          ;SET INTERRUPT VECTOR TO WRDFRC.
                                        SETCOM                          ;ISSUE WDATA OR RDATA.
                                WRDFRB: OPEN                            ;COMMAND GOES HERE.
                                        SCOPE                           ;SETCOM ERROR.
                                        DELAY                           ;TIMEOUT INTERRUPT.
                                        DELAY
                                        NOINT                           ;FAILURE TO INTERRUPT.
                                        SCOPE
                                WRDFRC: MOV     #WRDERD,(6)             ;HERE WHEN INTERRUPT OCCURS.
                                        RTI                             ;EXIT TO WRDFRD.
                                WRDFRD: POPSP2                          ;RESTORE STACK.
                                        TST     @TCCM                   ;ERROR BIT SET?
                                        BPL     WRDFRF                  ;BR IF NOT.
                                        CKERRZ                          ;CHECK FOR ERRORS.
                                        SCOPE                           ;ERROR RETURN.
                                        NOP                             ;ENDZ RETURN.
                                WRDFRF: CKWCBA                          ;CHECK WORD COUNT AND CURRENT ADDR.
                                WRDFRG: OPEN                            ;TCBA SHOULD EQUAL THIS.
                                WRDFRE: RSTSS
                                        RTI                             ;EXIT.
                                WDATF:  MOV     #WDATA!FWD!IE!DO,WRDFRB
                                        BR      RDATF+6
                                RDATF:  MOV     #RDATA!FWD!IE!DO,WRDFRB
                                        MOV     #SRCHF,WRDFRA
                                        BR      WRDFR
                                WDATR:  MOV     #WDATA!REV!IE!DO,WRDFRB
                                        BR      RDATR+6
                                RDATR:  MOV     #RDATA!REV!IE!DO,WRDFRB
                                        MOV     #SRCHR,WRDFRA
                                        BR      WRDFR
                                RDTFX:  MOV     #RDATA!FWD!IE!BIT5!BIT4!DO,WRDFRB
                                        BR      RDATF+6
                                ;EMT SUB TO SELECT SEQUENTIAL DECTAPE UNIT.
                                SQDRV:  INC     SQDRVA
                                        BIC     #177770,SQDRVA
                                        SELDRV                          ;SELECT UNIT SET IN SQDRVA IF AVAILABLE.
                                SQDRVA: OPEN                            ;UNIT NUMBER GOES HERE.
                                        BR      SQDRV                   ;UNIT NOT AVAILABLE RETURN.
                                        RTI                             ;UNIT SELECTED. EXIT.
                                ;EMT SUB TO SELECT SPECIFIED DECTAPE UNIT IF AVAILABLE.
                                SELDRR: SAVOSS
                                        MOV     (5)+,R0                 ;GET UNIT NUMBER.
                                        BITB    UNTAB(0),UNITS          ;SEE IF UNIT AVAILABLE.
                                        BEQ     SELDRA                  ;BR IF UNIT NOT AVAILABLE.
                                        MOV     R0,UNITN                ;AVAILABLE. SELECT UNIT.
                                        MOVB    R0,UNIT+1
                                        TST     (5)+                    ;SET UP SELECTED EXIT.
                                SELDRA: RSTOSS
                                        RTI                             ;EXIT.
                                UNTAB:  .BYTE   BIT0,BIT1,BIT2,BIT3,BIT4,BIT5,BIT6,BIT7
```

```
1441  005457      010      020      040
1442  005462      100      200
1443  005464   022445      124              EMC:    .ASCII  '%%T'
1444  005467      040   020040   020040      ATNUMB: .ASCII  '     PC '
1445  005474   041520      040
1446  005477      040   020040   020040      APC:    .ASCII  '       ICNT '
1447  005504   020040   041511   052116
1448  005512      040
1449  005513      040   020040   020040      AICNT:  .ASCII  '     .'
1450  005521      040
1451  005523      040   047125   052111              .ASCII  ' UNIT '
1452  005530      040
1453  005531      040      000              AUNIT:  .ASCIZ  ' '
1454  005534      040   044445   053116      AINCRT: .ASCIZ  '%%INVALID TEST.'
1455  005550   046101   042111   052040
1456  005556   051505   027124      000
1457  005561      040   052045   031503      PGTIT:  .ASCIZ  '%%TC3 - TC11 TEST 3%%'
1458  005566   026440   052040   030503
1459  005574   020061   042524   052123
1460  005602   031440   022445      000
1461  005607      045   052123   047101      INST1:  .ASCII  '%STANDARD TAPES ON UNITS.'
1462  005624   040504   042122   052040
1463  005632   050101   051505   047440
1464  005640   020116   047125   052111
1465  005646   027123
1466  005650   051045   046505   052117              .ASCII  '%REMOTE, WRITE ENABLE.'
1467  005656   026105   053440   044522
1468  005664   042524   042440   040516
1469  005672   046102   027105
1470  005676   051445   046101   051514              .ASCII  '%WALLSW: OFF, WRTMSW: OFF.'
1471  005704   035127   047440   043106
1472  005712   020054   051127   046524
1473  005720   053523   020072   043117
1474  005726   027106
1475  005730   051445   046105   041505              .ASCII  '%SELECT UNITS WITH SR7 - SR0. '
1476  005736   020124   047125   052111
1477  005744   020123   044527   044124
1478  005752   051440   033523   026440
1479  005760   051440   030123   020056
1480  005766   051120   051505   020123              .ASCIZ  'PRESS CONT%'
1481  005774   047503   052116   000045
1482  006002   051445   052105   051440      ASETSR: .ASCIZ  '%SET SR OPTIONS. NORMAL SR=0'
1483  006020   020122   050117   044524
1484  006036   047117   027123   047040
1485  006044   051117   040515   020114
1486  006052   051123   030075      000
1487  006057      007              APGEND: .BYTE   007
1488  006060   025445      000             .ASCIZ  '%*'
1489  006063      040   041524   041527      CTCWC:  .ASCII  '  TCWC '
1490  006070      040
1491  006071      040   020040   020040      ATCWC:  .ASCIZ  '       '
1492  006076   020040      000
1493  006101      040   041524   040502      CTCBA:  .ASCII  '  TCBA '
1494  006106      040
1495  006107      040   020040   020040      ATCBA:  .ASCIZ  '       '
1496  006114   020040      000
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 1497  006057      040  041524  052104  DTCDT:  .ASCII  ' TCDT '
 1498  006064      040
 1499  006065      040  020040  020040  ATCDT:  .ASCIZ  '       '
 1500  006071   020040      000
 1501  006074      040  041524  052104  SBTCDT: .ASCII  ' TCDTSB '
 1502  006102   041123      040
 1503  006107      040  020040  020040  ASBTCD: .ASCIZ  '       '
 1504  006113   020040      000
 1505  006115      040  041524  046503  STAT:   .ASCII  ' TCCM '
 1506  006122      040
 1507  006123      040  020040  020040  ATCCM:  .ASCII  '        TCST '
 1508  006130   020040  052040  051503
 1509  006136   020124
 1510  006140   020040  020040  020040  ATCST:  .ASCIZ  '       '
 1511  006146   000040
 1512  006150   047045  020117  052104  INTFAI: .ASCIZ  '%NO DT INTRPT '
 1513  006156   044440  052116  050122
 1514  006164   020124      000
 1515  006167      045  052104  042440  DTERR:  .ASCIZ  '%DT ERR '
 1516  006174   051122  000040
 1517  006200   041040  045514  050522  BLKSB:  .ASCII  ' BLKRQ '
 1518  006206      040
 1519  006207      040  020040  020040  ABLKRQ: .ASCIZ  '       '
 1520  006214   020040      000
 1521  006217      045  041524  041527  WCNOTO: .ASCIZ  '%TCWC NOT 0 '
 1522  006224   047040  052117  030040
 1523  006233   000040
 1524  006234   020040  041103  020101  INCTCB: .ASCIZ  '%TCBA WRONG '
 1525  006242   051127  047117  020107
 1526  006250      000
 1527  006251      040  041524  040502  TCBASB: .ASCII  ' TCBA '
 1528  006256      040
 1529  006257      040  020040  020040  ATCBAS: .ASCIZ  '       '
 1530  006264   020040  000040
 1531  006270   042045  052101  020101  DATERR: .ASCII  '%DATA ERR  WORD '
 1532  006276   051105  020122  053440
 1533  006304   051117  020104
 1534  006310   020040  020040  020056  AWDCNT: .ASCII  '    .  S B '
 1535  006316   051440  041057      040  ADATSB: .ASCII  '        WAS '
 1536  006323      040  020040  020040
 1537  006330   020040  053440  051501
 1538  006336      040
 1539  006337      040  020040  020040  ADATWS: .ASCIZ  '       '
 1540  006344   000040
 1541  006346   051045  054504  042457  STCMSG: .ASCIZ  '%RDY ERR NOT C AFTER DO '
 1542  006354   051122  047040  052117
 1543  006362   030040  040440  052106
 1544  006370   051105  042040  020117
 1545  006376      000
 1546  006377      045  050125  020123  EMSGO:  .ASCIZ  '%UPS DIDNT SET '
 1547  006404   044440  047104  020124
 1548  006412   042523  020124      000
 1549  006417      045  051120  046505  EMSGOA: .ASCIZ  '%PREMATURE UPS '
 1550  006424   052101  051125  020105
 1551  006432   050125  020123      000  EMSG1:  .ASCIZ  '%UPS DIDNT CLEAR '
 1552  006437      045  050125  020123
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006444  044504  047104  020124
006452  046103  040505  020122
006460     000
006461     045  047122  046525  EMSG2:  .ASCIZ  '%RNUM FAILURE '
006466  043040  044501  052514
006474  042522  000040
006500  042445  042116  027132  EMSG3:  .ASCIZ  '%ENDZ. NO INTRPT '
006506  047040  020117  047111
006514  051124  052120  000040
006522  042445  042116  020132  EMSG4:  .ASCIZ  '%ENDZ DIDNT SET '
006530  044504  047104  020124
006536  042523  020124     000
006543     045  047105  055104  EMSG5:  .ASCIZ  '%ENDZ. UPS NOT 0 '
006550  020056  050125  020123
006556  047516  020124  020060
006564     000
006565     045  051120  046505  EMSG6:  .ASCIZ  '%PREMATURE ENDZ. LAST BLK READ '
006572  052101  051125  020105
006600  047105  055104  020056
006606  040514  052123  041040
006614  045514  051040  040505
006622  020104     000
006625     045  047111  020124  EMSG7:  .ASCIZ  '%INT AFTER BLK 1101 NOT DUE TO ENDZ '
006632  043101  042524  020122
006640  046102  020113  030461
006646  030460  047040  052117
006654  042040  042525  052040
006662  020117  047105  055104
006670  000040
006672  041045  045514  047040  SRCHER: .ASCIZ  '%BLK NOT FOUND. '
006700  052117  043040  052517
006706  042116  020056     000
006713     040  050106  020103  FPCMSG: .ASCII  ' FPC '
006720  020040  020040  020040  AFPC:   .ASCIZ  '      %'
006726  000045
006730  022445     000          CRLF:   .ASCIZ  '%%'
006733     045  047516  052440  NOUNIT: .ASCIZ  '%NO UNITS AVAILABLE.'
006740  044516  051524  040440
006746  040526  046111  041101
006754  042514  000056
006760  053445  046111  020114  GOOD:   .ASCIZ  '%WILL TEST UNITS: '
006766  042524  052123  052440
006774  044516  051524  020072
007002     000
007003     040  000054          GTAPES: .ASCIZ  ', '
007006     060     061     062  GTAB:   .BYTE   '0,'1,'2,'3,'4,'5,'6,'7
007011     063     064     065
007014     066     067
                                        .EVEN
```

```
                                        ;*****************************************************************
007016  000000                          T0:     0                       ;ROUTINE NUMBER 0               *
007020  007150                                  T1                      ;ADDRESS OF NEXT ROUTINE        *
007022  000012                                  10.                     ;TEST ITERATION COUNT           *
007024  007026                                  AA                      ;SCOPE ENTRY POINT              *
                                                .LIST
                                        ;*****************************************************************
                                        ;TEST THAT ISSUING RNUM-FWD-NODO, AND RNUM-REV-NODO CAUSE UPS TO SET
                                        ; CHECK THAT ISSUING SST COMMAND CAUSES UPS TO CLEAR.
007026  012767  000002  000022          AA:     MOV     #RNUM!FWD,ABA   ;SET UP FORWARD RNUM COMMAND.
007034  004767  000014                          JSR     PC,AB
007040  012767  004002  000010                  MOV     #RNUM!REV,ABA   ;SET UP REVERSE RNUM COMMAND.
007046  004767  000002                          JSR     PC,AB
007052  104000                                  SCOPE                   ;SCOPE.
007054  104017                          AB:     SETCOM                  ;ISSUE COMMAND.
007056  000000                          ABA:    OPEN                    ;COMMAND GOES HERE.
007060  104000                                  SCOPE                   ;SETCOM ERROR.
007062  104016                          ABAA:   DELAY                   ;WAIT.
007064  104023                                  CKERRZ                  ;CHECK FOR ERRORS.
007066  104000                                  SCOPE                   ;ERROR RETURN.
007070  000411                                  BR      ABC             ;ENDZ RETURN.
007072  032777  000200  171704                  BIT     #BIT7,@TCST     ;UPS SET?
007100  001005                                  BNE     ABC             ;BR IF SET.
007102  104012                                  ERRORN                  ;ERROR.  UPS FAILED TO SET AFTER
007104  006377                                  EMSGO                   ;ISSUING RNUM-WD-NO- DO, OR AFTER
007106  006115                                  STAT                    ;RNUM!REV!NO-DO. CHECK TYPED STATUS
007110  177777                                  -1
007112  104000                                  SCOPE                   ;SCOPE.
007114  104017                          ABC:    SETCOM                  ;ISSUE SST
007116  000010                                  SST
007120  104000                                  SCOPE                   ;SETCOM ERROR.
007122  104020                                  STATUS                  ;SAVE TCCM AND TCST
007124  032777  000200  171652                  BIT     #BIT7,@TCST     ;UPS CLEAR?
007132  001405                                  BEQ     AC              ;BR IF CLEAR.
007134  104012                                  ERRORN                  ;ERROR. UPS FAILED TO CLEAR.
007136  006437                                  EMSG1                   ;AFTER ISSUING SST-DO
007140  006115                                  STAT
007142  177777                                  -1
007144  104000                                  SCOPE                   ;SCOPE
007146  000207                          AC:     RTS     PC              ;EXIT.
                                        ;*****************************************************************
007150  000001                          T1:     1                       ;ROUTINE NUMBER 1               *
007152  007314                                  T2                      ;ADDRESS OF NEXT ROUTINE        *
007154  000012                                  10.                     ;TEST ITERATION COUNT           *
007156  007160                                  BA                      ;SCOPE ENTRY POINT              *
                                                .LIST
                                        ;*****************************************************************
                                        ;TEST THAT WHEN RNUM COMMAND INTERRUPTS VALID DATA HAS BEEN
                                        ;TRANSFERRED TO THE DATA REGISTER.
007160  012767  000103  000034          BA:     MOV     #RNUM!FWD!IE!DO,BBA     ;SET UP FORWARD RNUM.
007166  004767  000014                          JSR     PC,BB
007172  012767  004103  000022                  MOV     #RNUM!REV!IE!DO,BBA     ;SET UP REV RNUM.
007200  004767  000002                          JSR     PC,BB
007204  104000                                  SCOPE
007206  104015                          BB:     SVECTR                  ;SET INTERRUPT VECTOR TO
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 1659  007310  007234                          BC
 1660  007312  012777  177777  171574          MOV     #-1,@TCDT       ;SET TCDT TO ALL 1'S
 1661  007320  104017                          SETCOM                  ;ISSUE RNUM!FWD!IE!DO
 1662  007322  000000                  BBA:    OPEN                    ;RNUM!FWD!IE!DO, OR RNUM!REV!IE!DO
 1663  007324  104000                          SCOPE                   ;SETCOM ERROR.
 1664  007326  104016                          DELAY                   ;WAIT.
 1665  007330  104027                          NOINT                   ;RNUM!FWD!IE!DO OR RNUM!REV!IE!DO FAILED
 1666                                                                  ;TO INTERRUPT.  IF IN PRINTED TCOM
 1667                                                                  ;THE READY BIT IS SET, ERROR DUE
 1668                                                                  ;TO INTERRUPT FAILURE.
 1669  007332  104000                          SCOPE                   ;SCOPE.
 1670  007334  012716  007342          BC:     MOV     #BD,(6)         ;HERE WHEN INTERRUPT OCCURS.
 1671  007340  000002                          RTI                     ;EXIT TO BD.
 1672  007342  022626                  BD:     POPSP2                  ;RESTORE STACK.
 1673  007344  104023                          CKERR2                  ;ERROR?
 1674  007346  104000                          SCOPE                   ;HERE IF ERROR.
 1675  007350  000413                          BR      BF              ;ENDZ RETURN.
 1676  007352  022777  177777  171534          CMP     #-1,@TCDT       ;IS TCDT STILL A -1?
 1677  007360  001007                          BNE     BE              ;NO.  OK
 1678  007362  104024                  BCA:    SAVDTR                  ;SAVE TCDT.
 1679  007364  104012                          ERRORN                  ;TCDT STILL -1. ERROR RNUM FAILED
 1680  007366  006461                          EMSG2                   ;TO READ BLOCK # INTO TCDT, OR
 1681  007370  006115                          STAT                    ;DATA IN TCDT IS NOT BETWEEN
 1682  007372  006057                          CTCDT                   ;0 AND 1101. (CHECK TYPED TCDT).
 1683  007374  177777                          -1
 1684  007376  104000                          SCOPE                   ;SCOPE.
 1685  007400  027727  171510  001101  BE:     CMP     @TCDT,#1101     ;BLOCK BETWEEN 0 AND 1101?
 1686  007406  101365                          BHI     BCA             ;BR IF NOT (ERROR).
 1687  007410  104021                  BF:     STOPDT                  ;ALL STOP.
 1688  007412  000207                          RTS     PC              ;EXIT.
 1689                                  ;*****************************************************************************
 1690  007414  000002                  T2:     2                       ;ROUTINE NUMBER 2                           *
 1691  007416  007552                          T3                      ;ADDRESS OF NEXT ROUTINE                    *
 1692  007420  000012                          10.                     ;TEST ITERATION COUNT                       *
 1693  007422  007424                          CA                      ;SCOPE ENTRY POINT                          *
 1694                                          .LIST
 1695                                  ;*****************************************************************************
 1696                                  ;TEST ABILITY TO DETECT REV ENDZ, BUT NOT BEFORE BLOCK # 0 HAS BEEN READ.
 1697  007424  104017                  CA:     SETCOM                  ;ISSUE RNUM!FWD!DO.
 1698  007426  000003                          RNUM!FWD!DO
 1699  007430  104000                          SCOPE                   ;SETCOM ERROR.
 1700  007432  104016                  CAB:    DELAY                   ;WAIT.
 1701  007434  104023                          CKERRZ                  ;CHECK FOR ERROR
 1702  007436  104000                          SCOPE                   ;HERE IF ERROR
 1703  007440  000240                          NOP                     ;ENDZ RETURN.
 1704  007442  005777  171446                  TST     @TCDT           ;BLOCK 0?
 1705  007446  001766                          BEQ     CA              ;YES.  GO PAST BLOCK 0
 1706  007450  104015                          SVECTR                  ;NO.  SET INTERRUPT VECTOR TO CD
 1707  007452  007376                          CD
 1708  007454  104017                          SETCOM                  ;ISSUE RNUM!REV!IE!DO.
 1709  007456  004103                          RNUM!REV!IE!DO
 1710  007460  104000                          SCOPE                   ;SETCOM ERROR.
 1711  007462  000402                          BR      CCB
 1712  007464  005277  171416          CCA:    INC     @TCOM           ;ISSUE DO.
 1713  007470  104016                  CCB:    DELAY                   ;TIME OUT INTERRUPT.
 1714  007472  104027                          NOINT                   ;INTERRUPT FAILURE.
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 1715  007374  104000                        SCOPE
 1716  007376  012716  007404          CD:   MOV     #CE,(6)         ;HERE WHEN INTERRUPT OCCURS.
 1717  007402  000002                        RTI                     ;EXIT TO CE.
 1718  007404  022626                  CE:   POPSP2                  ;RESTORE STACK.
 1719  007406  005777  171374                TST     @TCCM           ;ERR BIT SET?
 1720  007412  100003                        BPL     CEA             ;BR IF NOT.
 1721  007414  104023                        CKERRZ                  ;CHECK FOR ERROR
 1722  007416  104000                        SCOPE                   ;HERE IF ERROR
 1723  007420  104053                        FRMEND                  ;PREMATURE REV ENDZ.
 1724  007422  017767  171366  171432  CEA:  MOV     @TCDT,BLKRQ     ;SAVE BLOCK NUMBER.
 1725  007430  005777  171360                TST     @TCDT           ;BLOCK 0?
 1726  007434  001353                        BNE     CCA             ;BR IF NOT.  (KEEP LOOKING FOR BLOCK 0).
 1727  007436  104015                        SVECTR                  ;SET INTERRUPT VECTOR TO CH
 1728  007440  007522                        CH
 1729  007442  104016                        DELAY                   ;WAIT FOR POSSIBLE ENDZ INTERRUPT.
 1730  007444  104020                        STATUS                  ;SAVE TCCM AND TCST
 1731  007446  005777  171332                TST     @TCST           ;ENDZ BIT SET?
 1732  007452  100405                        BMI     CF              ;BR IF ENDZ IS SET.
 1733  007454  104012                        ERRORN                  ;REV END ZONE FAILED TO SET
 1734  007456  006522                        EMSG4                   ;ENDZ BIT.
 1735  007460  006115                        STAT
 1736  007462  177777                        -1
 1737  007464  104000                        SCOPE
 1738  007466  032777  000200  171310  CF:   BIT     #UPS,@TCST      ;UPS CLEAR?
 1739  007474  001405                        BEQ     CG              ;BR IF UPS CLEAR
 1740  007476  104012                  CFA:  ERRORN                  ;GETTING TO REV ENDZ FAILED TO
 1741  007500  006543                        EMSG5                   ;CLEAR UPS.
 1742  007502  006115                        STAT
 1743  007504  177777                        -1
 1744  007506  104000                        SCOPE                   ;SCOPE
 1745  007510  104012                  CG:   ERRORN                  ;ENDZ BIT FAILED TO CAUSE
 1746  007512  006500                        EMSG3                   ;INTERRUPT.  (CHECK TYPED TCCM
 1747  007514  006115                        STAT                    ;TO SEE IF ERROR BIT SET).
 1748  007516  177777                        -1
 1749  007520  104000                        SCOPE                   ;SCOPE.
 1750  007522  012716  007530          CH:   MOV     #CI,(6)         ;HERE IF INTERRUPT OCCURS.
 1751  007526  000002                        RTI                     ;EXIT TO CI.
 1752  007530  022626                  CI:   POPSP2                  ;RESTORE STACK.
 1753  007532  104023                        CKERRZ                  ;CHECK FOR ERROR OR ENDZ
 1754  007534  104000                        SCOPE                   ;HERE IF ERROR
 1755  007536  000240                        NOP
 1756  007540  032777  000200  171236        BIT     #UPS,@TCST      ;HERE IF ENDZ.  UPS CLEAR?
 1757  007546  001353                        BNE     CFA             ;BR IF UPS NOT CLEAR.
 1758  007550  104000                        SCOPE                   ;SCOPE.
 1759
 1760                          ;*****************************************************************
 1761  007552  000003          T3:   3                               ;ROUTINE NUMBER 3               *
 1762  007554  007706                4                               ;ADDRESS OF NEXT ROUTINE        *
 1763  007556  000001                1                               ;TEST ITERATION COUNT           *
 1764  007560  007562                DA                              ;SCOPE ENTRY POINT              *
 1765                                .LIST
 1766                          ;*****************************************************************
 1767                          ;SEQUENTIALLY SEARCH ALL BLOCK NUMBERS IN FORWARD DIRECTION.
 1768  007562  104025          DA:   REWIND                          ;REWIND TO REV ENDZ.
 1769  007564  104015                SVECTR                          ;SET INTERRUPT VECTOR TO DB
 1770  007566  007616                DB
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 1771  007570  005067  171266                CLR     BLKRQ           ;1ST EXPECTED BLOCK # TO BLKRQ.
 1772  007574  012767  001102  171242        MOV     #578.,CTRA      ;# OF BLOCKS TO CHECK TO CTRA
 1773  007602  104017                        SETCOM                  ;ISSUE RNUM!FWD!IE!DO
 1774  007604  000103                        RNUM!FWD!IE!DO
 1775  007606  104000                        SCOPE                   ;SETCOM ERROR.
 1776  007610  104016                DAA:    DELAY                   ;TIMEOUT INTERRUPT.
 1777  007612  104027                        NOINT                   ;NO DECTAPE INTERRUPT.
 1778  007614  104000                        SCOPE
 1779  007616  012716  007624        DB:     MOV     #DC,(6)         ;HERE WHEN INTERRUPT OCCURS.  SET
 1780  007622  000002                        RTI                     ;INIT. EXIT TO DC AND EXIT.
 1781  007624  022626                DC:     POPSP2                  ;RESTORE STACK.
 1782  007626  104023                        CKERRZ                  ;CHECK FOR ERROR OR ENDZ
 1783  007630  104000                        SCOPE                   ;HERE IF ERROR.
 1784  007632  104053                        PRMEND                  ;PREMATURE FWD ENDZ.
 1785  007634  104024                        SAVDTR                  ;SAVE TCDT
 1786  007636  026777  171220  171150        CMP     BLKRQ,@TCDT     ;TCDT=EXPECTED BLOCK?
 1787  007644  001407                        BEQ     DD              ;BR IF YES.
 1788  007646  104012                        ERRORN                  ;BLOCK # IN TCDT NOT EQUAL TO
 1789  007650  006461                        EMSG2                   ;EXPECTED BLOCK NUMBER
 1790  007652  006200                        BLKSB
 1791  007654  006057                        CTCDT
 1792  007656  006115                        STAT
 1793  007660  177777                        -1
 1794  007662  104000                        SCOPE                   ;SCOPE
 1795  007664  005267  171172        DD:     INC     BLKRQ
 1796  007670  005367  171150                DEC     CTRA            ;578 BLOCK # TESTED?
 1797  007674  001403                        BEQ     DF              ;BR IF YES.
 1798  007676  105277  171104                INCB    @TCCM           ;ISSUE DO TO CONTINUE RNUM!FWD!IE
 1799  007702  000742                        BR      DAA
 1800  007704  104000                DF:     SCOPE                   ;SCOPE.
 1801
 1802                                        ;*************************************************************************
 1803  007706  000004                T4:     4                       ;ROUTINE NUMBER 4                       *
 1804  007710  010116                        T5                      ;ADDRESS OF NEXT ROUTINE                *
 1805  007712  000012                        10.                     ;TEST ITERATION COUNT                   *
 1806  007714  007716                        EA                      ;SCOPE ENTRY POINT                      *
 1807                                        .LIST
 1808                                        ;*************************************************************************
 1809                                        ;TEST ABILITY TO DETECT FWD ENDZ, BUT NOT BEFORE BLOCK 1101 HAS BEEN READ.
 1810  007716  104025                EA:     REWIND                  ;GO TO REV ENDZ.
 1811  007720  000404                        BR      EAA
 1812  007722  104017                        SETCOM                  ;ISSUE RNUM!REV!DO
 1813  007724  004003                        RNUM!REV!DO
 1814  007726  104000                        SCOPE                   ;SETCOM ERROR.
 1815  007730  104016                        DELAY                   ;WAIT.
 1816  007732  012777  177777  171054  EAA:  MOV     #-1,@TCDT       ;-1 TO TCDT.
 1817  007740  104015                        SVECTR                  ;OK RETURN
 1818  007742  007760                        EC
 1819  007744  104017                        SETCOM                  ;ISSUE RNUM!FWD!IE!DO
 1820  007746  000103                        RNUM!FWD!IE!DO
 1821  007750  104000                        SCOPE                   ;SETCOM ERROR.
 1822  007752  104016                EB:     DELAY
 1823  007754  104027                        NOINT                   ;FAILURE TO INTERRUPT.
 1824  007756  104000                        SCOPE
 1825  007760  012716  007766        EC:     MOV     #ED,(6)
 1826  007764  000002                        RTI                     ;EXIT INTERRUPT
```

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 1827  007766  022626                    ED:     POPSP2                  ;RESTORE STACK.
 1828  007770  104023                            CKERRZ                  ;CHECK FOR ERRORS.
 1829  007772  104000                            SCOPE                   ;ERROR RETURN
 1830  007774  104053                            PRMEND                  ;PREMATURE FWD ENDZ.
 1831  007776  017767  171012  171056            MOV     @TCDT.BLKRQ     ;SAVE BLOCK NUMBER.
 1832  010004  022777  001101  171002            CMP     #1101,@TCDT     ;BLOCK 1101 (577(10))
 1833  010012  001403                            BEQ     EE              ;BR IF BLOCK 1101 FOUND.
 1834  010014  105277  170766                    INCB    @TCCM           ;NOT YET. CONTINUE SEARCH.
 1835  010020  000754                            BR      EB
 1836  010022  104015                    EE:     SVECTR                  ;SET INTERRUPT VECTOR TO EH.
 1837  010024  010064                            EH
 1838  010026  104016                            DELAY                   ;TIMEOUT INTERRUPT
 1839  010030  104020                            STATUS                  ;SAVE TCCM AND TCST
 1840  010032  005777  170746                    TST     @TCST           ;ENDZ SET?
 1841  010036  100405                            BMI     EF              ;BR IF SET.
 1842  010040  104012                            ERRORN                  ;FWD ENDZ FAILED TO SET ENDZ BIT.
 1843  010042  006522                            EMSG4
 1844  010044  006115                            STAT
 1845  010046  177777                            -1
 1846  010050  104000                            SCOPE                   ;SCOPE.
 1847  010052  104012                    EF:     ERRORN                  ;ENDZ BIT FAILED TO CAUSE
 1848  010054  006500                            EMSG3                   ;INTERRUPT.  CHECK TYPED TCCM
 1849  010056  006115                            STAT                    ;TO SEE IF ERROR BIT SET.
 1850  010060  177777                            -1
 1851  010062  104000                            SCOPE                   ;SCOPE.
 1852  010064  012716  010072            EH:     MOV     #EI,(6)         ;HERE WHEN INTERRUPT OCCURS.  SET
 1853  010070  000002                            RTI                     ;INT. EXIT POINTER TO EI AND EXIT.
 1854  010072  022626                    EI:     POPSP2                  ;RESTORE STACK.
 1855  010074  104023                            CKERRZ                  ;CHECK FOR ERRORS
 1856  010076  104000                            SCOPE                   ;ERROR RETURN
 1857  010100  000404                            BR      EK              ;ENDZ RETURN
 1858  010102  104012                            ERRORN                  ;ERROR.  INTERRUPT AFTER BLOCK 1101 NOT
 1859  010104  006625                            EMSG7                   ;DUE TO ENDZ.
 1860  010106  006115                            STAT
 1861  010110  177777                            -1
 1862  010112  104021                    EK:     STOPDT                  ;ALL STOP
 1863  010114  104000                            SCOPE                   ;SCOPE
 1864                                     ;*****************************************************************************
 1865  010116  000005                    T5:     5                       ;ROUTINE NUMBER 5                           *
 1866  010120  010254                            T6                      ;ADDRESS OF NEXT ROUTINE                    *
 1867  010122  000001                            1                       ;TEST ITERATION COUNT                       *
 1868  010124  010126                            EEA                     ;SCOPE ENTRY POINT                          *
 1869                                             .LIST
 1870                                     ;*****************************************************************************
 1871                                     ;SEQUENTIALLY SEARCH ALL BLOCK NUMBERS IN REVERSE DIRECTION.
 1872  010126  104026                    EEA:    WIND                    ;GO TO FWD ENDZ.
 1873  010130  104015                            SVECTR                  ;SET INTERRUPT VECTOR TO EEB.
 1874  010132  010164                            EEB
 1875  010134  012767  001101  170720            MOV     #577.,BLKRQ     ;START WITH BLK# 577.
 1876  010142  012767  001102  170674            MOV     #578.,CTRA      ;# OF BLOCKS TO CHECK TO CTRA.
 1877  010150  104017                            SETCOM                  ;ISSUE RNUM!REV!IE!DO.
 1878  010152  004103                            RNUM!REV!IE!DO
 1879  010154  104000                            SCOPE                   ;SETCOM ERROR.
 1880  010156  104016                    EEAA:   DELAY                   ;TIME OUT INTERRUPT.
 1881  010160  104027                            NOINT                   ;FAILURE TO INTERRUPT.
 1882  010162  104000                            SCOPE
```

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 1883  010164  012716  010172          EEB:    MOV     #EEC,(6)        ;HERE WHEN INTERRUPT OCCURS.
 1884  010170  000002                  RTI                             ;EXIT TO EEC.
 1885  010172  022626                  EEC:    POPSP2                  ;RESTORE STACK.
 1886  010174  104023                          CKERRZ                  ;ERROR OR ENDZ?
 1887  010176  104000                          SCOPE                   ;ERROR RETURN.
 1888  010200  104053                          PRMEND                  ;PREMATURE REV ENDZ.
 1889  010202  104024                          SAVDTR                  ;SAVE TCDT.
 1890  010204  026777  170652  170602          CMP     BLKRQ,@TCDT     ;EXPECTED AND ACTUAL BLK#'S SAME?
 1891  010212  001407                          BEQ     EED             ;BR IF SAME.
 1892  010214  104012                          ERRORN                  ;BLOCK# IN TCDT NOT EQUAL TO
 1893  010216  006461                          EMSG2                   ;EXPECTED BLOCK#.
 1894  010220  006200                          BLKSB
 1895  010222  006057                          CTCDT
 1896  010224  006115                          STAT
 1897  010226  177777                          -1
 1898  010230  104000                          SCOPE
 1899  010232  005367  170624          EED:    DEC     BLKRQ           ;DECREMENT EXPECTED BLK#.
 1900  010236  005367  170602                  DEC     CTRA            ;CHECKED 578 BLOCKS?
 1901  010242  001403                          BEQ     EEF             ;BR IF YES.
 1902  010244  005277  170536                  INC     @TCCM           ;ISSUE DO TO CONTINUE SEARCH.
 1903  010250  000742                          BR      EEAA
 1904  010252  104000                  EEF:    SCOPE
 1905                                  ;*****************************************************************
 1906  010254  000006                  T6:     6                       ;ROUTINE NUMBER 6                *
 1907  010256  010426                          T7                      ;ADDRESS OF NEXT ROUTINE         *
 1908  010260  000001                          1                       ;TEST ITERATION COUNT            *
 1909  010262  010264                          FA                      ;SCOPE ENTRY POINT               *
 1910                                          .LIST
 1911                                  ;*****************************************************************
 1912                                  ;SEARCH FORWARD.  READ EVERY ELEVENTH BLOCK # AND CHECK THAT IT MATCHES
 1913                                  ;WITH EXPECTED BLOCK.
 1914  010264  104025                  FA:     REWIND                  ;REWIND TO REV ENDZ.
 1915  010266  012767  000062  170550          MOV     #50.,CTRA
 1916  010274  012767  000013  170544          MOV     #11.,CTRB
 1917  010302  012767  000012  170552          MOV     #10.,BLKRQ
 1918  010310  104015                          SVECTR                  ;SET INTERRUPT VECTOR TO FB.
 1919  010312  010330                          FB
 1920  010314  104017                          SETCOM                  ;ISSUE RNUM!FWD!IE!DO
 1921  010316  000103                          RNUM!FWD!IE!DO
 1922  010320  104000                          SCOPE                   ;SETCOM ERROR.
 1923  010322  104016                  FAA:    DELAY                   ;TIME OUT INTERRUPT
 1924  010324  104027                          NOINT                   ;FAILURE TO INTERRUPT
 1925  010326  104000                          SCOPE                   ;SCOPE.
 1926  010330  012716  010336          FB:     MOV     #FC,(6)         ;HERE WHEN INTERRUPT OCCURS. SET
 1927  010334  000002                  RTI                             ;EXIT TO FC AND EXIT.
 1928  010336  022626                  FC:     POPSP2                  ;RESTORE STACK.
 1929  010340  104023                          CKERRZ                  ;CHECK FOR ERRORS
 1930  010342  104000                          SCOPE                   ;ERROR RETURN.
 1931  010344  104053                          PRMEND                  ;PREMATURE FWD ENDZ.
 1932  010346  005367  170474                  DEC     CTRB            ;ELEVENTH BLOCK?
 1933  010352  001403                          BEQ     FD              ;BR IF YES.
 1934  010354  005277  170426          FCA:    INC     @TCCM           ;NO. CONTINUE
 1935  010360  000760                          BR      FAA
 1936  010362  104024                  FD:     SAVDTR                  ;SAVE TCDT.
 1937  010364  026777  170472  170422          CMP     BLKRQ,@TCDT     ;BLKRQ=TCDT?
 1938  010372  001402                          BEQ     FE              ;BR IF SAME.
```

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1939  010374  104034                          WRNGBK                  ;THE BLOCK NOT THE EXPECTED BLOCK.
1940  010376  104000                          SCOPE                   ;SCOPE
1941  010400  062767  000013  170454  FE:     ADD     #11.,BLKRQ      ;SET UP BCKRQ TO NEXT EXPECTED BLOCK.
1942  010406  012767  000013  170432          MOV     #11.,CTRB       ;RESET CTRB TO 11.
1943  010414  005367  170424                  DEC     CTRA            ;DONE 50 TIMES?
1944  010420  001355                          BNE     FCA             ;BR IF NOT.
1945  010422  104021                          STOPDT                  ;DONE TO. ALL STOP.
1946  010424  104000                          SCOPE                   ;SCOPE
1947                                  ;*****************************************************************
1948  010426  000007                  T7:     7                       ;ROUTINE NUMBER 7                *
1949  010430  010600                          T10                     ;ADDRESS OF NEXT ROUTINE         *
1950  010432  000001                          1                       ;TEST ITERATION COUNT            *
1951  010434  010436                          GA                      ;SCOPE ENTRY POINT               *
1952                                          .LIST
1953                                  ;*****************************************************************
1954                                  ;SEARCH REVERSE.  READ EVERY 11TH BLOCK # AND CHECK THAT IT MATCHES
1955                                  ;WITH EXPECTED BLOCK.
1956  010436  104026                  GA:     WIND                    ;GO TO FWD ENDZ.
1957  010440  012767  000062  170376          MOV     #50.,CTRA
1958  010446  012767  000013  170372          MOV     #11.,CTRB
1959  010454  012767  001067  170400          MOV     #567.,BLKRQ     ;1ST EXPECTED BLK # TO BLKRQ
1960  010462  104015                          SVECTR                  ;SET INTERRUPT VECTOR TO GB.
1961  010464  010502                          GB
1962  010466  104017                          SETCOM                  ;ISSUE RNUM!REV!IE!DO
1963  010470  004103                          RNUM!REV!IE!DO
1964  010472  104000                          SCOPE                   ;SETCOM ERROR.
1965  010474  104016                  GAA:    DELAY                   ;TIME OUT INTERRUPT
1966  010476  104027                          NOINT                   ;FAILURE TO INTERRUPT
1967  010500  104000                          SCOPE                   ;SCOPE
1968  010502  012716  010510          GB:     MOV     #GC,(6)         ;HERE WHEN INTERRUPT OCCURS. SET
1969  010506  000002                          RTI                     ;EXIT TO GC AND EXIT
1970  010510  022626                  GC:     POPSP2                  ;RESTORE STACK.
1971  010512  104023                          CKERRZ                  ;CHECK FOR ERROR OR ENDZ.
1972  010514  104000                          SCOPE                   ;HERE IF ERROR
1973  010516  104053                          PRMEND                  ;PREMATURE REV ENDZ.
1974  010520  005367  170322                  DEC     CTRB            ;ELEVENTH BLOCK?
1975  010524  001403                          BEQ     GD              ;BR IF YES.
1976  010526  005277  170254          GCA:    INC     @TCCM           ;NO. CONTINUE
1977  010532  000760                          BR      GAA
1978  010534  104024                  GD:     SAVDTR                  ;SAVE TCDT.
1979  010536  026777  170320  170250          CMP     BLKRQ,@TCDT     ;TCDT SAME AS EXPECTED?
1980  010544  001402                          BEQ     GE              ;BR IF YES.
1981  010546  104034                          WRNGBK                  ;NO BLK# IN TCDT NOT SAME AS
1982  010550  104000                          SCOPE                   ;EXPECTED. SCOPE.
1983  010552  162767  000013  170302  GE:     SUB     #11.,BLKRQ      ;SET UP BLKRQ TO NEXT EXPECTED BLOCK.
1984  010560  012767  000013  170260          MOV     #11.,CTRB       ;RESET CTRB TO 11.
1985  010566  005367  170252                  DEC     CTRA            ;DONE 50 TIMES
1986  010572  001355                          BNE     GCA             ;BR IF NOT
1987  010574  104021                          STOPDT                  ;DONE 50.  ALL STOP.
1988  010576  104000                          SCOPE                   ;SCOPE
1989                                  ;*****************************************************************
1990  010600  000010                  T10:    10                      ;ROUTINE NUMBER 10               *
1991  010602  010732                          T11                     ;ADDRESS OF NEXT ROUTINE         *
1992  010604  000001                          1.                      ;TEST ITERATION COUNT            *
1993  010606  010610                          HA                      ;SCOPE ENTRY POINT               *
1994                                          .LIST
```

```
                                        ;*****************************************************************************
                                        ;FORWARD STOP-START TEST. FROM STAND STILL THE FIRST BLOCK # READ
                                        ;MUST NOT BE MORE THAN 5 BLOCKS AWAY FROM PREVIOUSLY READ BLOCK.
010610  104025                  HA:    REWIND                  ;REWIND TO REV ENDZ.
010612  012767  000024  170224          MOV     #20.,CTRA       ;TIMES TO DO TEST TO CTRA.
010620  012767  000000  170234          MOV     #0,BLKRQ        ;SET EXPECTED BLOCK TO 0
010626  104015                          SVECTR                  ;SET INTERRUPT VECTOR TO HB.
010630  010646                          HB
010632  104017                  HAA:    SETCOM                  ;ISSUE RNUM!FWD!IE!DO.
010634  000103                          RNUM!FWD!IE!DO
010636  104000                          SCOPE                   ;SETCOM ERROR.
010640  104016                          DELAY                   ;TIME OUT INTERRUPT
010642  104027                          NOINT                   ;FAILURE TO INTERRUPT
010644  104000                          SCOPE                   ;SCOPE
010646  012716  010654          HB:    MOV     #HC,(6)         ;HERE WHEN INTERRUPT OCCURS EXIT
010652  000002                          RTI                     ;TO HC.
010654  022626                  HC:    POPSP2                  ;RESTORE STACK.
010656  104023                          CKERRZ                  ;CHECK FOR ERROR OR ENDZ.
010660  104000                          SCOPE
010662  104053                          PRMEND                  ;PREMATURE FWD ENDZ.
010664  104021                          STOPDT                  ;ALL STOP
010666  104024                          SAVDTR                  ;SAVE TCDT.
010670  027767  170120  170164          CMP     @TCDT,BLKRQ     ;COMPARE EXPECTED AND CURRENT BLOCKS.
010676  101402                          BLOS    HD              ;BR IF TCDT LOWER OR SAME.
010700  104034                          WRNGBK                  ;BLOCK# READ MORE THAN 5 BLOCKS AWAY
010702  104000                          SCOPE                   ;FROM PREVIOUS BLOCK READ.
010704  017767  170104  170150  HD:    MOV     @TCDT,BLKRQ     ;SAVE CURRENT BLOCK#.
010712  062767  000005  170142          ADD     #5,BLKRQ        ;SET UP FOR NEXT EXPECTED BLOCK
010720  104016                          DELAY                   ;WAIT. INSURE TAPE IS STOPPED.
010722  005367  170116                  DEC     CTRA            ;DONE TIMES REQUIRED?
010726  001341                          BNE     HAA             ;BR IF NOT.
010730  104000                          SCOPE                   ;DONE.  SCOPE.
                                        ;*****************************************************************************
010732  000011                  T11:    11                      ;ROUTINE NUMBER 11                                  *
010734  011064                          T12                     ;ADDRESS OF NEXT ROUTINE                            *
010736  000001                          1.                      ;TEST ITERATION COUNT                               *
010740  010742                          IA                      ;SCOPE ENTRY POINT                                  *
                                        .LIST
                                        ;*****************************************************************************
                                        ;REVERSE STOP-START TEST. FROM STAND STILL THE FIRST BLOCK # READ
                                        ;MUST NOT BE MORE THAN 5 BLOCKS AWAY FROM PREVIOUSLY READ BLOCK.
010742  104026                  IA:    WIND                    ;GO TO FWD ENDZ.
010744  012767  000024  170072          MOV     #20.,CTRA       ;DO TEST 20 TIMES
010752  012767  001101  170102          MOV     #1101,BLKRQ     ;1ST EXPECTED BLOCK # TO BLKRQ
010760  104015                          SVECTR                  ;SET INTERRUPT VECTOR TO IB
010762  011000                          IB
010764  104017                  IAA:    SETCOM                  ;ISSUE RNUM!REV!IE!DO
010766  004103                          RNUM!REV!IE!DO
010770  104000                          SCOPE                   ;SETCOM ERROR.
010772  104016                          DELAY                   ;TIME OUT INTERRUPT
010774  104027                          NOINT                   ;FAILURE TO INTERRUPT
010776  104000                          SCOPE                   ;SCOPE
011000  012716  011006          IB:    MOV     #IC,(6)         ;HERE WHEN INTERRUPT OCCURS.
011004  000002                          RTI                     ;EXIT INTERRUPT TO IC.
011006  022626                  IC:    POPSP2                  ;RESTORE STACK.
011010  104023                          CKERRZ                  ;CHECK FOR ERROR OR ENDZ
                                . . .
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2051  011012  104000                        SCOPE                   ;ERROR OR ENDZ RETURN
2052  011014  104053                        PRMEND                  ;PREMATURE REV ENDZ.
2053  011016  104021                        STOPDT                  ;ALL STOP
2054  011020  104024                        SAVDTR                  ;SAVE TCDT.
2055  011022  026777  170034  167764        CMP     BLKRQ,@TCDT     ;TCDT SAME AS EXPECTED BLOCK #?
2056  011030  101402                        BLOS    ID              ;BR IF TCDT EQUAL OR GREATER.
2057  011032  104034                        WRNGBK                  ;BLOCK# READ MORE THAN 5 BLOCKS AWAY
2058  011034  104000                        SCOPE                   ;FROM PREVIOUS BLOCK READ.
2059  011036  017767  167752  170016  ID:   MOV     @TCDT,BLKRQ     ;SAVE CURRENT BLOCK#.
2060  011044  162767  000005  170010        SUB     #5,BLKRQ        ;SET UP FOR NEXT EXPECTED BLOCK
2061  011052  104016                        DELAY                   ;WAIT (INSURE TAPE IS STOPPED).
2062  011054  005367  167764                DEC     CTRA            ;DONE TIMES REQUIRED?
2063  011060  001341                        BNE     IAA             ;BR IF NOT.
2064  011062  104000                        SCOPE                   ;DONE.  SCOPE.
2065                        ;*****************************************************************************
2066  011064  000012        T12:            12                      ;ROUTINE NUMBER 12                      *
2067  011066  011162                       T13                     ;ADDRESS OF NEXT ROUTINE                *
2068  011070  000001                       1.                      ;TEST ITERATION COUNT                   *
2069  011072  011074                       JA                      ;SCOPE ENTRY POINT                      *
2070                                        .LIST
2071                        ;*****************************************************************************
2072                        ;SEARCH FORWARD AND REVERSE ALL BLOCKS USING SRCHF AND SRCHR SUBS.
2073  011074  012767  001102  167742  JA:   MOV     #578.,CTRA      ;SET UP TO SEARCH 578 BLOCKS
2074  011102  012767  177777  167752        MOV     #-1,BLKRQ       ;STARTING WITH BLOCK 0.
2075  011110  005267  167746        JB:     INC     BLKRQ
2076  011114  104032                        SRCHF                   ;FIND FWD BLOCK # SET IN BLKRQ.
2077  011116  104000                        SCOPE                   ;ERROR IN SRCHF.
2078  011120  005367  167720                DEC     CTRA            ;FOUND 578 BLOCKS?
2079  011124  001371                        BNE     JB              ;BR IF NOT.
2080  011126  012767  001102  167710        MOV     #578.,CTRA      ;SET UP TO SEARCH 578 BLOCKS
2081  011134  012767  001102  167720        MOV     #578.,BLKRQ     ;STARTING WITH BLOCK 577.
2082  011142  005367  167714        JC:     DEC     BLKRQ
2083  011146  104033                        SRCHR                   ;FIND REVERSE BLOCK SET IN BLKRQ.
2084  011150  104000                        SCOPE                   ;ERROR IN SRCHR.
2085  011152  005367  167666                DEC     CTRA            ;578 BLOCKS FOUND?
2086  011156  001371                        BNE     JC              ;BR IF NOT.
2087  011160  104000                        SCOPE                   ;DONE. SCOPE.
2088                        ;*****************************************************************************
2089  011162  000013        T13:            13                      ;ROUTINE NUMBER 13                      *
2090  011164  011240                       T14                     ;ADDRESS OF NEXT ROUTINE                *
2091  011166  000024                       20.                     ;TEST ITERATION COUNT                   *
2092  011170  011174                       KA                      ;SCOPE ENTRY POINT                      *
2093                                        .LIST
2094                        ;*****************************************************************************
2095                        ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATA FWD. DATA IS ALL 0'S.
2096  011172  104030                        RNDBLK                  ;RANDOM BLK# TO BLKRQ.
2097  011174  104044        KA:             CLEAR                   ;CLEAR 256 WORD WRITE BUFFER TO 0'S.
2098  011176  013350                        WBUF
2099  011200  000400                        256.
2100  011202  104045                        FILL                    ;CLEAR 256 WORD READ BUFFER TO 1'S.
2101  011204  015420                        RBUF
2102  011206  177777                        -1.
2103  011210  000400                        256.
2104  011212  104037                        WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 256. WORDS
2105  011214  000400                        256.                    ;STARTING AT ADDR WBUF
2106  011216  013350                        WBUF
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                        RDATAF                  ;CALL RDATAF SUB TO READ FWD 256. WORDS
                        256.                    ;AND STORE AT ADDR STARTING AT RBUF
                        RBUF
                        DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
                        RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
                        256.                    ;ERRORS.
                        SCOPE
                ;*******************************************************************
                14:     14                      ;ROUTINE NUMBER 14                    *
                        15                      ;ADDRESS OF NEXT ROUTINE              *
                        20.                     ;TEST ITERATION COUNT                 *
                        CA                      ;SCOPE ENTRY POINT                    *
                        .LIST
                ;*******************************************************************
                ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATAFWD, BINARY COUNT PATTERN.
                        RNDBLK                  ;RANDOM BLK# TO BLKRQ
                        MOV     #WDATAF,SBINTX  ;SET UP WRITE DATA FWD.
                        MOV     #RDATAF,SBINTY  ;SET UP READ DATA FWD.
                LA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TEST.
                        DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
                        RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
                        256.                    ;ERRORS.
                        SCOPE
                ;*******************************************************************
                15:     15                      ;ROUTINE NUMBER 15
                        16                      ;ADDRESS OF NEXT ROUTINE              *
                        20.                     ;TEST ITERATION COUNT                 *
                        MA                      ;SCOPE ENTRY POINT                    *
                        .LIST
                ;*******************************************************************
                ;SINGLE BLOCK TRANSFER TEST. WDATA REV, RDATA REV. BINARY COUNT PATTERN.
                        RNDBLK                  ;RANDOM BLK# TO BLKRQ.
                        MOV     #WDATAR,SBINTX  ;SET UP WRITE DATA REV.
                        MOV     #RDATAR,SBINTY  ;SET UP READ DATA REV.
                MA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TEST.
                        DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
                        RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
                        256.                    ;ERRORS.
                        SCOPE
                ;*******************************************************************
                16:     16                      ;ROUTINE NUMBER 16                    *
                        17                      ;ADDRESS OF NEXT ROUTINE              *
                        20.                     ;TEST ITERATION COUNT                 *
                        NA                      ;SCOPE ENTRY POINT                    *
                        .LIST
                ;*******************************************************************
                ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATA REV. BINARY COUNT PATTERN.
                        RNDBLK                  ;RANDOM BLK# TO BLKRQ.
                        MOV     #WDATAF,SBINTX  ;SET UP WRITE DATA FWD.
                        MOV     #RDATAR,SBINTY  ;SET UP READ DATA REV.
                NA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TRANSFERS.
                        DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF+SIZ.
```

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                                        RBUF+510.               ;CHECK # OF WORDS SPECIFIED, REPORT ERRORS.
                                        256.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
                                        SCOPE
                            ;***********************************************************************
                            T17:        17                      ;ROUTINE NUMBER 17                    *
                                        T20                     ;ADDRESS OF NEXT ROUTINE              *
                                        20.                     ;TEST ITERATION COUNT                 *
                                        DA                      ;SCOPE ENTRY POINT                    *
                                        .LIST
                            ;***********************************************************************
                            ;SINGLE BLOCK TRANSFER TEST. WDATA REV, RDATA FWD. BINARY COUNT PATTERN.
                                        RNDBLK                  ;RANDOM BLK# TO BLKRQ.
                                        MOV     #WDATAR,SBINTX  ;SET UP WRITE DATA REV.
                                        MOV     #RDATAF,SBINTY  ;SET UP READ DATA FWD.
                            DA:         JSR     PC,SBINT        ;GO DO SINGLE BLOCK TRANSFERS.
                                        DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
                                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF+510
                                        RBUF+510.               ;CHECK # OF WORDS SPECIFIED, REPORT ERRORS.
                                        256.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
                                        SCOPE

                            SBINT:      BINFIL                  ;FILL 256 WORD WRITE BUFFER WITH
                                        WBUF                    ;BINARY COUNT PATTERN.
                                        256.
                                        CLEAR                   ;CLEAR 256 WORD READ BUFFER.
                                        RBUF
                                        256.
                            SBINTX:     OPEN                    ;WDATAF OR WDATAR.
                                        LUN6
                                        WBUF                    ;ADDR TO START WRITE FROM.
                            SBINTY:     OPEN                    ;RDATAF OR RDATAR.
                                        LUN6
                                        RBUF                    ;READ 256 WORDS
                                        RTS     PC              ;INTO THIS ADDR AND UP.
                                                                ;EXIT SBINT SUB.
                            ;***********************************************************************
                            T20:        20                      ;ROUTINE NUMBER 20                    *
                                        T21                     ;ADDRESS OF NEXT ROUTINE              *
                                        20.                     ;TEST ITERATION COUNT                 *
                                        PA                      ;SCOPE ENTRY POINT                    *
                                        .LIST
                            ;***********************************************************************
                            ;TWO BLOCK TRANSFER TEST. WDATA FWD, RDATA FWD. BINARY COUNT PATTERN.
                                        MOV     #WDATAF,DBINTX  ;SET UP WDATAF.
                                        MOV     #RDATAF,DBINTY  ;SET UP RDATAF.
                                        CLR     DBINT           ;CLEAR DIFFERENT DIRECTION INDICATOR.
                            PA:         JSR     PC,DBINT        ;GO DO 2 BLOCK TRANSFERS.
                                        DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
                                        WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
                                        RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
                                        512.                    ;ERRORS.
                                        SCOPE
                            ;***********************************************************************
                            T21:        21                      ;ROUTINE NUMBER 21                    *
                                        T22                     ;ADDRESS OF NEXT ROUTINE              *
                                        20.                     ;TEST ITERATION COUNT                 *
                                        DA                      ;SCOPE ENTRY POINT                    *
```

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                                        .LIST
                                ;*******************************************************************
                                ;TWO BLOCK TRANSFER TEST, WDATA REV, RDATA REV. BINARY COUNT PATTERN.
011570  012767  104040  000172          MOV     #WDATAR,DBINTX  ;SET UP WDATAR.
011576  012767  104042  000224          MOV     #RDATAR,DBINTY  ;SET UP RDATAR.
011604  005067  000330                  CLR     DBINTZ          ;CLEAR DIFFERENT DIRECTION INDICATOR.
011610  004767  000132          QA:     JSR     PC,DBINT        ;GO DO 2 BLOCK TRANSFERS.
011614  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
011616  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
011622  015450                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
011626  001000                          512.                    ;ERRORS.
011634  104000                          SCOPE
                                ;*******************************************************************
011636  000022          T22:    22                              ;ROUTINE NUMBER 22                  *
011640  011676                  T23                             ;ADDRESS OF NEXT ROUTINE            *
011642  000024                  20.                             ;TEST ITERATION COUNT               *
011644  011660                  RA                              ;SCOPE ENTRY POINT                  *
                                        .LIST
                                ;*******************************************************************
                                ;TWO BLOCK TRANSFER TEST, WDATA FWD, RDATA REV. BINARY COUNT PATTERN.
011636  012767  104037  000124          MOV     #WDATAF,DBINTX  ;SET UP WDATAF.
011644  012767  104042  000160          MOV     #RDATAR,DBINTY  ;SET UP RDATAR.
011652  012767  177777  000150          MOV     #-1,DBINTZ      ;SET DIFFERENT DIRECTION INDICATOR.
011660  004767  000062          RA:     JSR     PC,DBINT        ;GO DO 2 BLOCK TRANSFERS.
011664  104050                          DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
011666  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF+1022.
011672  017416                          RBUF+1022.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
011676  001000                          512.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
011674  104000                          SCOPE
                                ;*******************************************************************
011676  000023          T23:    23                              ;ROUTINE NUMBER 23                  *
011700  012004                  T24                             ;ADDRESS OF NEXT ROUTINE            *
011702  000024                  20.                             ;TEST ITERATION COUNT               *
011704  011730                  SA                              ;SCOPE ENTRY POINT                  *
                                        .LIST
                                ;*******************************************************************
                                ;TWO BLOCK TRANSFER TEST, WDATA REV, RDATA FWD. BINARY COUNT PATTERN.
011706  012767  104040  000054          MOV     #WDATAR,DBINTX  ;SET UP WDATAR.
011714  012767  104041  000106          MOV     #RDATAF,DBINTY  ;SET UP RDATAF.
011722  012767  177777  000110          MOV     #-1,DBINTZ      ;SET DIFFERENT DIRECTION INDICATOR.
011730  004767  000012          SA:     JSR     PC,DBINT        ;GO DO 2 BLOCK TRANSFERS.
011734  104050                          DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
011736  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF+1022.
011742  017416                          RBUF+1022.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
011746  001000                          512.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
011744  104000                          SCOPE
011746  104046          DBINT:  BINFIL                          ;FILL 512 WORD WRITE BUFFER WITH
011750  013350                  WBUF                            ;BINARY COUNT PATTERN.
011754  001000                  512.
011756  104044                  CLEAR                           ;CLEAR 512 WORD READ BUFFER.
011760  015420                  RBUF
011764  001000                  512.
011766  012767  000310  167072          MOV     #200.,BLKRQ     ;200 TO BLOCK REQUIRED.
011774  000000          DBINTX: OPEN                            ;WDATAF OR WDATAR.
011776  001000                  512.                            ;WRITE 512 WORDS.
012000  013350                  WBUF                            ;ADDR TO START WRITE FROM.
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 02275  011776  005767  000036                TST     DBINTZ          ;DIFF DIR IND SET?
 02276  013002  001412                        BEQ     DBINTY          ;BR IF NOT.
 02277  013002  001412                        BEQ     DBINTY          ;BR IF NOT.
 02300  013004  062767  000001  167050        ADD     #1,BLKRQ        ;ASSUME DT GOING FWD. INC BLKRQ.
 02306  013012  032777  004000  166766        BIT     #REV,@TCCM      ;DT GOING FWD?
 02314  013020  001403                        BEQ     DBINTY          ;BR IF YES.
 02316  013022  162767  000002  167032        SUB     #2.BLKRQ        ;NO. -2 FROM BLKRQ.
 02324  013030  000000            DBINTY: OPEN                    ;RDATAF OR RDATAR.
 02326  013032  001000                    512.                    ;READ 512 WORDS.
 02330  013034  015420                    RBUF                    ;ADDR TO START READING INTO.
 02332  013036  000207                    RTS     PC              ;EXIT DBINT SUB.
 02334  013040  000000            DBINTZ: OPEN                    ;DIFFERENT DIRECTION INDICATOR.
                                ;*****************************************************************
 02336  013042  000024            T24:    24                      ;ROUTINE NUMBER 24                *
 02340  013044  013154                    T25                     ;ADDRESS OF NEXT ROUTINE          *
 02342  013046  000024                    20.                     ;TEST ITERATION COUNT             *
 02344  013050  012062                    TA                      ;SCOPE ENTRY POINT                *
                                        .LIST
                                ;*****************************************************************
                                ;PARTIAL BLOCK TRANSFER TEST. WDATA FWD 1.5 BLOCKS. RDATA FWD 2 BLOCKS.
                                ;BINARY COUNT PATTERN. UNWRITTEN PORTION OF 2ND BLOCK SHOULD BE 0'S.
 02346  012052  104051                    INBIN                   ;INIT BINARY COUNT.
 02350  012054  104044                    CLEAR                   ;CLEAR 512 WORD WRITE BUFFER.
 02352  012056  013350                    WBUF
 02354  012060  001000                    512.
 02356  012062  104046            TA:     BINFIL                  ;FILL 384 WORD WRITE BUFFER WITH
 02360  012064  013350                    WBUF                    ;BINARY COUNT PATTERN.
 02362  012066  000600                    384.
 02364  012070  104044                    CLEAR                   ;CLEAR 512 WORD READ BUFFER.
 02366  012072  015420                    RBUF
 02370  012074  001000                    512.
 02372  012076  104037                    WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 384. WORDS
 02374  012100  000600                    384.                    ;STARTING AT ADDR WBUF
 02376  012102  013350                    WBUF
 02400  012104  104041                    RDATAF                  ;CALL RDATAF SUB TO READ FWD 512. WORDS
 02402  012106  001000                    512.                    ;AND STORE AT ADDR STARTING AT RBUF
 02404  012110  015420                    RBUF
 02406  012112  104047                    DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 02410  012114  013350                    WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
 02412  012116  015420                    RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 02414  012120  001000                    512.                    ;ERRORS.
 02416  012122  104000                    SCOPE
                                ;*****************************************************************
 02420  012124  000025            T25:    25                      ;ROUTINE NUMBER 25                *
 02422  012126  012172                    T26                     ;ADDRESS OF NEXT ROUTINE          *
 02424  012130  000024                    20.                     ;TEST ITERATION COUNT             *
 02426  012132  012154                    UA                      ;SCOPE ENTRY POINT                *
                                        .LIST
                                ;*****************************************************************
                                ;4 BLOCK TRANSFER TEST. WDATA FWD, RDATA FWD. WRITE AND READ BUFFERS ARE
                                ;COMBINED AND USED AS 1024 WORD READ BUFFER. WRITE DATA IS TAKEN FROM THE
                                ;PROGRAM CODE ITSELF STARTING AT SYMBOLIC ADDRESS EMD.
 02430  012134  012767  104037  000232        MOV     #WDATAF,QBINTX  ;SET UP WDATAF.
 02436  012142  012767  104041  000264        MOV     #RDATAF,QBINTY  ;SET UP RDATAF.
 02444  012150  005067  000270                CLR     QBINTZ          ;CLEAR DIFFERENT DIRECTION INDICATOR.
 02450  012154  004767  000200        UA:     JSR     PC,QBINT        ;GO DO 4 BLOCK TRANSFERS.
 02454  012160  104047                        DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
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012162  005464                  EMO                     ;EMO AGAINST DATA STORED AT WBUF
012164  013360                  WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
012166  002000                  1024.                   ;ERRORS.
012170  104000                  SCOPE
                        ;*****************************************************************************
012172  000026          T26:    26                      ;ROUTINE NUMBER 26                          *
012174  012240                  T27                     ;ADDRESS OF NEXT ROUTINE                    *
012176  000024                  20.                     ;TEST ITERATION COUNT                       *
012200  012252                  VA                      ;SCOPE ENTRY POINT                          *
                                .LIST
                        ;*****************************************************************************
                        ;4 BLOCK TRANSFER TEST. WDATA REV. RDATA REV. WRITE AND READ BUFFERS ARE
                        ;COMBINED AND USED AS 1024 WORD READ BUFFER. WRITE DATA IS TAKEN FROM THE
                        ;PROGRAM CODE ITSELF STARTING AT SYMBOLIC ADDRESS EMO.
012202  012767  104040  000164          MOV     #WDATAR,QBINTX  ;SET UP WDATAR.
012210  012767  104042  000216          MOV     #RDATAR,QBINTY  ;SET UP RDATAR.
012216  005067  000222                  CLR     QBINTZ          ;CLEAR DIFFERENT DIRECTION INDICATOR.
012222  004767  000132          VA:     JSR     PC,QBINT        ;GO DO 4 BLOCK TRANSFERS.
012226  104047                  DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
012230  005464                  EMO                     ;EMO AGAINST DATA STORED AT WBUF
012232  013360                  WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
012234  002000                  1024.                   ;ERRORS.
012236  104000                  SCOPE
                        ;*****************************************************************************
012240  000027          T27:    27                      ;ROUTINE NUMBER 27                          *
012242  012310                  T30                     ;ADDRESS OF NEXT ROUTINE                    *
012244  000024                  20.                     ;TEST ITERATION COUNT                       *
012246  012272                  BUA                     ;SCOPE ENTRY POINT                          *
                                .LIST
                        ;*****************************************************************************
                        ;4 BLOCK TRANSFER TEST. WDATAF, RDATAR. WRITE AND READ BUFFERS ARE
                        ;COMBINED AND USED AS 1024 WORD READ BUFFER. WRITE DATA IS TAKEN FROM
                        ;THE PROGRAM CODE ITSELF STARTING AT ADDR EMO.
012250  012767  104037  000116          MOV     #WDATAF,QBINTX  ;SET UP WDATAF.
012256  012767  104042  000150          MOV     #RDATAR,QBINTY  ;SET UP RDATAR.
012264  012767  177777  000152          MOV     #-1,QBINTZ      ;SET DIFFERENT DIRECTION INDICATOR.
012272  004767  000062          BUA:    JSR     PC,QBINT        ;GO DO 4 BLOCK TRANSFERS.
012276  104050                  DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
012300  005464                  EMO                     ;EMO AGAINST DATA STORED AT WBUF+2046.
012302  017346                  WBUF+2046.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
012304  002000                  1024.                   ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
012306  104000                  SCOPE                   ;SCOPE.
                        ;*****************************************************************************
012310  000030          T30:    30                      ;ROUTINE NUMBER 30                          *
012312  012446                  T31                     ;ADDRESS OF NEXT ROUTINE                    *
012314  000024                  20.                     ;TEST ITERATION COUNT                       *
012316  012342                  BVA                     ;SCOPE ENTRY POINT                          *
                                .LIST
                        ;*****************************************************************************
                        ;4 BLOCK TRANSFER TEST. WDATAR, RDATAF. WRITE AND READ BUFFERS ARE
                        ;COMBINED AND USED AS 1024 WORD READ BUFFER. WRITE DATA IS TAKEN FROM
                        ;THE PROGRAM CODE ITSELF STARTING AT ADDR EMO.
012320  012767  104040  000046          MOV     #WDATAR,QBINTX  ;SET UP WDATAR.
012326  012767  104041  000100          MOV     #RDATAF,QBINTY  ;SET UP RDATAF.
012334  012767  177777  000102          MOV     #-1,QBINTZ      ;SET DIFFERENT DIRECTION INDICATOR.
012342  004767  000012          BVA:    JSR     PC,QBINT        ;GO DO 4 BLOCK TRANSFERS.
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                                DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
                                EMO                     ;EMO AGAINST DATA STORED AT WBUF+2046.
                                WBUF+2046.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
                                1024.                   ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
                                SCOPE                   ;SCOPE.

                        QBINT:  CLEAR                   ;CLEAR 1024 WORD READ BUFFER.
                                WBUF
                                1024.
000310  166466                  MOV     #200..BLKRQ     ;200 TO BLOCK REQUIRED.
                        QBINTX: OPEN                    ;WDATAF OR WDATAR.
                                1024.                   ;WRITE 1024 WORDS.
                                EMO                     ;ADDR TO START WRITE FROM.
000036                          TST     QBINTZ          ;DIFF DIR IND SET?
                                BEQ     QBINTY          ;BR IF NOT.
000003  166444                  ADD     #3,BLKRQ        ;ASSUME DT GOING FWD. ADD 3 TO BLKRQ.
004000  166362                  BIT     #REV,DTCOM      ;DT GOING FWD?
                                BEQ     QBINTY          ;BR IF YES.
000006  166426                  SUB     #6,BLKRQ        ;NO. SUB 6 FROM BLKRQ.
                        QBINTY: OPEN                    ;RDATAF OR RDATAR.
                                1024.                   ;READ 1024 WORDS.
                                WBUF                    ;ADDR TO START READING INTO.
                                RTS     PC              ;EXIT QBINT SUB.
                        QBINTZ: OPEN                    ;DIFFERENT DIRECTION INDICATOR.
                        ;*****************************************************************
                        T31:    31                      ;ROUTINE NUMBER 31                      *
                                T32                     ;ADDRESS OF NEXT ROUTINE                *
                                1                       ;TEST ITERATION COUNT                   *
                                WA                      ;SCOPE ENTRY POINT                      *
                                .LIST
                        ;*****************************************************************
                        ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. DATA ALL 0'S.
                                MOV     #ZCSB,SBKSBP
000354                  WA:     JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
000116                          SCOPE                   ;SCOPE.
                        ;*****************************************************************
                        T32:    32                      ;ROUTINE NUMBER 32                      *
                                T33                     ;ADDRESS OF NEXT ROUTINE                *
                                1                       ;TEST ITERATION COUNT                   *
                                XA                      ;SCOPE ENTRY POINT                      *
                                .LIST
                        ;*****************************************************************
                        ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. EACH BLOCK IS WRITTEN WITH
                        ;ITS OWN BLOCK NUMBER.
                                MOV     #WCSB,SBKSBP
000330                  XA:     JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
000072                          SCOPE                   ;SCOPE.
                        ;*****************************************************************
                        T33:    33                      ;ROUTINE NUMBER 33                      *
                                T34                     ;ADDRESS OF NEXT ROUTINE                *
                                1                       ;TEST ITERATION COUNT                   *
                                YA                      ;SCOPE ENTRY POINT                      *
                                .LIST
                        ;*****************************************************************
                        ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS BINARY COUNT PATTERN.
                                MOV     #YCSBB,SBKSBP
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                                        INBIN                   ;INIT BINARY COUNT PATTERN.
                                YA:     BINFIL                  ;FILL 512 WORD WRITE BUFFER WITH
                                        WBUF                    ;BINARY COUNT PATTERN.
                                        512.
                                        JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
                                        SCOPE                   ;SCOPE.
                                ;*******************************************************************
                                T34:    34                      ;ROUTINE NUMBER 34                 *
                                        T35                     ;ADDRESS OF NEXT ROUTINE           *
                                        5                       ;TEST ITERATION COUNT              *
                                        ZA                      ;SCOPE ENTRY POINT                 *
                                        .LIST
                                ;*******************************************************************
                                ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. RANDOM DATA.
                                        MOV     #YCSBB,SBKSBP
                                        INRND                   ;INIT RANDOM NUMBER SUB.
                                ZA:     RNDFIL                  ;FILL 512 WORD WRITE BUFFER WITH
                                        WBUF                    ;RANDOM DATA.
                                        512.
                                        JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
                                        SCOPE                   ;SCOPE.
                                ;
                                ;SUBROUTINE TO WRITE-READ ALL BLOCKS. DOUBLE BLOCK TRANSFERS.
                                ;ROUTINE WRITES 2 BLOCKS FORWARD, SKIPS 2 BLOCKS, WRITES ANOTHER 2 BLOCKS.
                                ;ETC.. SKIPPED BLOCKS ARE WRITTEN IN REVERSE. SAME PROCEDURE
                                ;IS USED FOR READING DATA.
                        SBKSUB: MOV     #145.,CTRA              ;SET UP TO WRITE 2 BLOCKS 145 TIMES.
                                MOV     #-4,BLKRQ               ;STARTING WITH BLOCK 0.
                        SBKSBA: ADD     #4,BLKRQ
                                JSR     PC,@SBKSBP              ;GO SET UP WRITE BUFFER.
                                WDATAF                          ;CALL WDATAF SUB TO WRITE FWD 512. WORDS
                                512.                            ;STARTING AT ADDR WBUF
                                WBUF
                                DEC     CTRA                    ;WRITTEN 145 TIMES?
                                BNE     SBKSBA                  ;BR IF NOT.
                                MOV     #144.,CTRA              ;SET UP TO WRITE 2 BLOCKS IN REV 144 TIMES
                                MOV     #579.,BLKRQ             ;STARTING WITH BLOCK 575.
                        SBKSBB: SUB     #4,BLKRQ
                                JSR     PC,@SBKSBP              ;GO SET UP WRITE BUFFER.
                                WDATAR                          ;CALL WDATAR SUB TO WRITE REV 512. WORDS
                                512.                            ;STARTING AT ADDR WBUF
                                WBUF
                                DEC     CTRA                    ;WRITTEN 144 TIMES?
                                BNE     SBKSBB                  ;BR IF NOT.
                                MOV     #145.,CTRA              ;SET UP TO READ 2 BLOCKS FWD 145 TIMES
                                MOV     #-4,BLKRQ               ;STARTING WITH BLOCK 0.
                        SBKSBC: ADD     #4,BLKRQ
                                JSR     PC,@SBKSBP              ;SET WRITE BUFFER WITH CHECK DATA.
                                RDATAF                          ;CALL RDATAF SUB TO READ FWD 512. WORDS
                                512.                            ;AND STORE AT ADDR STARTING AT RBUF
                                RBUF
                                DATCHK                          ;CALL DATCHK SUB TO CHECK DATA STORED AT
                                WBUF                            ;WBUF AGAINST DATA STORED AT RBUF
                                RBUF                            ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
                                512.                            ;ERRORS.
                                DEC     CTRA                    ;READ 145 TIMES?
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013762  001361                          BNE     SBKSBC          ;BR IF NOT.
013764  012767  000220  166052          MOV     #144.,CTRA      ;SET UP TO READ 2 BLOCKS IN REV 144 TIMES
013772  012767  001103  166062          MOV     #579.,BLKRQ     ;STARTING WITH BLOCK 575.
014000  162767  000004  166054  SBKSBD: SUB     #4,BLKRQ
014006  004777  000026                  JSR     PC,@SBKSBP      ;SET WRITE BUFFER WITH CHECK DATA.
014012  104042                          RDATAR                  ;CALL RDATAR SUB TO READ REV 512. WORDS
014014  001000                          512.                    ;STARTING AT ADDR RBUF
014016  015420                          RBUF
014020  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
014022  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
014024  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
014026  001000                          512.                    ;ERRORS.
014030  005367  166010                  DEC     CTRA            ;READ 144 TIMES?
014034  001361                          BNE     SBKSBD          ;BR IF NOT.
014036  000207                          RTS     PC              ;DONE. EXIT.
014040  000000                  SBKSBP: OPEN                    ;WRITE BUFFER SET UP SUB POINTER.
                                ;SUB TO FILL 512 WORD WRITE BUFFER WITH  # OF BLOCK TO BE WRITTEN, AND
                                ;TO CLEAR 512 WORD READ BUFFER.
014042  016767  166014  000004  WCSB:   MOV     BLKRQ,WCSBA     ;BLK# TO WCSBA
014050  104045                          FILL                    ;FILL WRITE BUFFER WITH DATA IN WCSBA.
014052  013350                          WBUF
014054  000000                  WCSBA:  OPEN
014056  001000                          512.
014060  000400                          BR      YCSBB           ;GO CLEAR READ BUFFER.
                                ;SUB TO CLEAR 512 WORD READ BUFFER.
014062  104044                  YCSBB:  CLEAR                   ;CLEAR 512 WORD READ BUFFER.
014064  015420                          RBUF
014066  001000                          512.
014070  000207                          RTS     PC              ;EXIT.
                                ;SUB TO FILL WRITE BUFFER WITH 0'S AND READ BUFFER WITH 1'S
014072  104044                  ZCSB:   CLEAR                   ;CLEAR 512 WORD WRITE BUFFER.
014074  013350                          WBUF
014076  001000                          512.
014100  104045                          FILL                    ;FILL READ BUFFER WITH 1'S.
014102  015420                          RBUF
014104  177777                          -1
014106  001000                          512.
014110  000207                          RTS     PC              ;EXIT.
;*****************************************************************************
014112  000035                  T35:    35                      ;ROUTINE NUMBER 35                  *
014114  177777                          TLAST                   ;ADDRESS OF NEXT ROUTINE            *
014116  000005                          5                       ;TEST ITERATION COUNT               *
014120  013122                          C1A                     ;SCOPE ENTRY POINT                  *
                                        .LIST
;*****************************************************************************
;4 BLOCK TRANSFER TEST. ALL BLOCKS. WRITE AND READ BUFFER ARE COMBINED
;AND USED AS 1024 WORD READ BUFFER. WRITE DATA IS TAKEN FROM THE PROGRAM
;CODE ITSELF STARTING AT ADDRESS EMO.
013122  012767  000110  165714  C1A:    MOV     #72.,CTRA       ;SET UP TO WRITE 4 BLOCKS FWD 72 TIMES.
013130  012767  177770  165724          MOV     #-8.,BLKRQ      ;STARTING WITH BLOCK 0.
013136  062767  000010  165716  C1B:    ADD     #8.,BLKRQ
013144  104037                          WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 1024. WORDS
013146  002000                          1024.                   ;STARTING AT ADDR EMO
013150  005464                          EMO
013152  005367  165666                  DEC     CTRA            ;WRITTEN 72 TIMES?
013156  001367                          BNE     C1B             ;BR IF NOT.
```

```
 2555  013160  012767  000110  165656          MOV     #72.,CTRA       ;SET UP TO WRITE 4 BLOCKS REV 72 TIMES
 2556  013166  012767  001107  165666          MOV     #583.,BLKRQ     ;STARTING WITH BLOCK 575
 2557  013174  162767  000010  165660  C1C:    SUB     #8.,BLKRQ
 2558  013202  104040                          WDATAR                  ;CALL WDATAR SUB TO WRITE REV 1024. WORDS
 2559  013204  002000                          1024.                   ;STARTING AT ADDR EMO
 2560  013206  005464                          EMO
 2561  013210  005367  165630                  DEC     CTRA            ;WRITTEN 72 TIMES?
 2562  013214  001367                          BNE     C1C             ;BR IF NOT.
 2563  013216  012767  000110  165620          MOV     #72.,CTRA       ;SET UP TO READ 4 BLOCKS FWD 72 TIMES.
 2564  013224  012767  177770  165630          MOV     #-8.,BLKRQ      ;STARTING WITH BLOCK 0.
 2565  013232  062767  000010  165622  C1D:    ADD     #8.,BLKRQ
 2566  013240  104044                          CLEAR                   ;CLEAR 1024 WORD READ BUFFER.
 2567  013242  013350                          WBUF
 2568  013244  002000                          1024.
 2569  013246  104041                          RDATAF                  ;CALL RDATAF SUB TO READ FWD 1024. WORDS
 2570  013250  002000                          1024.                   ;AND STORE AT ADDR STARTING AT WBUF
 2571  013252  013350                          WBUF
 2572  013254  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 2573  013256  005464                          EMO                     ;EMO AGAINST DATA STORED AT WBUF
 2574  013260  013350                          WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 2575  013262  002000                          1024.                   ;ERRORS.
 2576  013264  005367  165554                  DEC     CTRA            ;READ 72 TIMES?
 2577  013270  001360                          BNE     C1D             ;BR IF NOT.
 2578  013272  012767  000110  165544          MOV     #72.,CTRA       ;SET UP TO READ 4 BLOCKS REV 72 TIMES.
 2579  013300  012767  001107  165554          MOV     #583.,BLKRQ     ;STARTING WITH BLOCK 575.
 2580  013306  162767  000010  165546  C1E:    SUB     #8.,BLKRQ
 2581  013314  104044                          CLEAR                   ;CLEAR 1024 WORD READ BUFFER.
 2582  013316  013350                          WBUF
 2583  013320  002000                          1024.
 2584  013322  104042                          RDATAR                  ;CALL RDATAR SUB TO READ REV 1024. WORDS
 2585  013324  002000                          1024.                   ;STARTING AT ADDR WBUF
 2586  013326  013350                          WBUF
 2587  013330  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 2588  013332  005464                          EMO                     ;EMO AGAINST DATA STORED AT WBUF
 2589  013334  013350                          WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 2590  013336  002000                          1024.                   ;ERRORS.
 2591  013340  005367  165500                  DEC     CTRA            ;READ 72 TIMES?
 2592  013344  001360                          BNE     C1E             ;BR IF NOT.
 2593  013346  104000                          SCOPE                   ;DONE. SCOPE.
 2594  013350                          WBUF:
 2595          015420                          .=WBUF+1064.
 2596  015420                          RBUF:
 2597          017440                          .=RBUF+1040.
 2598          000001                          .END
```

```
A      = 100000            451#
AA       007026           1608    1613#
AB       007054           1614    1616    1618#
ABA      007056           1613*   1615*   1619#
ABAA     007062           1621#
ABC      007114           1624    1626    1632#
ABLKRQ   006207            883    1519#
AC       007146           1637    1643#
ACTD     004326           1203*   1209#
ADATSB   006323           1206    1536#
ADATWS   006337           1210    1539#
AFPC     006720            860    1306    1586#
AICNT    005513            875    1449#
AINCRT   005531            714    1454#
APC      005477            967    1446#
APGEND   006017            739    1487#
ASBTCD   006105           1503#
ASETSR   005762            693    1482#
ATCBA    006047            903    1495#
ATCBAS   006257           1278    1529#
ATCCM    006123            891    1507#
ATCDT    006065            895    1499#
ATCST    006140            987    1510#
ATCWC    006031            899    1491#
ATNUMB   005467            871    1444#
AUNIT    005527            879    1453#
AWDCNT   006310           1214    1534#
B      = 040000            452#
BA       007160           1648    1653#
BB       007206           1654    1656    1658#
BBA      007222           1653*   1655*   1662#
BC       007234           1659    1670#
BCA      007262           1678#   1686
BD       007242           1670    1672#
BDCNV  = 104062            627#    873    1212
BDCNVA   003424           1037#   1047
BDCNVB   003426           1038#   1041
BDCNVC   003436           1039    1042#
BDCNVD   003462           1051#   1053
BDCNVV   003404            626    1032#
BE       007300           1677    1685#
BELL   = 000007            446#
BF       007310           1675    1687#
BINFIL = 104046            603#   2184    2265    2299    2444
BINFLA   004452           1253#   1257
BINFLB   004454           1254#   1255
BINFLL   004444            602    1250#
BIT0   = 000001            424#    483    1075    1440
BIT1   = 000002            423#    476     478     480     482    1440
BIT10  = 002000            414#    470     471     472     473     730
BIT11  = 004000            413#    464     486     667     726    1162    1178    1340    1346    1352    1363    1365    1367
BIT12  = 010000            412#    463     485     667
BIT13  = 020000            411#    453     462     906
BIT14  = 040000            410#    452     722
BIT15  = 100000            408     409#    451     655    1073
BIT2   = 000004            422#    477     478     481     482    1440
```

DZTCCA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
BIT3   = 000010   421#   479   480   481   482  1440
BIT4   = 000020   420#  1421  1440
BIT5   = 000040   419#  1421  1440
BIT6   = 000100   418#   474  1440
BIT7   = 000200   417#   484   655  1073  1440  1625  1636
BIT8   = 000400   416#   467   469   471   473
BIT9   = 001000   415#   468   469   472   473   705   734
BLKRQ    001062   517#   882  1160  1170*  1174  1176  1188*  1337  1343  1349  1724*  1771*  1785
                 1795*  1831*  1875*  1890  1899*  1917*  1937  1941*  1959*  1979  1983*  2000*  2017
                 2021*  2022*  2038*  2055  2059*  2060*  2074*  2075*  2091*  2082*  2271*  2277*  2280*
                 2396*  2402*  2405*  2470*  2471*  2479*  2480*  2488*  2489*  2501*  2502*  2517   2543*
                 2549*  2556*  2557*  2564*  2565*  2579*  2580*
BLKSB    006200   1123   1218   1296   1374   1517#  1790   1894
BMOVA    003372   1026#  1029
BMOVE    003362   1022#
BUA      012272   2358   2367#
BVA      012342   2377   2386#
C      = 020000    453#
CA       007324   1693   1697#  1705
CAB      007332   1700#
CCA      007364   1712#  1726
CCB      007370   1711   1713#
CD       007376   1707   1716#
CE       007404   1716   1718#
CEA      007422   1720   1724#
CF       007466   1732   1738#
CFA      007476   1740*  1757
CFPC     004620    586   1303#
CG       007510   1739   1745#
CH       007522   1728   1750#
CHAINN   001704    526    717#
CHALT  = 104013    549#   689   694   715
CHLT     002436    548    842#
CHNA     001742    723    726#
CHNAA    001760    727    730#
CHNAB    001734    724#   729
CHNAC    001724    720    722#
CHNB     001776    731    734#
CHNC     002022    666    740#  746
CI       007530   1750   1752#
CKER     003636    562   1091#
CKERR  = 104022    563#
CKERRZ= 104023     565#  1334  1404  1622  1673  1701  1721  1753  1782  1828  1955  1996  1939
                  1971  2012  2050
CKERZ    003654    564   1098#
CKERZA   003670   1103#  1107
CKERZB   003672   1096   1104#  1113
CKERZC   003676   1101   1106#
CKERZD   003704   1094   1108#
CKWCBA= 104043     597#  1407
CLEAR  = 104044    599#  2097  2187  2268  2296  2302  2393  2524  2529  2566  2581
CLEARR   004402    598   1231#
CNVFPC= 104036     587#
COMND    001072    521#  1069*  1070*  1071*  1072  1075
CPENA    001504    674*   677#   683*   685
CPENB    001526    678    683#
```

```
CRLF    006730          1588#
CTCBA   006041          1271    1285    1493#
CTCDT   006057          1297    1497#   1682    1791    1895
CTCWC   006023          1270    1286    1489#
CTRA    001044           510#   1772*   1796*   1876*   1900*   1915*   1943*   1957*   1985*   1999*   2024*   2037*   2062*
                        2073*   2078*   2080*   2085*   2469*   2476*   2478*   2485*   2487*   2498*   2500*   2511*   2547*
                        2553*   2555*   2561*   2563*   2576*   2578*   2591*
CTRB    001046           511#    675*    684*   1916*   1932*   1942*   1958*   1974*   1984*
CURTST  001042           509#    708     753*
CWCBA   004472           596    1262#
CWCBB   004526          1266    1274#
CWCBC   004570          1275    1289#
C1A     013122          2541    2547#
C1B     013136          2549#   2554
C1C     013174          2557#   2562
C1D     013232          2565#   2577
C1E     013306          2580#   2592
DA      007562          1764    1768#
DAA     007610          1776#   1799
DATCHK= 104047           605#   2110    2127    2144    2209    2226    2311    2330    2349    2494    2507    2572    2597
DATCK   004250           604    1193#
DATCKA  004300          1200#   1226
DATCKB  004362          1201    1223#
DATCKC  004374          1222    1227#
DATCKI= 104050           607#   2161    2178    2243    2260    2368    2387
DATCKK  004256          1192    1194#
DATERR  006270          1219    1531#
DATKNT  004400          1198*   1213    1223*   1229#
DB      007616          1770    1779#
DBINT   011746          2208    2225    2242    2259    2265#
DBINTX  011770          2205*   2222*   2239*   2256*   2272#
DBINTY  012030          2206*   2223*   2240*   2257*   2276    2279    2281#
DBINTZ  012040          2207*   2224*   2241*   2258*   2275    2285#
DC      007624          1779    1781#
DD      007664          1787    1795#
DECVAL  003506          1034    1061#
DELAY = 104016           555#   1325    1326    1395    1396    1621    1664    1700    1713    1729    1775    1815    1822
                        1838    1880    1923    1965    2006    2023    2044    2061
DF      007704          1797    1800#
DINH  = 010000           463#
DIRIND  005171          1311*   1313*   1354    1360    1380#
DLY     003142           554     973     975#
DLYA    003154           974     977#    981
DLYB    003162           978#    979
DLYRO = 003146           973#    980*
DLYR1 = 003160           974#    978*
DO    = 000001           483#    653     1321    1411    1413    1416    1418    1421    1653    1655    1698    1709    1774
                        1813    1820    1878    1921    1963    2004    2042
DTCKBA  004366          1191*   1193*   1224#
DTCKI   004240           606    1191#
DTERR   006167          1110    1144    1515#
DTRMN   001312           638*    661
DTRMNA  001414           642     659#    668     671
DTRMNB  001436           645     649     654     658     667#
DTRMNC  001462           663     672#
EA      007716          1806    1810#
```

N04


```
EAA        007732          1811    1816#
EB         007752          1822#   1835
EC         007760          1818    1825#
ED         007766          1825    1827#
EE         010022          1833    1836#
EEA        010126          1868    1872#
EEAA       010156          1880#   1903
EEB        010164          1874    1883#
EEC        010172          1883    1885#
EED        010232          1891    1899#
EEF        010252          1901    1904#
EF         010052          1841    1847#
EH         010064          1837    1852#
EHALT   =  104014           551#    914
EHLT       002452           550     849#
EHLTA      002462           850     852#
EI         010072          1852    1854#
EK         010112          1857    1862#
EMSG0      006377          1546#   1628
EMSG0A     006417          1549#
EMSG1      006437          1552#   1639
EMSG2      006461          1556#   1680    1789    1893
EMSG3      006500          1559#   1746    1848
EMSG4      006522          1562#   1734    1843
EMSG5      006543          1565#   1741
EMSG6      006565          1122    1569#
EMSG7      006625          1575#   1859
EMTINT     002120           396     758#
EMTTAB     001102           525#    762
EMTV       000030           396#
EMTX    =  000063           487#    527#    529#    531#    533#    535#    537#    539#    541#    543#    545#    547#    549#
                            551#    553#    555#    557#    559#    561#    563#    565#    567#    569#    571#    573#    575#
                            577#    579#    581#    583#    585#    587#    589#    591#    593#    595#    597#    599#    601#
                            603#    605#    607#    609#    611#    613#    615#    617#    619#    621#    623#    625#    627#
EMO        005464           905    1443#   2331    2350    2369    2388    2399    2552    2560    2573    2588
ERR        002464           544     853#
ERRB       002674           863#    864#    866     905#    909#    911#    912
ERRLIM     001100           524#   1199
ERRN       002474           546     854     855#
ERRNA      002662           906#    913
ERRNB      002676           853#    855#    907     910#
ERRNC      002714           914#
ERRND      002670           635#    695#    907#
ERROR   =  104011           545#
ERRORN  =  104012           547#   1078    1108    1121    1142    1152    1216    1267    1280    1294    1372    1627    1639
                           1679    1733    1740    1745    1798    1842    1847    1859    1892
EXPD       004316          1202#   1205#
FA         010264          1909    1914#
FAA        010322          1923#   1935
FB         010330          1919    1926#
FC         010336          1926    1928#
FCA        010354          1934#   1944
FD         010362          1933    1936#
FE         010400          1938    1941#
FILL    =  104045           601#   2100    2518    2532
FILLL      004422           600    1240#
```

```
FORWD     002052      704     748#
FORWDA    002076      753#
FPC       001076      523#    857*    859     1303*   1305
FPCMSG    006713     1079    1109    1143    1153    1217    1268    1281    1295    1373    1535#
FWD     = 000200      465#    653    1128    1411    1413    1421    1613    1653    1698    1774    1820    1921    2004
GA        010436     1951    1956#
GAA       010474     1965#   1977
GAB       010502     1961    1968#
GAC       010510     1968    1970#
GACA      010526     1976#   1985
GAD       010534     1975    1979#
GAE       010552     1980    1983#
GETBN1  = 104052      611#   1253
GETRDY    001566      493     686     695#    716     735     747
GOOD      006760      673    1593#
GORUN     001646      707#    710
GTAB      007006      680    1598#
GTAPES    007003      680*    682    1597#
GTBIN1    003232      610     992#
GTRDYA    001632      704#    712
GTRDYB    001636      705#
GTRDYC    001654      706     709#
GTRDYD    001664      711#
GTRDYX    001602      697#    737
HA        010610     1993    1999#
HAA       010632     2003#   2025
HAB       010646     2002    2009#
HAC       010654     2009    2011#
HAD       010704     2018    2021#
HERE      002050      741     747#
I       = 000040      449#
IA        010742     2031    2036#
IAA       010764     2041#   2063
IB        011000     2040    2047#
IC        011006     2047    2049#
ICNT      001030      504#    719*    721*    754*    874
ICTR      001026      503#    728*    751*
ID        011036     2056    2059#
IE      = 000100      474#   1321    1411    1413    1416    1419    1421    1653    1655    1709    1774    1820    1878
                     1921    1963    2004    2042
ILO     = 012000      485#
INBIN   = 104051      609#    701    2295    2443
INBINM    003200      608     994#
INCTCB    006234     1282    1283    1524#
INRND   = 104055      617#   2459
INRMON    003000      616     936#
INST1     005577      688    1461#
INTFAI    006150     1154    1512#
IOTV      000020      392#
JA        011074     2069    2073#
JB        011110     2075#   2079
JC        011142     2082#   2086
JD        011174     2092    2097#
KSTART    001032      505#    696
KA        011266     2119    2126#
LOOP      002032      743#
```

C05


```
MA        011332          2136    2143#
MACHER    000004           396#    697*
MAINT  =  020000           462#
MANUAL=   100000           408#
NA        011376          2153    2160#
NOINT  =  104027           573#   1327    1397    1665    1714    1777    1823    1881    1924    1966    2007    2045
NOINTR    004046           572    1150#
NOP    =  000240           406#    744     770     955
NOUNIT    006733           665    1589#
NXTST     001040           508#    696*    711     736     748     750*
OA        011442          2170    2177#
OACNV  =  104061           625#    858     865     869     877     881     885     889     893     897     901    1204    1208
                          1276    1304
OACNVA    003312          1009#   1018
OACNVV    003276           624    1003#
OACNVX=   003302          1004#   1009    1013*   1014*   1015*   1016*
OPEN   =  000000           407#    503     504     506     507     508     509     510     511     512     513     514     515
                           516     517     518     519     520     521     522     523     641     677     [illegible] [illegible] [illegible]
                           989     990    1133    1166    1182    1205    1209    1224    1229    1254    1373    1380    [illegible]
                          1393    1408    1427    1619    1662    2190    2193    2272    2281    2285    2397    2406    2410
                          2514    2520
PA        011542          2201    2208#
PC     =%000007            433#    743*   1614*   1616*   1643*   1654*   1656*   1688*   2126*   2143*   2160*   2177*   2194*
                          2208*   2225*   2242*   2259*   2284*   2329*   2348*   2367*   2386*   2409*   2420*   2432*   2447*
                          2462*   2472*   2481*   2490*   2503*   2513*   2527*   2536*
PGTIT     005551           631    1457#
POPSP  =  005726           436#
POPSP2=   022626           437#    799     800     820    1331    1401    1672    1718    1752    1791    1827    1854    1895
                          1928    1970    2011    2049
PRENDZ    003744           612    1120#
PRMEND=   104053           613#   1723    1784    1830    1888    1931    1973    2014    2052
PRTY0  =  000000           445#
PRTY1  =  000040           444#
PRTY2  =  000100           443#
PRTY3  =  000140           442#
PRTY4  =  000200           441#
PRTY5  =  000240           440#
PRTY6  =  000300           439#    500
PRTY7  =  000340           391     393     397     438#    698
PSW    =  177776           404#    698*    976*
PT0       003226           985*    989#    992     997*
PT1       003230           986*    990#    992*    993*    996*    997     999
PUSH   =  005746           434#
PUSH2  =  024646           435#    782     814
QA        011610          2218    2225#
QBINT     012360          2329    2348    2367    2386    2393#
QBINTX    012374          2326*   2345*   2364*   2383*   2397#
QBINTY    012434          2327*   2346*   2365*   2384*   2401    2404    2406#
QBINTZ    012444          2328*   2347*   2366*   2385*   2400    2410#
RA        011660          2235    2242#
RALL   =  000006           478#
RBUF      015420          2101    2109    2112    2129    2146    2163    2180    2188    2195    2211    2228    2245    2262
                          2269    2283    2303    2310    2313    2493    2496    2506    2509    2525    2533    2596#   2597
RDATA  =  000004           477#   1413    1418    1421
RDATAF=   104041           593#   2107    2125    2176    2206    2257    2308    2327    2384    2491    2569
RDATAR=   104042           595#   2142    2159    2223    2240    2346    2365    2504    2584
```

```
RDATF    005324        592     1412    1413*   1422
RDATFX=  104054        615*
RDATR    005352        594     1417    1419*
RDBK1    004144        576     1174*
RDBK1A   004176       1175    1177     1179    1181*   1185    1197
RDBK1B   004200       1182*   1183*    1184    1186    1188
RDTFX    005370        614    1421*
REV    = 004000        464*    644     1131    1316    1317    1319    1416    1418    1615    1655    1709    1813    1878
                      1963    2042     2278    2403
REVCNT   005170       1315*   1368*    1379*
REWIND=  104025        569*   1769     1910    1914    1998
RIND     003224        984*    985      986     989*    994*
RNDBK    004070        574    1160*    1169
RNDBKA   004114       1166*   1167*    1168    1170
RNDBKK   004112       1161    1163     1165*
RNDBK1=  104031        577*
RNDBLK=  104030        575*   2096     2123    2140    2157    2174
RNDFIL=  104056        619*   2459
RNDFLA   003024        943*    947
RNDFLB   003026        944*    945
RNDFLL   003016        618     940*
RNDNUM=  104035        585*    943     1165    1181
RNGEN    002722        904     918*
RNUM   = 000002        476*    644     1128    1131    1321    1613    1615    1653    1655    1699    1709    1774    1813
                      1820    1878     1921    1963    2004    2042
RP1      002774        919     923*     930     933*    936*
RP2      002776        922     926      929*    934*    937*
RS103  = 104003        533*   1029
[illegible] = 104005   537*
RSTOSS = 104007        541*    831      846     931     948     957    1019    1054    1227    1237    1247    1259    1433
[illegible] = 000004   489*    915     1000    1083    1104    1157    1289    1300    1359    1409
[illegible]  002240    539     799*
[illegible]  002270    536     800*
[illegible]  002310    540     798*
[illegible]S 002350    392     819*
RTNNO    001036        507*    629*     709     732     749*    755     970
RWIND    003772        568    1131*
RWINDA   004000       1129    1132*
RWINDC   004044       1140    1148*
RWINDV   004002       1128*   1131*    1133*
R0      =%000000       425*    637*     660*    679*    732*    740*    758     759*    760*    761*    762*    763*    791
                       790*    801*     834     835*    836*    837     839*    843*    919*    920*    921*    922*    923
                       924*    925*     926*    927*    928*    929     941*    952*   1034*   1195*   1202    1232*   1241*
                      1251*   1432*    1435    1436
R1      =%000001       426*    669*     780     791*    802*    828*    942*    946*    953*    955*    959     963     967*
                       969*   1006*    1008*   1023*   1033*   1038*   1042*   1049*   1050*   1196*   1203    1233*   1235*
                      1243*   1245*    1252*   1256*
R2      =%000002       427*    779      792*    803*   1007*   1009    1017*   1024*   1035*   1049*   1050    1252*   1197*
                      1235*   1242*    1244
R3      =%000003       428*    778      793*    804*   1009*   1010*   1011*   1012    1025*   1027*   1036*   1046*   1199*
                      1221*
R4      =%000004       429*    777      785*    805*    913     916*    821*    857    1037*   1040*   1043*   1044    1303
R5      =%000005       430*    748*     753     776     784*    795     798     806*    812     815*    816     819     822*
                       843     863     1030*
R6      =%000006       431*    628*     699*    719*
R7      =%000007       432*    704*     756*    961*    966*    969*    970*
```

E05


```
SA       011730          2252    2259#
SAT    = 000000           475#
SAVOTR = 104024           567#   1264    1678    1795    1989    1936    1978    2016    2054
SAVO3  = 104002           531#   1022
SAVO5  = 104004           535#
SAVOSS = 104006           539#    827     842     918     940     951    1003    1032    1194    1231    1240    1350    1431
SAVSS  = 000003           488#    862     998    1069    1091    1099    1120    1141    1150    1262    1292    1356    1371
                         1382
SBINT    011460          2126    2143    2160    2177    2184#
SBINTX   011474          2124*   2141*   2158*   2175*   2190#
SBINTY   011502          2125*   2142*   2159*   2176*   2193#
SBKSBA   012622          2471#   2477
SBKSBB   012654          2480#   2486
SBKSBC   012726          2489#   2499
SBKSBD   013000          2502#   2512
SBKSBP   013040          2419*   2431*   2442*   2457*   2472    2481    2490    2503    2514#
SBKSUB   012606          2420    2432    2447    2462    2469#
SBTCDT   006075          1501#
SCOPE  = 104000           527#   1126    1134    1147    1273    1288    1390    1394    1398    1405    1617    1620    1623
                         1631    1634    1642    1657    1663    1669    1674    1684    1699    1702    1710    1715    1722
                         1737    1744    1749    1754    1759    1775    1778    1783    1794    1800    1814    1821    1824
                         1829    1846    1851    1856    1863    1879    1882    1887    1899    1904    1922    1926    1930
                         1940    1946    1964    1967    1972    1992    1998    2005    2008    2013    2020    2026    2043
                         2046    2051    2058    2064    2077    2084    2087    2114    2131    2148    2165    2182    2213
                         2230    2247    2264    2315    2334    2353    2372    2391    2421    2433    2449    2463    2533
SCOPTR   001034           506#    725     752*
SDTRG    003720           566    1115#
SELDRA   005450          1434    1439#
SELDRR   005422           622    1431#
SELDRV = 104060           623#    640     676    1426
SELE   = 004000           486#
SEQDRV = 104057           621#    707     724
SETCOM = 104017           557#    643     652    1132    1320    1392    1618    1632    1661    1697    1708    1773    1812
                         1819    1977    1920    1962    2003    2041
SPBOT  = 001000           405#    628     699     718
SQDRV    005400           620    1424#   1428
SQDRVA   005414          1424*   1425*   1427#
SQDRVI   001326           638*    639*    641#    669
SR     = 177570           403#    690     705     709     722     726     730     734     755*    849     906    1162    1178
SRCCON   004722          1324#   1341    1345    1347    1351    1355    1362    1369
SRCF     005054          1338    1352#
SRCHA    004652          1312    1314#
SRCHAA   004712          1318    1320#
SRCHB    004726          1323    1325#
SRCHC    004736          1314    1329#
SRCHD    004744          1329    1331#
SRCHDA   004762          1333    1337#
SRCHE    005024          1339    1346#
SRCHER   006672          1375    1582#
SRCHF  = 104032           579#   1414    2076
SRCHFF   004636           578    1311#
SRCHG    005102          1353    1360#
SRCHM    004714          1316*   1319*   1321#
SRCHR  = 104033           581#   1419    2083
SRCHRR   004644           580    1313#
SRCOUT   005072          1356#   1361
```

```
SRCREV  005112          1336    1363#
SRCRVA  005122          1344    1365#
SRCRVB  005132          1350    1364    1367#
SRCRVC  005140          1366    1368#
SREOUT  005076          1325    1328    1335    1358#   1378
SRESET= 104001           529#    700
SRSETT  002414           528     834#    837*
SST     = 000010         479#   1633
START   001250           491     628#
STAT    006115          1081    1111    1124    1145    1155    1298    1375    1505#   1629    1640    1681    1735    1742
                        1747    1792    1844    1849    1860    1896
STATS   003514           558    1064#
STATUS= 104020           559#   1077    1092    1099    1137    1151    1293    1370    1635    1730    1839
STCMSG  006346          1080    1541#
STCOM   003532           556    1068#
STCOMA  003616          1083#   1086
STCOMB  003622          1074    1076    1085#
STOPDT= 104021           561#    659     717     856     1138    1687    1862    1945    1997    2015    2053
STPDT   003626           560    1088#
STRTA   001542           633     687#    691
STTCV   002374           552     827#
SVECTR= 104015           553#    702    1659    1706    1727    1769    1817    1836    1873    1918    1960    2001    2039
SVO3    002140           530     765#
SVOS    002170           534     773#
SVOSA   002176           771     774#
SVOSB   002212           768     778#
SVOSC   002224           767*    770*    773*    783#
SVOSS   002160           538     770#
SVSS    002320           390     810#
TA      012062          2290    2299#
TCBA    001012           497#    650*   1117    1274    1387*   1389
TCBASB  006251          1284    1527#
TCBAT   001060           516#    902    1117*
TCCM    001006           495#    646     655     657    1065    1072*   1073    1088*   1093    1100    1135    1317    1384*
                        1332    1340    1346    1352    1363    1365*   1367*   1402    1712*   1719    1798*   1884*   1903*
                        1934*   1976*   2278    2403
TCCMT   001050           512#    890    1065*
TCDT    001014           498#   1116    1337    1342*   1343    1348*   1349    1660*   1676    1685    1704    1734    1735
                        1786    1816*   1831    1832    1890    1937    1979    2017    2021    2055    2059
TCDTT   001054           514#    894    1116*
TCLVL   001020           500#    830
TCST    001004           494#    648     667    1064    1106    1625    1636    1731    1738    1756    1840
TCSTT   001052           513#    986    1064*   1139
TCVTR   001016           499#    828    1314*   1391*
TCWC    001010           496#    651*   1115    1265    1383*   1384    1386*
TCWCT   001056           515#    898    1115*
TEMP    001074           522#   1263*   1274    1277
TEMPWR  003474          1035    1056#
TLAST   = 177777         447#   2539
TPB     001024           502#    963*
TPS     001022           501#    964
TRC     = 000003         448#
TRCV    000014           390#
TRPV    000034           398#
TYP     003044           542     951#
TYPA    003060           953#    962     971
```

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TYPC      003070        954     959#
TYPD      003104        956     961     963#    968     970
TYPE   =  104010        543#    630     654     672     681     687     692     713     738     809
TYPF      003120        960     967#
TYPG      003130        969#
T0        007016        505     1605#
T1        007150        1606    1645#
T10       010600        1949    1990#
T11       010732        1991    2028#
T12       011054        2029    2066#
T13       011162        2067    2089#
T14       011240        2090    2116#
T15       011304        2117    2133#
T16       011350        2134    2150#
T17       011414        2151    2167#
T2        007314        1646    1690#
T20       011512        2168    2198#
T21       011560        2199    2215#
T22       011626        2216    2232#
T23       011676        2233    2249#
T24       012042        2250    2287#
T25       012124        2288    2317#
T26       012172        2318    2336#
T27       012240        2337    2355#
T3        007552        1691    1761#
T30       012310        2356    2374#
T31       012446        2375    2412#
T32       012472        2413    2423#
T33       012516        2424    2435#
T34       012552        2436    2450#
T35       013112        2451    2538#
T4        007706        1762    1803#
T5        010116        1804    1865#
T6        010254        1866    1906#
T7        010426        1907    1948#
UA        012154        2320    2329#
UNIT      001064        518#    1069    1436*
UNITN     001066        519#    679     878     1435*
UNITS     001070        520#    636*    662     670*    690*    745     1433
UNTAB     005454        670     1433    1440#
UPS    =  000200        484#    1738    1756
U0     =  000000        466#
U1     =  000400        467#
U2     =  001000        468#
U3     =  001400        469#
U4     =  002000        470#
U5     =  002400        471#
U6     =  003000        472#
U7     =  003400        473#
VAR       012222        2339    2348#
[illegible]  =  000000  454#
[illegible]  =  000004  455#
[illegible]  =  000010  456#
[illegible]  =  000014  457#
[illegible]  =  000020  458#
[illegible]  =  000024  459#
```

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VS      = 000030            460#
VT      = 000034            461#
WA        012464           2415    2420#
WALL    = 000016            482#
WBUF      013350            650    2098    2106    2111    2128    2145    2162    2179    2185    2192    2210    2227    2244
                           2261    2266    2274    2297    2300    2307    2312    2332    2351    2370    2389    2394    2409
                           2445    2460    2475    2484    2495    2508    2519    2530    2567    2571    2574    2582    2595
                           2589    2594#   2595
WCNOTO    006217           1269    1521#
WCSB      013042           2431    2517#
WCSBA     013054           2517*   2520#
WDATA   = 000014            481#    653    1411    1416
WDATAE  = 104037            589#   2104    2124    2158    2205    2238    2305    2326    2364    2473    2550
WDATAR= 104040              591#   2141    2175    2222    2256    2345    2383    2482    2558
WDATF     005314            588    1411#
WDATR     005342            590    1416#
WIND    = 104026            571#   1872    1956    2036
WINDD     003762            570    1128#
WNGBK     004574            582    1292#
WRDFR     005172           1382#   1415    1420
WRDFRA    005230           1389#   1414*   1419*
WRDFRB    005244           1393#   1411*   1413*   1416*   1418*   1421*
WRDFRC    005260           1391    1399#
WRDFRD    005266           1399    1401#
WRDFRE    005310           1409#
WRDFRF    005304           1403    1407#
WRDFRG    005306           1384*   1385*   1388*   1408#
WRNGBK= 104034              583#   1939    1981    2019    2057
WRTM    = 000012            480#
X       = 000035            450#   1604    1609#   1644    1649#   1689    1694#   1760    1765#   1802    1807#   1864    1869#
                           1905    1910#   1947    1952#   1989    1994#   2027    2032#   2065    2070#   2088    2093#   2115
                           2120#   2130    2137#   2149    2154#   2166    2171#   2197    2202#   2214    2219#   2231    2236#
                           2248    2253#   2286    2291#   2316    2321#   2335    2340#   2354    2359#   2373    2379#   2411
                           2416#   2422    2427#   2434    2439#   2449    2454#   2537    2542#
XA        012510           2426    2432#
YA        013536           2438    2444#
YCSB      013062           2442    2457    2522    2524#
ZA        013572           2453    2459#
ZCSB      013072           2419    2529#
.       = 017440            383#    384     386     388     394     398     401     490#    492#    647     656     985     995
                           1004    1136    1236    1246    2595#   2597#
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CKDT       383#   2110   2127   2144   2209   2226   2311   2330   2349   2494   2507   2572   2587
CKDTI      383#   2161   2178   2243   2260   2368   2387
[illegible]
EMTDEF     383#    526    528    530    532    534    536    538    540    542    544    546    548    550    552
            554    556    558    560    562    564    566    568    570    572    574    576    578    580    582
            584    586    588    590    592    594    596    598    600    602    604    606    608    610    612
            614    616    618    620    622    524    626
RALF       383#
RALR       383#
RDTF       383#   2107   2308   2491   2569
RDTR       383#   2504   2584
TSTA       383#   1604   1644   1689   1760   1802   1864   1905   1947   1989   2027   2065   2098   2115   2132
           2149   2166   2197   2214   2231   2248   2296   2316   2335   2354   2373   2411   2422   2434   2449
TSTAA      383#   1604   1644   1689   1760   1802   1864   1905   1947   1989   2027   2065   2080   2115   2132
           2149   2166   2197   2214   2231   2248   2296   2316   2335   2354   2373   2411   2422   2434   2449
           2537
WALF       383#
WALR       383#
WDTF       383#   2104   2305   2473   2550
WDTR       383#   2482   2559
```

ADD	922	926	1008	1011	1042	1043	1050	1342	1388	1941	2022	2277	2402	2471	2489
	2549	2565													
ASL	761	1385													
BCS	1039														
BEQ	633	656	668	691	710	723	731	741	746	960	1074	1076	1163	1179	1201
	1222	1266	1275	1338	1341	1364	1434	1637	1705	1739	1787	1797	1833	1891	1901
	1933	1938	1975	1980	2276	2279	2401	2404							
BGT	1339														
BHI	1161	1169	1175	1187	1686										
BIC	639	1010	1013	1070	1088	1167	1183	1319	1365	1425					
BICB	670														
BIS	1071	1316	1367												
BIT	655	667	705	722	726	730	734	906	1073	1075	1162	1178	1317	1340	1346
	1352	1363	1625	1636	1738	1756	2278	2403							
BITB	1433														
BLE	1350														
BLOS	1177	1185	1344	2018	2056										
BMI	658	1094	1101	1107	1140	1732	1841								
BNE	661	663	685	706	712	720	727	729	735	737	907	913	947	954	979
	991	995	1018	1029	1047	1053	1226	1236	1246	1257	1318	1347	1353	1355	1361
	1369	1626	1677	1726	1757	1944	1986	2025	2063	2079	2086	2477	2486	2499	2512
	2554	2562	2577	2592											
BPL	647	649	850	965	1136	1333	1403	1720							
BR	642	646	654	666	671	678	686	716	747	768	771	854	962	971	1041
	1086	1096	1113	1129	1192	1312	1322	1323	1328	1335	1336	1345	1351	1362	1366
	1379	1412	1415	1417	1420	1422	1428	1624	1675	1711	1799	1811	1835	1857	1903
	1935	1977	2522												
CLR	629	976	1037	1234	1771	2207	2224	2328	2347						
CLRB	1311														
CMP	711	736	912	1160	1168	1174	1176	1184	1186	1200	1274	1337	1343	1349	1676
	1685	1786	1832	1890	1937	1979	2017	2055							
CMPB	709	959													
COM	721	836	993	994											
DEC	660	684	728	946	978	980	1017	1027	1046	1052	1221	1225	1235	1245	1256
	1796	1899	1900	1932	1943	1974	1985	2024	2062	2078	2082	2085	2476	2485	2498
	2511	2553	2561	2576	2591										
DECB	1368														
EMT	527	529	531	533	535	537	539	541	543	545	547	549	551	553	555
	557	559	561	563	565	567	569	571	573	575	577	579	581	583	585
	587	589	591	593	595	597	599	601	603	605	607	609	611	613	615
	617	619	621	623	625	627									
HALT	385	387	389	395	399	401	733	845	851						
INC	638	683	719	996	1040	1223	1324	1424	1712	1795	1902	1934	1976	2075	
INCB	1798	1834													
JMP	491	493	708	725											
JSR	704	743	956	961	968	970	1614	1616	1654	1656	2126	2143	2160	2177	2208
	2225	2242	2259	2329	2348	2367	2386	2420	2432	2447	2462	2472	2481	2490	2503
MOV	628	635	637	650	651	669	674	675	679	695	696	697	698	699	719
	732	740	748	749	750	751	752	753	754	755	758	759	760	762	765
	766	767	770	773	774	775	776	777	778	779	780	781	784	785	790
	791	792	793	794	795	798	801	802	803	804	805	806	807	808	810
	811	812	813	815	816	819	821	822	823	824	828	829	830	834	835
	837	839	843	853	855	857	863	905	911	919	923	929	930	936	937
	941	942	945	952	975	977	984	985	986	992	997	999	1005	1006	1007
	1009	1023	1024	1025	1033	1034	1035	1036	1048	1049	1064	1065	1069	1072	1115
	1116	1117	1128	1131	1170	1188	1191	1193	1195	1196	1197	1198	1199	1202	1203

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                1232  1233  1241  1242  1243  1244  1251  1252  1255  1263  1303  1314  1329  1383  1384
                1387  1391  1399  1411  1413  1414  1416  1418  1419  1421  1432  1435  1613  1615  1653
                1655  1660  1670  1716  1724  1750  1772  1779  1816  1825  1831  1852  1875  1876  1883
                1915  1916  1917  1926  1942  1957  1958  1959  1968  1984  1999  2000  2009  2021  2037
                2038  2047  2059  2073  2074  2080  2081  2124  2125  2141  2142  2158  2159  2175  2176
                2205  2206  2222  2223  2239  2240  2241  2256  2257  2258  2271  2326  2327  2345  2346
                2364  2365  2366  2383  2384  2385  2396  2419  2431  2442  2457  2469  2470  2478  2479
                2487  2488  2500  2501  2517  2547  2548  2555  2556  2563  2564  2578  2579
MOVB             636   680   690   953   955   963   967   969  1012  1026  1044  1051  1313  1315  1436
NEG             1386
NOP              910  1406  1703  1755
RESET            742   838
ROL              920   921   924   925   927   928
ROR             1014  1015  1016
RTI              767   773   783   787   796   809   818   825   832   840   847   852   916   932   938
                 949   958   982   987  1001  1020  1055  1066  1084  1089  1105  1118  1148  1158  1164
                1171  1180  1189  1228  1238  1248  1259  1290  1301  1308  1330  1359  1400  1410  1429
                1439  1671  1717  1751  1780  1826  1853  1884  1927  1969  2010  2048
RTS              756   763   966  1030  1643  1688  2196  2284  2409  2513  2527  2536
SUB              864  1038  1348  1983  2060  2280  2405  2480  2502  2557  2580
TST              632   646   648   657   786   817   844   849  1045  1085  1093  1095  1100  1102  1103
                1106  1135  1139  1265  1332  1357  1402  1437  1704  1719  1725  1731  1840  2275  2400
TSTB             662   745   964  1354  1360
.ABS             381
.ASCII          1443  1444  1446  1449  1451  1461  1466  1470  1475  1489  1493  1497  1501  1505  1507
                1517  1527  1531  1534  1536  1585
.ASCIZ          1453  1454  1457  1480  1482  1488  1491  1495  1499  1503  1510  1512  1515  1519  1521
                1524  1529  1539  1541  1546  1549  1552  1556  1559  1562  1565  1569  1575  1582  1586
                1588  1589  1593  1597
.BYTE           1061  1379  1380  1440  1487  1598
.END            2598
.EVEN           1601
.LIST              1   379   401   527   529   531   533   535   537   539   541   543   545   547   549
                 551   553   555   557   559   561   563   565   567   569   571   573   575   577   579
                 581   583   585   587   589   591   593   595   597   599   601   603   605   607   609
                 611   613   615   617   619   621   623   625   627  1609  1649  1694  1765  1807  1969
                1910  1952  1994  2032  2070  2093  2120  2137  2154  2171  2202  2219  2236  2253  2291
                2321  2340  2359  2378  2416  2427  2439  2454  2542
.MACR            383
.NLIST             1   380   401   527   529   531   533   535   537   539   541   543   545   547   549
                 551   553   555   557   559   561   563   565   567   569   571   573   575   577   579
                 581   583   585   587   589   591   593   595   597   599   601   603   605   607   609
                 611   613   615   617   619   621   623   625   627  1609  1649  1694  1765  1807  1969
                1910  1952  1994  2032  2070  2093  2120  2137  2154  2171  2202  2219  2236  2253  2291
                2321  2340  2359  2378  2416  2427  2439  2454  2542
.REM               1
.REPT            401
.TITLE             1
.WORD            526   528   530   532   534   536   538   540   542   544   546   548   550   552   554
                 556   558   560   562   564   566   568   570   572   574   576   578   580   582   584
                 586   588   590   592   594   596   598   600   602   604   606   608   610   612   614
                 616   618   620   622   624   626   744
```

```
TC3 - TC11 TEST 3       MACY11 27(732)  10-SEP-76  15:51  PAGE 66
DZTCCA.P11      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *DZTCCA,DZTCCA.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZTCCA.P11
 RUN-TIME:  9  17 5 SECONDS
 RUN-TIME RATIO: 78/33=2.3
 CORE USED:  12K  (23 PAGES)
```

MOS

Spooler runtime 10 Seconds, 44 KCS, 270 disk reads, 4 disk writes, 63 pages