TC11

TC3 BASIC FUNCTIONS

MD-11-DZTCC-A

EP DZTCC A DL A

OCT 1976

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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

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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
```

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 SR10 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.

8.2 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.

8.3 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:   SVSS                    ;TRACE TRAP
000016          000340                  PRTY7
000020          002350          IOTV:   RSSS                    ;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
                177570                  SR=177570
                177776                  PSW=177776
                001000                  SPBOT=1000
                000240                  NOP=240
                000000                  OPEN=0
                100000                  MANUAL=BIT15
                100000                  BIT15=100000
                040000                  BIT14=40000
                020000                  BIT13=20000
                010000                  BIT12=10000
                004000                  BIT11=4000
                002000                  BIT10=2000
                001000                  BIT9=1000
                000400                  BIT8=400
                000200                  BIT7=200
                000100                  BIT6=100
                000040                  BIT5=40
                000020                  BIT4=20
                000010                  BIT3=10
                000004                  BIT2=4
                000002                  BIT1=2
                000001                  BIT0=1
                000000                  R0=%0
                000001                  R1=%1
                000002                  R2=%2
                000003                  R3=%3
                000004                  R4=%4
                000005                  R5=%5
                000006                  R6=%6
                000007                  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          D0=BIT0
000200          UPS=BIT7
010000          ILO=BIT12
004000          SELE=BIT11
000000          EMTX=0
000003          SAVSS=3
```

```
                000004                          RST5S=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 CUFRENT 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                  BLKRQ:  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  003526                  .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                               SELDRV                  ;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               MOV      #WBUF,@TCBA    ;SET CURRENT ADDR.
001362  012777  177777  177420               MOV      #-1,@TCWC      ;SET WORD COUNT.
001370  104017                               SETCOM                  ;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
```

```
001406  005737  177374                   TST     @TCCM               ;ERROR?
001412  100411                           BMI     DTRMNB              ;BR IF YES.
001414  104021                 DTRMNA:   STOPDT                      ;STOP DECTAPE.
001416  005300                           DEC     R0                  ;DONE 8 TIMES?
001420  001334                           BNE     DTRMN               ;BR IF NOT.
001422  105767  177442                   TSTB    UNITS               ;ANY UNITS AVAILABLE?
001426  001015                           BNE     DTRMNC              ;BR IF YES.
001430  104010                           TYPE                        ;TYPE NON AVAILABLE MESSAGE.
001432  006733                           NOUNIT
001434  000572                           BR      CHNC                ;GO EXIT.
001436  032777  014000  177340 DTRMNB:   BIT     #BIT12+BIT11,@TCST       ;ILO OR SELE ERROR?
001444  001763                           BEQ     DTRMNA              ;BR IF NOT.
001446  016701  177654                   MOV     SQDRV1,R1
001452  146167  005454  177410           BICB    UNTAB(1),UNITS      ;DESELECT NON AVAILABLE TRANSPORT.
001460  000755                           BR      DTRMNA
001462  104010                 DTRMNC:   TYPE                        ;TYPE UNITS TO BE TESTED.
001464  006760                           GOOD
001466  012767  000001  000010           MOV     #1,CPENA
001474  012767  000007  177344           MOV     #7,CTRB             ;CHECK UP TO 7 UNITS.
001502  104060                           SELDRV                      ;SELECT DRIVE.
001504  000000                 CPENA:    OPEN                        ;UNIT TO BE SELECTED.
001506  000407                           BR      CPENB               ;UNIT NOT AVAILABLE.
001510  016700  177352                   MOV     UNITN,R0            ;SUCCESS.
001514  116067  007006  005261           MOVB    GTAB(0),GTAPES      ;GET ASCII # FOR GOOD TAPE.
001522  104010                           TYPE                        ;TYPE # OF UNIT TO TEST.
001524  007003                           GTAPES
001526  005267  177752         CPENB:    INC     CPENA               ;UPDATE TO NEXT DRIVE.
001532  005367  177310                   DEC     CTRB                ;CHECKED ALL DRIVES?
001536  001361                           BNE     CPENA-2             ;BR IF NOT.
001540  000412                           BR      GETRDY              ;YES.
001542  104010                 STRTA:    TYPE                        ;TYPE UNIT SELECT INSTRUCTIONS.
001544  005577                           INST1
001546  104013                           CHALT                       ;WAIT FOR USER.
001550  116767  176014  177312           MOVB    SR,UNITS            ;GET UNITS TO TEST.
001556  001771                           BEQ     STRTA               ;BR IF NO UNITS SELECTED.
001560  104010                           TYPE                        ;TYPE SR OPTION MESSAGE.
001562  005762                           ASETSR
001564  104013                           CHALT                       ;COMMON HALT.
001566  012767  001002  001074 GETRDY:   MOV     #1002,ERRND         ;ALLOW ERROR PRINTOUTS.
001574  016767  177232  177236           MOV     KSTART,NXTST        ;ADDR OF 1ST ROUTINE TO NXTST
001602  012767  000006  176174 GTRDYX:   MOV     #6,MACHER           ;RESET MACHER TRAP.
001610  012767  000340  176160           MOV     #PRTY7,PSW          ;SET PRIORITY 7.
001616  012706  001000                   MOV     #SPBOT,R6           ;SET BOTTOM OF STACK.
001622  104001                           SRESET                      ;ISSUE RESET.
001624  104051                           INBIN                       ;INITIALIZE BINARY COUNT.
001626  104015                           SVECTR                      ;PRESET DT INTERRUPT VECTOR TO 0.
001630  000000                           0
001632  004767  000214         GTRDYA:   JSR     R7,FORWD            ;ROLL FORWARD TO "NEXT" ROUTINE.
001636  032767  001000  175724 GTRDYB:   BIT     #BIT9,SR            ;CHECK SELECT ROUTINE SWITCH
001644  001003                           BNE     GTRDYC              ;BRANCH IF SELECT ROUTINE SWITCH IS SET.
001646  104057                 GORUN:    SEQDRV                      ;SELECT SEQUENTIAL DRIVE.
001650  000177  177166                   JMP     @CURTST             ;GO RUN CURRENT ROUTINE.
001654  126767  177156  175706 GTRDYC:   CMPB    RTNNO,SR            ;COMPARE RTNNO TO SR.
001662  001771                           BEQ     GORUN               ;BRANCH IF ROUTINE FOUND.
001664  022767  177777  177146 GTRDYD:   CMP     #-1,NXTST           ;NO. CHECK FOR LAST ROUTINE.
001672  001357                           BNE     GTRDYA              ;BRANCH IF NOT LAST ROUTINE.
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001674  104010                             TYPE                           ;TYPE INCORRECT RTN SELECTED.
001676  005531                             AINCRT
001700  104013                             CHALT                          ;COMMON HALT.
001702  000731                             BR      GETRDY                 ;START OVER.
001704  104021                   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  024646                          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 TO5.
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.
002324  012666  177772                  MOV     (6)+,-6(6)
002330  010546                          MOV     R5,-(6)          ;SAVE R5.
002332  010446                          MOV     R4,-(6)          ;SAVE R4.
002334  024646                          PUSH2
002336  016605  000010                  MOV     8.(6),R5         ;EMT PC TO R5.
002342  010504                          MOV     R5,R4            ;EMT PC TO R4.
002344  005744                          TST     -(4)
002346  000002                          RTI                      ;EXIT EMT SUB.
002350  010566  000010          RS5S:   MOV     R5,8.(6)         ;R5 TO EMT PC.
002354  022626                          POPSP2
002356  012604                          MOV     (6)+,R4          ;RESTORE R4.
002360  012605                          MOV     (6)+,R5          ;RESTORE R5.
002362  016646  177772                  MOV     -6(6),-(6)
002366  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                          SAV5S                           ;SAVE REG 5S
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     #EMO,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 5S.
002720  000002                                  RTI                             ;EXIT EMT SUB.
                                        ;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.
002722  104006                          RNGEN:  SAV05S                          ;SAVE REGS 0-5S.
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                                  RST05S                          ;RESTORE REGS 0-5S.
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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003240  005167  177764                  COM     PT1
003244  005167  177754                  COM     RIND
003250  001002                          BNE     .+6
003252  005267  177752                  INC     PT1
003256  016767  177746  177742          MOV     PT1,PTO            ;SAVE BIN CHAR IN PTO
003264  000003                          SAV5S
003266  016725  177736                  MOV     PT1,(5)+           ;
003272  000004                          RST5S
003274  000002                          RTI                        ;EXIT.
                                ;OCTAL TO ASCII CONVERT ROUTINE
003276  104006                  OACNVV: SAV05S                     ;SAVE REGS.
        003302                          OACNVX=.+2
003300  013527  000000                  MOV     @(5)+,#0           ;GET OCTAL VALUE.
003304  012501                          MOV     (5)+,R1            ;GET DESTINATION ADDR.
003306  012502                          MOV     (5)+,R2            ;GET CONVERT COUNT.
003310  060201                          ADD     R2,R1              ;DEVELOP ADDR TO STORE 1ST CHAR.
003312  016703  177764          OACNVA: MOV     OACNVX,R3
003316  042703  177770                  BIC     #177770,R3         ;ISOLATE LEAST SIGNIFICANT DIGIT.
003322  062703  000060                  ADD     #60,R3             ;CONVERT DIGIT TO ASCII.
003326  110341                          MOVB    R3,-(1)            ;STORE ASCII CHARACTER.
003330  042767  000007  177744          BIC     #7,OACNVX
003336  006067  177740                  ROR     OACNVX
003342  006067  177734                  ROR     OACNVX
003346  006067  177730                  ROR     OACNVX
003352  005302                          DEC     R2                 ;DONE ALL DIGITS?
003354  001356                          BNE     OACNVA             ;BRANCH IF NOT DONE.
003356  104007                          RST05S                     ;RESTORE REGS.
003360  000002                          RTI                        ;DONE. EXIT.
                                ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
003362  104002                  BMOVE:  SAV03                      ;SAVE REGS.
003364  012501                          MOV     (5)+,R1            ;GET"FROM"ADDRESS
003366  012502                          MOV     (5)+,R2            ;GET"TO"ADDRESS
003370  012503                          MOV     (5)+,R3            ;GET COUNT
003372  112122                  BMOVA:  MOVB    (1)+,(2)+          ;MOVE BYTE
003374  005303                          DEC     R3                 ;DECREMENT COUNT
003376  001375                          BNE     BMOVA              ;BRANCH IF NOT DONE.
003400  104003                          RST03                      ;RESTORE REGS.
003402  000205                          RTS     R5                 ;DONE EXIT
                                ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
003404  104006                  BDCNVV: SAV05S                     ;SAVE REGS.
003406  013501                          MOV     @(5)+,R1           ;GET BINARY VALUE.
003410  012700  003506                  MOV     #DECVAL,R0         ;ADDR OF DECVAL TO R0.
003414  012702  003474                  MOV     #TENPWR,R2         ;ADDR OF 10 POWER TO R2.
003420  012703  000005                  MOV     #5,R3              ;SET UP FOR 5 CONVERSIONS.
003424  005004                  BDCNVA: CLR     R4                 ;CLEAR RESULT.
003426  161201                  BDCNVB: SUB     (2),R1             ;10 POWER FROM VALUE.
003430  103402                          BCS     BDCNVC             ;BR IF UNSUCCESSFUL.
003432  005204                          INC     R4                 ;+1 TO RESULT.
003434  000774                          BR      BDCNVB             ;DO IT AGAIN.
003436  061201                  BDCNVC: ADD     (2),R1             ;RESTORE SUBTRACTED VALUE.
003440  062704  000060                  ADD     #60,R4   ;CONVERT RESULT TO ASCII.
003444  110420                          MOVB    R4,(0)+            ;STORE RESULT.
003446  005722                          TST     (2)+               ;UPDATE 10 POWER ADDR.
003450  005303                          DEC     R3                 ;DONE 5 TIMES?
003452  001364                          BNE     BDCNVA             ;BR IF NOT.
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                  RSTO5S                  ;RESTORE REGS.
 1055  003472  000002                  RTI                     ;EXIT.
 1056  003474  023420          TENPWR: 10000.
 1057  003476  001750                  1000.
 1058  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:  SAV5S
 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: RST5S
 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:   SAV5S
 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:  SAV5S
 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: RST5S
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003674  000002                           RTI                          ;EXIT EMT SUB.
003676  005777  175102          CKERZC:  TST     @TCST                ;ENDZ BIT SET?
003702  100772                           BMI     CKERZA               ;BR IF YES.
003704  104012                  CKERZD:  ERRORN                       ;DECTAPE ERROR.
003706  006713                           FPCMSG
003710  006167                           DTERR
003712  006115                           STAT
003714  177777                           -1
003716  000765                           BR      CKERZB
                                ;EMT SUB TO SAVE TCDT, TCBA, TCWC REGS.
003720  017767  175064  175130  SDTRG:   MOV     @TCWC,TCWCT          ;SAVE TCWC.
003726  017767  175062  175120           MOV     @TCDT,TCDTT          ;SAVE TCDT.
003734  017767  175052  175116           MOV     @TCBA,TCBAT          ;SAVE TCBA.
003742  000002                           RTI                          ;EXIT EMT SUB.
                                ;EMT SUB TO REPORT PREMATURE ENDZ DETECTION.
003744  000003                  PRENDZ:  SAVSS
003746  104012                           ERRORN                       ;PREMATURE ENDZ DETECTED.
003750  006565                           EMSG6
003752  006200                           BLKSB
003754  006115                           STAT
003756  177777                           -1
003760  104000                           SCOPE
                                ;EMT SUB TO MOVE TAPE TO FORWARD END ZONE.
003762  012767  000002  000012  WINDD:   MOV     #RNUM!FWD,RWINDV          ;SET UP WIND.
003770  000403                           BR      RWINDA
                                ;EMT SUB TO MOVE TAPE TO REVERSE END ZONE.
003772  012767  004002  000002  RWIND:   MOV     #RNUM!REV,RWINDV          ;SET UP REWIND.
004000  104017                  RWINDA:  SETCOM                       ;ISSUE WIND/REWIND.
004002  000000                  RWINDV:  OPEN
004004  104000                           SCOPE                        ;SETCOM ERROR.
004006  005777  174774                   TST     @TCCM                ;ERROR BIT SET?
004012  100375                           BPL     .-4                  ;BR IF NOT.
004014  104020                           STATUS                       ;YES. GET STATUS AND STOP.
004016  104021                           STOPDT
004020  005767  175026                   TST     TCSTT                ;WAS ERROR DUE TO ENDZ?
004024  100407                           BMI     RWINDC               ;BR IF YES.
004026  000003                           SAVSS
004030  104012                           ERRORN                       ;NO. DECTAPE ERROR.
004032  006713                           FPCMSG
004034  006167                           DTERR
004036  006115                           STAT
004040  177777                           -1
004042  104000                           SCOPE
004044  000002                  RWINDC:  RTI                          ;EXIT.
                                ;EMT SUB TO HANDLE FAILURE TO INTERRUPT.
004046  000003                  NOINTR:  SAVSS
004050  104020                           STATUS                       ;SAVE STATUS.
004052  104012                           ERRORN                       ;DECTAPE FAIL TO INTERRUPT.
004054  006713                           FPCMSG
004056  006150                           INTFAI
004060  006115                           STAT
004062  177777                           -1
004064  000004                           RSTSS
004066  000002                           RTI                          ;EXIT EMT SUB.
                                ;EMT SUB TO GENERATE RANDOM BLOCK #, AND STORE AT BLKRQ.
004070  026727  174766  001101  RNDBK:   CMP     BLKRQ,#577.          ;VALID # IN BLKRQ?
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004076  101005                           BHI     RNDBKK           ;BR IF NOT.
004100  032767  004000  173462           BIT     #BIT11,SR        ;RANDOM # DESIRED?
004106  001401                           BEQ     RNDBKK           ;BR IF YES.
004110  000002                           RTI                      ;NO. RETAIN SAME BLOCK#.
004112  104035                  RNDBKK:  RNDNUM                   ;GET RANDOM NUMBER.
004114  000000                  RNDBKA:  OPEN                     ;RANDOM NUMBER GOES HERE.
004116  042767  176000  177770           BIC     #176000,RNDBKA
004124  026727  177764  001101           CMP     RNDBKA,#1101     ;NUMBER A VALID BLOCK NUMBER?
004132  101356                           BHI     RNDBK            ;BR IF NOT.
004134  016767  177754  174720           MOV     RNDBKA,BLKRQ     ;YES. NUMBER TO BLKRQ.
004142  000002                           RTI                      ;EXIT EMT SUB.
                                ;EMT SUB TO GENERATE RANDOM BLOCK# AND STORE AT BLKRQ.
                                ;THE NUMBER MUST NOT BE >574, OR <3.
004144  026727  174712  001076  RDBK1:   CMP     BLKRQ,#574.      ;SEE IF CURRENT BLK# IS VALID.
004152  101011                           BHI     RDBK1A           ;IF # IS HIGH GENERATE ANOTHER.
004154  026727  174702  000002           CMP     BLKRQ,#2         ;IS # <3?
004162  101405                           BLOS    RDBK1A           ;IF # IS <3 GENERATE ANOTHER.
004164  032767  004000  173376           BIT     #BIT11,SR        ;VALID #. RANDOM NUMBER CHANGE?
004172  001401                           BEQ     RDBK1A           ;BR IF RANDOM # IS DESIRED.
004174  000002                           RTI                      ;NO. KEEP SAME NUMBER.
004176  104035                  RDBK1A:  RNDNUM                   ;GET RANDOM NUMBER.
004200  000000                  RDBK1B:  OPEN                     ;RANDOM # IS STORED HERE.
004202  042767  176000  177770           BIC     #176000,RDBK1B
004210  026727  177764  000002           CMP     RDBK1B,#2        ;IS # <3?
004216  101767                           BLOS    RDBK1A           ;IF # IS <3 GET ANOTHER.
004220  026727  177754  001076           CMP     RDBK1B,#574.     ;# LARGER THAN 574.?
004226  101363                           BHI     RDBK1A           ;BR IF LARGER.
004230  016767  177744  174624           MOV     RDBK1B,BLKRQ     ;NEW NUMBER TO BLKRQ.
004236  000002                           RTI                      ;EXIT.
                                ;EMT SUB TO CHECK EXPECTED DATA AGAINST ACTUAL DATA AND REPORT ERRORS.
004240  012767  022041  000120  DTCKI:   MOV     #022041,DTCKBA   ;SET UP TO INCR EXP ADDR, DECR ACT ADDR.
004246  000403                           BR      DATCKK
004250  012767  022021  000110  DATCK:   MOV     #022021,DTCKBA   ;SET UP TO INCR BOTH DATA ADDRESSES.
004256  104006                  DATCKK:  SAVOSS
004260  012500                           MOV     (5)+,R0          ;GET EXPECTED DATA ADDR.
004262  012501                           MOV     (5)+,R1          ;GET ACTUAL DATA ADDR.
004264  012502                           MOV     (5)+,R2          ;GET CHECK COUNT.
004266  012767  000001  000104           MOV     #1,DATKNT        ;SET CURRENT WORD # TO 1.
004274  016703  174600                   MOV     ERRLIM,R3        ;ERROR LIMIT TO R3.
004300  021011                  DATCKA:  CMP     (0),(1)          ;COMPARE ACTUAL AND EXPECTED WORD.
004302  001427                           BEQ     DATCKB           ;BR IF EQUAL (OK).
004304  010067  000006                   MOV     R0,EXPD
004310  010167  000012                   MOV     R1,ACTD
004314  104061                           OACNV                    ;CONVERT EXPECTED DATA TO ASCII.
004316  000000                  EXPD:    OPEN
004320  006323                           ADATSB
004322  000006                           6
004324  104061                           OACNV                    ;CONVERT ACTUAL DATA TO ASCII.
004326  000000                  ACTD:    OPEN
004330  006337                           ADATWS
004332  000006                           6
004334  104062                           BDCNV                    ;CONVERT WORD # TO DECIMAL ASCII.
004336  004400                           DATKNT
004340  006310                           AWDCNT
004342  000004                           4
004344  104012                           ERRORN                   ;DATA ERROR.
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004346  006713                          FPCMSG
004350  006200                          BLKSB
004352  006270                          DATERR
004354  177777                          -1
004356  005303                          DEC     R3              ;NTH ERROR?
004360  001405                          BEQ     DATCKC          ;BR IF YES.
004362  005267  000012          DATCKB: INC     DATKNT          ;INCREMENT WORD NUMBER.
004366  000000                  DTCKBA: OPEN                    ;UPDATE DATA ADDRESSES.
004370  005302                          DEC     R2              ;DONE?
004372  001342                          BNE     DATCKA          ;BR IF NOT DONE.
004374  104007                  DATCKC: RSTOSS                  ;DONE.
004376  000002                          RTI                     ;EXIT.
004400  000000                  DATKNT: OPEN
                                ;EMT SUB TO CLEAR SPECIFIED AREA TO 0'S
004402  104006                  CLEARR: SAVOSS
004404  012500                          MOV     (5)+,R0         ;GET STARTING ADDR.
004406  012501                          MOV     (5)+,R1         ;GET COUNT.
004410  005020                          CLR     (0)+            ;CLEAR WORD.
004412  005301                          DEC     R1              ;DONE?
004414  001375                          BNE     .-4             ;BR IF NOT DONE.
004416  104007                          RSTOSS                  ;DONE
004420  000002                          RTI                     ;EXIT.
                                ;EMT SUB TO FILL AREA WITH SPECIFIED VALUE.
004422  104006                  FILLL:  SAVOSS
004424  012500                          MOV     (5)+,R0         ;GET STARTING ADDR.
004426  012502                          MOV     (5)+,R2         ;GET VALUE.
004430  012501                          MOV     (5)+,R1         ;GET COUNT.
004432  010220                          MOV     R2,(0)+         ;SET VALUE IN WORD.
004434  005301                          DEC     R1              ;DONE?
004436  001375                          BNE     .-4             ;BR IF NOT DONE.
004440  104007                          RSTOSS                  ;DONE
004442  000002                          RTI                     ;EXIT.
                                ;EMT SUB TO FILL AREA WITH BINARY COUNT PATTERN.
004444  104006                  BINFLL: SAVOSS
004446  012500                          MOV     (5)+,R0         ;GET STARTING ADDR.
004450  012501                          MOV     (5)+,R1         ;GET COUNT.
004452  104052                  BINFLA: GETBN1                  ;GET BINARY WORD.
004454  000000                  BINFLB: OPEN                    ;BINARY WORD IS STORED HERE.
004456  016720  177772                  MOV     BINFLB,(0)+     ;STORE WORD.
004462  005301                          DEC     R1              ;DONE?
004464  001372                          BNE     BINFLA          ;BR IF NOT DONE.
004466  104007                          RSTOSS                  ;DONE.
004470  000002                          RTI                     ;EXIT.
                                ;EMT SUB TO CHECK THAT WORD COUNT IS 0, AND THAT TCBA CONTENTS
                                ;MATCH THE EXPECTED CONTENTS.
004472  000003                  CWCBA:  SAV5S
004474  012567  174374                  MOV     (5)+,TEMP       ;GET EXPECTED TCBA CONTENTS.
004500  104024                          SAVDTR                  ;SAVE TCWC AND TCBA.
004502  005777  174302                  TST     @TCWC           ;WORD COUNT 0?
004506  001407                          BEQ     CWCBB           ;BR IF 0 (OK).
004510  104012                          ERRORN                  ;WORD COUNT NOT 0. TYPE
004512  006713                          FPCMSG                  ;CONTENTS OF TCWC AND TCBA.
004514  006217                          WCNOTO
004516  006023                          CTCWC
004520  006041                          CTCBA
004522  177777                          -1
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 004524  104000                          SCOPE
 004526  026777  174342  174256  CWCBB:  CMP     TEMP,@TCBA        ;TCBA AND EXPECTED TCBA SAME?
 004534  001415                          BEQ     CWCBC             ;BR IF YES (OK).
 004536  104061                          OACNV                     ;NO. CONVERT EXPECTED TCBA TO AS[illegible]
 004540  001074                          TEMP
 004542  006257                          ATCBAS
 004544  000006                          6
 004546  104012                          ERRORN                    ;TCBA DOES NOT MATCH EXPECTED
 004550  006713                          FPCMSG                    ;TCBA CONTENTS. TYPE EXPECTED TCB[illegible],
 004552  006234                          INCTCB                    ;ACTUAL TCBA, AND TCWC.
 004554  006234                          INCTCB
 004556  006251                          TCBASB
 004560  006041                          CTCBA
 004562  006023                          CTCWC
 004564  177777                          -1
 004566  104000                          SCOPE
 004570  000004                  CWCBC:  RST5S
 004572  000002                          RTI                       ;EXIT.
                                 ;EMT SUB TO HANDLE WRONG BLOCK # FOUND.
 004574  000003                  WNGBK:  SAV5S
 004576  104020                          STATUS                    ;SAVE STATUS.
 004600  104012                          ERRORN                    ;WRONG BLOCK NUMBER FOUND.
 004602  006713                          FPCMSG
 004604  006200                          BLKSB
 004606  006057                          CTCDT
 004610  006115                          STAT
 004612  177777                          -1
 004614  000004                          RST5S
 004616  000002                          RTI                       ;EXIT EMT SUB.
                                 ;EMT SUB TO CONVERT LOC A ROUTINE WAS CALLED FROM TO ASCII. ([illegible] IN R4)
 004620  010467  174252          CFPC:   MOV     R4,FPC            ;R4 TO FPC.
 004624  104061                          OACNV                     ;CONVERT TO ASCII.
 004626  001076                          FPC
 004630  006720                          AFPC
 004632  000006                          6
 004634  000002                          RTI                       ;EXIT EMT SUB.
                                 ;EMT SUBS TO SEARCH FOR DESIRED BLOCK NUMBER. SRCHFF GETS FORW[illegible]
                                 ;BLOCK NUMBERS. SRCHRR GETS REVERSE BLOCK NUMBERS.
 004636  105067  000327          SRCHFF: CLRB    DIRIND            ;SET FORWARD INDICATOR.
 004642  000403                          BR      SRCHA
 004644  112767  177777  000317  SRCHRR: MOVB    #-1,DIRIND        ;SET REVERSE INDICATOR.
 004652  012777  004736  174136  SRCHA:  MOV     #SRCHC,@TCVTR     ;SET INTERRUPT VECTOR TO SRCHC.
 004660  112767  000005  000302          MOVB    #5,REVCNT         ;SET MAX # OF REVERSALS ALLOWE[illegible]
 004666  052767  004000  000020          BIS     #REV,SRCHM        ;SET REV BIT IN SRCHM.
 004[illegible]  032777  004000  174104          BIT     #REV,@TCCM        ;REV BIT SET IN TCCM?
 004702  001003                          BNE     SRCHAA            ;BR IF YES.
 004704  042767  004000  000002          BIC     #REV,SRCHM        ;NO. CLEAR REV BIT FROM SRCHM.
 004712  104017                  SRCHAA: SETCOM                    ;START SEARCH.
 004714  000103                  SRCHM:  RNUM!IE!DO
 004716  000467                          BR      SREOUT            ;GO TO ERROR EXIT.
 004720  000402                          BR      SRCHB
 004722  005277  174060          SRCCON: INC     @TCCM             ;ISSUE DO TO ENABLE RNUM.
 004726  104016                  SRCHB:  DELAY                     ;TIME OUT INTERRUPT.
 004730  104016                          DELAY
 004732  104027                          NOINT                     ;FAILURE TO INTERRUPT.
 004734  000460                          BR      SREOUT            ;GO TO ERROR EXIT.
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004736  012716  004744          SRCHC:  MOV     #SRCHD,(6)       ;HERE WHEN INTERRUPT OCCURS.
004742  000002                          RTI                      ;EXIT TO SRCHD.
004744  022626                  SRCHD:  POPSP2                   ;RESTORE STACK.
004746  005777  174034                  TST     @TCCM            ;ERROR BIT SET?
004752  100003                          BPL     SRCHDA           ;BR IF NOT.
004754  104023                          CKERRZ                   ;CHECK FOR ERROR/ENDZ.
004756  000447                          BR      SREOUT           ;ERROR. GO TO ERROR EXIT.
004760  000454                          BR      SRCREV           ;ENDZ. GO REVERSE DIRECTION.
004762  027767  174026  174072  SRCHDA: CMP     @TCDT,BLKRQ      ;COMPARE BLK# IN TCDT TO REQUIRED BLK.
004770  001431                          BEQ     SRCF             ;BR IF BLK FOUND.
004772  003014                          BGT     SRCHE            ;BR IF TCDT HIGH.
004774  032777  004000  174004          BIT     #BIT11,@TCCM     ;TCDT LOW. CHECK DIRECTION.
005002  001747                          BEQ     SRCCON           ;BR IF GOING FWD. CONTINUE SAME DIRECTION.
005004  062777  000003  174002          ADD     #3,@TCDT         ;ADD 3 TO TCDT.
005012  027767  173776  174042          CMP     @TCDT,BLKRQ      ;LOWER BY 3 OR MORE?
005020  101440                          BLOS    SRCRVA           ;GO REVERSE IF LOWER BY 3 OR MORE.
005022  000737                          BR      SRCCON           ;NOT LOW ENOUGH. CONTINUE SAME DIRECTION.
005024  032777  004000  173754  SRCHE:  BIT     #BIT11,@TCCM     ;TCDT HIGH. CHECK DIRECTION.
005032  001333                          BNE     SRCCON           ;BR IF IN REVERSE. CONTINUE DIRECTION.
005034  162777  000003  173752          SUB     #3,@TCDT         ;SUBTRACT 3 FROM TCDT.
005042  026777  174014  173744          CMP     BLKRQ,@TCDT      ;HIGHER BY 3 OR MORE?
005050  003430                          BLE     SRCRVB           ;GO REVERSE IF HIGHER BY 3 OR MORE.
005052  000723                          BR      SRCCON           ;NOT HIGH ENOUGH. CONTINUE DIRECTION.
005054  032777  004000  173724  SRCF:   BIT     #BIT11,@TCCM     ;TCDT EQUAL. CHECK DIRECTION.
005062  001007                          BNE     SRCHG            ;BR IF IN REVERSE.
005064  105767  000101                  TSTB    DIRIND           ;GOING FORWARD. FWD BLK# WANTED?
005070  001314                          BNE     SRCCON           ;BR IF FWD BLK# NOT WANTED.
005072  000003                  SRCOUT: SAV5S
005074  005725                          TST     (5)+             ;SET UP SUCCESS EXIT.
005076  000004                  SREOUT: RST5S
005100  000002                          RTI                      ;EXIT EMT SUB.
005102  105767  000063          SRCHG:  TSTB    DIRIND           ;GOING REV. REV BLK# WANTED?
005106  001371                          BNE     SRCOUT           ;BR IF REV BLK# WANTED.
005110  000704                          BR      SRCCON           ;NOT WANTED CONTINUE.
005112  032777  004000  173666  SRCREV: BIT     #BIT11,@TCCM     ;REV BIT SET?
005120  001404                          BEQ     SRCRVB           ;BR IF NOT.
005122  042777  004000  173656  SRCRVA: BIC     #BIT11,@TCCM     ;IN REVERSE. SET TO FORWARD.
005130  000403                          BR      SRCRVC
005132  052777  004000  173646  SRCRVB: BIS     #BIT11,@TCCM     ;FORWARD. SET TO REVERSE.
005140  105367  000024          SRCRVC: DECB    REVCNT           ;FIFTH REVERSAL ISSUED?
005144  001266                          BNE     SRCCON           ;BR IF NOT.
005146  104020                          STATUS                   ;YES. ERROR. SAVE STATUS.
005150  000003                          SAV5S
005152  104012                          ERRORN                   ;BLK# NOT FOUND WITHIN 5 TAPE REVERSALS.
005154  006713                          +PCMSG
005156  006200                          BLKSB
005160  006672                          SRCHER
005162  006115                          STAT
005164  177777                          -1
005166  000743                          BR      SREOUT           ;GO TO ERROR EXIT.
005170     000                  REVCNT: .BYTE   OPEN
005171     000                  DIRIND: .BYTE   OPEN
                                ;EMT SUBS TO WDATA, RDATA, FORWARD OR REVERSE.
005172  000003                  WRDFR:  SAV5S
005174  012577  173610                  MOV     (5)+,@TCWC       ;GET WORD COUNT AND SET IN TCWC
005200  017767  173604  000100          MOV     @TCWC,WRDFRG     ;2(WORD COUNT) TO WRDFRG.
```

B03


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005206  006367  000074                      ASL     WRDFRG
005212  005477  173572                      NEG     @TCWC               ;IN 2'S COMPLEMENT FORM.
005216  012577  173570                      MOV     (5)+,@TCBA          ;SET ADDR IN TCBA.
005222  067767  173564  000056              ADD     @TCBA,WRDFRG        ;2(WORD COUNT)+TCBA=FINAL TCBA CONTENTS.
005230  000000                      WRDFRA: OPEN                        ;SRCHF OR SRCHR CALL GOES HERE.
005232  104000                              SCOPE                       ;ERROR IN SRCHF OR SRCHR.
005234  012777  005260  173554              MOV     #WRDFRC,@TCVTR      ;SET INTERRUPT VECTOR TO WRDFRC.
005242  104017                              SETCOM                      ;ISSUE WDATA OR RDATA.
005244  000000                      WRDFRB: OPEN                        ;COMMAND GOES HERE.
005246  104000                              SCOPE                       ;SETCOM ERROR.
005250  104016                              DELAY                       ;TIMEOUT INTERRUPT.
005252  104016                              DELAY
005254  104027                              NOINT                       ;FAILURE TO INTERRUPT.
005256  104000                              SCOPE
005260  012716  005266              WRDFRC: MOV     #WRDFRD,(6          ;HERE WHEN INTERRUPT OCCURS.
005264  000002                              RTI                         ;EXIT TO WRDFRD.
005266  022626                      WRDFRD: POPSP2                      ;RESTORE STACK.
005270  005777  173512                      TST     @TCCM               ;ERROR BIT SET?
005274  100003                              BPL     WRDFRF              ;BR IF NOT.
005276  104023                              CKERRZ                      ;CHECK FOR ERRORS.
005300  104000                              SCOPE                       ;ERROR RETURN.
005302  000240                              NOP                         ;ENDZ RETURN.
005304  104043                      WRDFRF: CKWCBA                      ;CHECK WORD COUNT AND CURRENT ADDR.
005306  000000                      WRDFRG: OPEN                        ;TCBA SHOULD EQUAL THIS.
005310  000004                      WRDFRE: RST5S
005312  000002                              RTI                         ;EXIT.
005314  012767  000115  177722      WDATF:  MOV     #WDATA!FWD!IE!DO,WRDFRB
005322  000403                              BR      RDATF+6
005324  012767  000105  177712      RDATF:  MOV     #RDATA!FWD!IE!DO,WRDFRB
005332  012767  104032  177670              MOV     #SRCHF,WRDFRA
005340  000714                              BR      WRDFR
005342  012767  004115  177674      WDATR:  MOV     #WDATA!REV!IE!DO,WRDFRB
005350  000403                              BR      RDATR+6
005352  012767  004105  177664      RDATR:  MOV     #RDATA!REV!IE!DO,WRDFRB
005360  012767  104033  177642              MOV     #SRCHR,WRDFRA
005366  000701                              BR      WRDFR
005370  012767  000165  177646      RDTFX:  MOV     #RDATA!FWD!IE!BIT5!BIT4!DO,WRDFRB
005376  000755                              BR      RDATF+6
                                    ;EMT SUB TO SELECT SEQUENTIAL DECTAPE UNIT.
005400  005267  000010              SQDRV:  INC     SQDRVA
005404  042767  177770  000002              BIC     #177770,SQDRVA
005412  104060                              SELDRV                      ;SELECT UNIT SET IN SQDRVA IF AVAILABLE.
005414  000000                      SQDRVA: OPEN                        ;UNIT NUMBER GOES HERE.
005416  000770                              BR      SQDRV               ;UNIT NOT AVAILABLE RETURN.
005420  000002                              RTI                         ;UNIT SELECTED. EXIT.
                                    ;EMT SUB TO SELECT SPECIFIED DECTAPE UNIT IF AVAILABLE.
005422  104006                      SELDRR: SAV05S
005424  012500                              MOV     (5)+,R0             ;GET UNIT NUMBER.
005426  136067  005454  173434              BITB    UNTAB(0),UNITS      ;SEE IF UNIT AVAILABLE.
005434  001405                              BEQ     SELDRA              ;BR IF UNIT NOT AVAILABLE.
005436  010067  173424                      MOV     R0,UNITN            ;AVAILABLE. SELECT UNIT.
005442  110067  173417                      MOVB    R0,UNIT+1
005446  005725                              TST     (5)+                ;SET UP SELECTED EXIT.
005450  104007                      SELDRA: RST05S
005452  000002                              RTI                         ;EXIT.
005454     001     002     004      UNTAB:  .BYTE   BIT0,BIT1,BIT2,BIT3,BIT4,BIT5,BIT6,BIT7
```

```
005457     010     020     040
005462     100     200
005464  022445     124          EMC:    .ASCII  '%%T'
005467     040  020040  020040  ATNUMB: .ASCII  '     PC '
005474  041520     040
005477     040  020040  020040  APC:    .ASCII  '       ICNT '
005504  020040  041511  052116
005512     040
005513     040  020040  020040  AICNT:  .ASCII  '     .'
005520     056
005521     040  047125  052111          .ASCII  ' UNIT '
005526     040
005527     040     000          AUNIT:  .ASCIZ  ' '
005531     045  044445  053116  AINCRT: .ASCIZ  '%%INVALID TEST.'
005536  046101  042111  052040
005544  051505  027124     000
005551     045  052045  031503  PGTIT:  .ASCIZ  '%%TC3 - TC11 TEST 3%%'
005556  026440  052040  030503
005564  020061  042524  052123
005572  031440  022445     000
005577     045  052123  047101  INST1:  .ASCII  '%STANDARD TAPES ON UNITS.'
005604  040504  042122  052040
005612  050101  051505  047440
005620  020116  047125  052111
005626  027123
005630  051045  046505  052117          .ASCII  '%REMOTE, WRITE ENABLE.'
005636  026105  053440  044522
005644  042524  042440  040516
005652  046102  027105
005656  053445  046101  051514          .ASCII  '%WALLSW: OFF, WRTMSW: OFF.'
005664  035127  047440  043106
005672  020054  051127  046524
005700  053523  020072  043117
005706  027106
005710  051445  046105  041505          .ASCII  '%SELECT UNITS WITH SR7 - SR0. '
005716  020124  047125  052111
005724  020123  044527  044124
005732  051440  033522  026440
005740  051440  030122  020056
005746  051120  051505  020123          .ASCIZ  'PRESS CONT%'
005754  047503  052116  000045
005762  051445  052105  051440  ASETSP: .ASCIZ  '%SET SR OPTIONS. NORMAL SR=0'
005770  020122  050117  044524
005776  047117  027123  047040
006004  051117  040515  020114
006012  051123  030075     000
006017     007                  APGEND: .BYTE   007
006020  025045     000                  .ASCIZ  '%*'
006023     040  041524  041527  CTCWC:  .ASCII  ' TCWC '
006030     040
006031     040  020040  020040  ATCWC:  .ASCIZ  '       '
006036  020040     000
006041     040  041524  040502  CTCBA:  .ASCII  ' TCBA '
006046     040
006047     040  020040  020040  ATCBA:  .ASCIZ  '       '
006054  020040     000
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006057     040  041524  052104  CTCDT:  .ASCII  ' TCDT '
006064     040
006065     040  020040  020040  ATCDT:  .ASCIZ  '      '
006072  020040     000
006075     040  041524  052104  SBTCDT: .ASCII  ' TCDTSB '
006102  041123     040
006105     040  020040  020040  ASBTCD: .ASCIZ  '      '
006112  020040     000
006115     040  041524  046503  STAT:   .ASCII  ' TCCM '
006122     040
006123     040  020040  020040  ATCCM:  .ASCII  '         TCST '
006130  020040  052040  051503
006136  020124
006140  020040  020040  020040  ATCST:  .ASCIZ  '      '
006146  000040
006150  047045  020117  052104  INTFAI: .ASCIZ  '%NO DT INTRPT '
006156  044440  052116  050122
006164  020124     000
006167     045  052104  042440  DTERR:  .ASCIZ  '%DT ERR '
006174  051122  000040
006200  041040  045514  050522  BLKSB:  .ASCII  ' BLKRQ '
006206     040
006207     040  020040  020040  ABLKRQ: .ASCIZ  '      '
006214  020040     000
006217     045  041524  041527  WCNOTO: .ASCIZ  '%TCWC NOT 0 '
006224  047040  052117  030040
006232  000040
006234  052045  041103  020101  INCTCB: .ASCIZ  '%TCBA WRONG '
006242  051127  047117  020107
006250     000
006251     040  041524  040502  TCBASB: .ASCII  ' TCBA '
006256     040
006257     040  020040  020040  ATCBAS: .ASCIZ  '      '
006264  020040  000040
006270  042045  052101  020101  DATERR: .ASCII  '%DATA ERR  WORD '
006276  051105  020122  053440
006304  051117  020104
006310  020040  020040  020056  AWDCNT: .ASCII  '    .  S/B '
006316  051440  041057     040
006323     040  020040  020040  ADATSB: .ASCII  '        WAS '
006330  020040  053440  051501
006336     040
006337     040  020040  020040  ADATWS: .ASCIZ  '      '
006344  000040
006346  051045  054504  042457  STCMSG: .ASCIZ  '%RDY/ERR NOT 0 AFTER DO '
006354  051122  047040  052117
006362  030040  040440  052106
006370  051105  042040  020117
006376     000
006377     045  050125  020123  EMSG0:  .ASCIZ  '%UPS DIDNT SET '
006404  044504  047104  020124
006412  042523  020124     000
006417     045  051120  046505  EMSG0A: .ASCIZ  '%PREMATURE UPS '
006424  052101  051125  020105
006432  050125  020123     000
006437     045  050125  020123  EMSG1:  .ASCIZ  '%UPS DIDNT CLEAR '
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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
```

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                                       ;*******************************************************************
                                       T0:     0                               ;ROUTINE NUMBER 0                          *
007016  000000
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                                 EMSG0                           ;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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      007210  007234                           BC                     ;BC.
      007212  012777  177777  171574           MOV     #-1,@TCDT      ;SET TCDT TO ALL 1'S
      007220  104017                           SETCOM                 ;ISSUE RNUM!FWD!IE!DO
      007222  000000                   BBA:    OPEN                   ;RNUM!FWD!IE!DO, OR RNUM!REV!IE!DO
      007224  104000                           SCOPE                  ;SETCOM ERROR.
      007226  104016                           DELAY                  ;WAIT.
      007230  104027                           NOINT                  ;RNUM!FWD!IE!DO OR RNUM!REV!IE!DO FAILED
                                                                      ;TO INTERRUPT.  IF IN PRINTED TCCM
                                                                      ;THE READY BIT IS SET, ERROR DUE
                                                                      ;TO INTERRUPT FAILURE.
      007232  104000                           SCOPE                  ;SCOPE.
      007234  012716  007242           BC:     MOV     #BD,(6)        ;HERE WHEN INTERRUPT OCCURS.
      007240  000002                           RTI                    ;EXIT TO BD.
      007242  022626                   BD:     POPSP2                 ;RESTORE STACK.
      007244  104023                           CKERRZ                 ;ERROR?
      007246  104000                           SCOPE                  ;HERE IF ERROR.
      007250  000417                           BR      BF             ;ENDZ RETURN.
      007252  022777  177777  171534           CMP     #-1,@TCDT      ;IS TCDT STILL A -1?
      007260  001007                           BNE     BE             ;NO.  OK
      007262  104024                   BCA:    SAVDTR                 ;SAVE TCDT.
      007264  104012                           ERRORN                 ;TCDT STILL -1. ERROR RNUM FAILED
      007266  006461                           EMSG2                  ;TO READ BLOCK # INTO TCDT, OR
      007270  006115                           STAT                   ;DATA IN TCDT IS NOT BETWEEN
      007272  006057                           CTCDT                  ;0 AND 1101. (CHECK TYPED TCDT).
      007274  177777                           -1
      007276  104000                           SCOPE                  ;SCOPE.
      007300  027727  171510  001101   BE:     CMP     @TCDT,#1101    ;BLOCK BETWEEN 0 AND 1101?
      007306  101365                           BHI     BCA            ;BR IF NOT (ERROR).
      007310  104021                   BF:     STOPDT                 ;ALL STOP.
      007312  000207                           RTS     PC             ;EXIT.
                                       ;**************************************************************
      007314  000002                   T2:     2                      ;ROUTINE NUMBER 2                *
      007316  007552                           T3                     ;ADDRESS OF NEXT ROUTINE         *
      007320  000012                           10.                    ;TEST ITERATION COUNT            *
      007322  007324                           CA                     ;SCOPE ENTRY POINT               *
                                               .LIST
                                       ;**************************************************************
                                       ;TEST ABILITY TO DETECT REV ENDZ, BUT NOT BEFORE BLOCK # 0 HAS BEEN READ.
      007324  104017                   CA:     SETCOM                 ;ISSUE RNUM!FWD!DO.
      007326  000003                           RNUM!FWD!DO
      007330  104000                           SCOPE                  ;SETCOM ERROR.
      007332  104016                   CAB:    DELAY                  ;WAIT.
      007334  104023                           CKERRZ                 ;CHECK FOR ERROR
      007336  104000                           SCOPE                  ;HERE IF ERROR
      007340  000240                           NOP                    ;ENDZ RETURN,
      007342  005777  171446                   TST     @TCDT          ;BLOCK 0?
      007346  001766                           BEQ     CA             ;YES.  GO PAST BLOCK 0
      007350  104015                           SVECTR                 ;NO.  SET INTERRUPT VECTOR TO CD
      007352  007376                           CD
      007354  104017                           SETCOM                 ;ISSUE RNUM!REV!IE!DO.
      007356  004103                           RNUM!REV!IE!DO
      007360  104000                           SCOPE                  ;SETCOM ERROR.
      007362  000402                           BR      CCB
      007364  005277  171416           CCA:    INC     @TCCM          ;ISSUE DO.
      007370  104016                   CCB:    DELAY                  ;TIME OUT INTERRUPT.
      007372  104027                           NOINT                  ;INTERRUPT FAILURE.
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 007374  104000                           SCOPE
 007376  012716  007404           CD:     MOV     #CE,(6)            ;HERE WHEN INTERRUPT OCCURS.
 007402  000002                           RTI                        ;EXIT TO CE.
 007404  022626                   CE:     POPSP2                     ;RESTORE STACK.
 007406  005777  171374                   TST     @TCCM              ;ERR BIT SET?
 007412  100003                           BPL     CEA                ;BR IF NOT.
 007414  104023                           CKERRZ                     ;CHECK FOR ERROR
 007416  104000                           SCOPE                      ;HERE IF ERROR
 007420  104053                           FRMEND                     ;PREMATURE REV ENDZ.
 007422  017767  171366  171432   CEA:    MOV     @TCDT,BLKRQ        ;SAVE BLOCK NUMBER.
 007430  005777  171360                   TST     @TCDT              ;BLOCK 0?
 007434  001353                           BNE     CCA                ;BR IF NOT.  (KEEP LOOKING FOR BLOCK 0).
 007436  104015                           SVECTR                     ;SET INTERRUPT VECTOR TO CH
 007440  007522                           CH
 007442  104016                           DELAY                      ;WAIT FOR POSSIBLE ENDZ INTERRUPT.
 007444  104020                           STATUS                     ;SAVE TCCM AND TCST
 007446  005777  171332                   TST     @TCST              ;ENDZ BIT SET?
 007452  100405                           BMI     CF                 ;BR IF ENDZ IS SET.
 007454  104012                           ERRORN                     ;REV END ZONE FAILED TO SET
 007456  006522                           EMSG4                      ;ENDZ BIT.
 007460  006115                           STAT
 007462  177777                           -1
 007464  104000                           SCOPE
 007466  032777  000200  171310   CF:     BIT     #UPS,@TCST         ;UPS CLEAR?
 007474  001405                           BEQ     CG                 ;BR IF UPS CLEAR
 007476  104012                   CFA:    ERRORN                     ;GETTING TO REV ENDZ FAILED TO
 007500  006543                           EMSG5                      ;CLEAR UPS.
 007502  006115                           STAT
 007504  177777                           -1
 007506  104000                           SCOPE                      ;SCOPE
 007510  104012                   CG:     ERRORN                     ;ENDZ BIT FAILED TO CAUSE
 007512  006500                           EMSG3                      ;INTERRUPT.  (CHECK TYPED TCCM
 007514  006115                           STAT                       ;TO SEE IF ERROR BIT SET).
 007516  177777                           -1
 007520  104000                           SCOPE                      ;SCOPE.
 007522  012716  007530           CH:     MOV     #CI,(6)            ;HERE IF INTERRUPT OCCURS.
 007526  000002                           RTI                        ;EXIT TO CI.
 007530  022626                   CI:     POPSP2                     ;RESTORE STACK.
 007532  104023                           CKERRZ                     ;CHECK FOR ERROR OR ENDZ
 007534  104000                           SCOPE                      ;HERE IF ERROR
 007536  000240                           NOP
 007540  032777  000200  171236           BIT     #UPS,@TCST         ;HERE IF ENDZ.  UPS CLEAR?
 007546  001353                           BNE     CFA                ;BR IF UPS NOT CLEAR.
 007550  104000                           SCOPE                      ;SCOPE.

                                  ;*******************************************************************
 007552  000003                   T3:     3                          ;ROUTINE NUMBER 3                    *
 007554  007706                           T4                         ;ADDRESS OF NEXT ROUTINE             *
 007556  000001                           1                          ;TEST ITERATION COUNT                *
 007560  007562                           DA                         ;SCOPE ENTRY POINT                   *
                                          .LIST
                                  ;*******************************************************************
                                  ;SEQUENTIALLY SEARCH ALL BLOCK NUMBERS IN FORWARD DIRECTION.
 007562  104025                   DA:     REWIND                     ;REWIND TO REV ENDZ.
 007564  104015                           SVECTR                     ;SET INTERRUPT VECTOR TO DB
 007566  007616                           DB
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007570  005067  171266                  CLR     BLKRQ           ;1ST EXPECTED BLOCK # TO BLKRQ.
007574  012767  001102  171242          MOV     #578.,CTRA      ;# OF BLOCKS TO CHECK TO CTRA
007602  104017                          SETCOM                  ;ISSUE RNUM!FWD!IE!DO
007604  000103                          RNUM!FWD!IE!DO
007606  104000                          SCOPE                   ;SETCOM ERROR.
007610  104016                  DAA:    DELAY                   ;TIMEOUT INTERRUPT .
007612  104027                          NOINT                   ;NO DECTAPE INTERRUPT.
007614  104000                          SCOPE
007616  012716  007624          DB:     MOV     #DC,(6)         ;HERE WHEN INTERRUPT OCCURS.  SET
007622  000002                          RTI                     ;INIT. EXIT TO DC AND EXIT.
007624  022626                  DC:     POPSP2                  ;RESTORE STACK.
007626  104023                          CKERRZ                  ;CHECK FOR ERROR OR ENDZ
007630  104000                          SCOPE                   ;HERE IF ERROR.
007632  104053                          PRMEND                  ;PREMATURE FWD ENDZ.
007634  104024                          SAVDTR                  ;SAVE TCDT
007636  026777  171220  171150          CMP     BLKRQ,@TCDT     ;TCDT=EXPECTED BLOCK?
007644  001407                          BEQ     DD              ;BR IF YES.
007646  104012                          ERRORN                  ;BLOCK # IN TCDT NOT EQUAL TO
007650  006461                          EMSG2                   ;EXPECTED BLOCK NUMBER
007652  006200                          BLKSB
007654  006057                          CTCDT
007656  006115                          STAT
007660  177777                          -1
007662  104000                          SCOPE                   ;SCOPE
007664  005267  171172          DD:     INC     BLKRQ
007670  005367  171150                  DEC     CTRA            ;578 BLOCK # TESTED?
007674  001403                          BEQ     DF              ;BR IF YES.
007676  105277  171104                  INCB    @TCCM           ;ISSUE DO TO CONTINUE RNUM!FWD!IE
007702  000742                          BR      DAA
007704  104000                  DF:     SCOPE                   ;SCOPE.

                                ;*************************************************************************
007706  000004                  T4:     4                       ;ROUTINE NUMBER 4                       *
007710  010116                          T5                      ;ADDRESS OF NEXT ROUTINE                *
007712  000012                          10.                     ;TEST ITERATION COUNT                   *
007714  007716                          EA                      ;SCOPE ENTRY POINT                      *
                                        .LIST
                                ;*************************************************************************
                                ;TEST ABILITY TO DETECT FWD ENDZ, BUT NOT BEFORE BLOCK 1101 HAS BEEN READ.
007716  104025                  EA:     REWIND                  ;GO TO REV ENDZ.
007720  000404                          BR      EAA
007722  104017                          SETCOM                  ;ISSUE RNUM!REV!DO
007724  004003                          RNUM!REV!DO
007726  104000                          SCOPE                   ;SETCOM ERROR.
007730  104016                          DELAY                   ;WAIT.
007732  012777  177777  171054  EAA:    MOV     #-1,@TCDT       ;-1 TO TCDT.
007740  104015                          SVECTR                  ;OK RETURN
007742  007760                          EC
007744  104017                          SETCOM                  ;ISSUE RNUM!FWD!IE!DO
007746  000103                          RNUM!FWD!IE!DO
007750  104000                          SCOPE                   ;SETCOM ERROR.
007752  104016                  EB:     DELAY
007754  104027                          NOINT                   ;FAILURE TO INTERRUPT.
007756  104000                          SCOPE
007760  012716  007766          EC:     MOV     #ED,(6)
007764  000002                          RTI                     ;EXIT INTERRUPT
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007766  022626                   ED:    POPSP2                    ;RESTORE STACK.
007770  104023                          CKERRZ                    ;CHECK FOR ERRORS.
007772  104000                          SCOPE                     ;ERROR RETURN
007774  104053                          PRMEND                    ;PREMATURE FWD ENDZ.
007776  017767  171012  171056          MOV     @TCDT,BLKRQ       ;SAVE BLOCK NUMBER.
010004  022777  001101  171002          CMP     #1101,@TCDT       ;BLOCK 1101 (577(10))
010012  001403                          BEQ     EE                ;BR IF BLOCK 1101 FOUND.
010014  105277  170766                  INCB    @TCCM             ;NOT YET. CONTINUE SEARCH.
010020  000754                          BR      EB
010022  104015                   EE:    SVECTR                    ;SET INTERRUPT VECTOR TO EH.
010024  010064                          EH
010026  104016                          DELAY                     ;TIMEOUT INTERRUPT
010030  104020                          STATUS                    ;SAVE TCCM AND TCST
010032  005777  170746                  TST     @TCST             ;ENDZ SET?
010036  100405                          BMI     EF                ;BR IF SET.
010040  104012                          ERRORN                    ;FWD ENDZ FAILED TO SET ENDZ BIT.
010042  006522                          EMSG4
010044  006115                          STAT
010046  177777                          -1
010050  104000                          SCOPE                     ;SCOPE.
010052  104012                   EF:    ERRORN                    ;ENDZ BIT FAILED TO CAUSE
010054  006500                          EMSG3                     ;INTERRUPT.  CHECK TYPED TCCM
010056  006115                          STAT                      ;TO SEE IF ERROR BIT SET.
010060  177777                          -1
010062  104000                          SCOPE                     ;SCOPE.
010064  012716  010072           EH:    MOV     #EI,(6)           ;HERE WHEN INTERRUPT OCCURS.  SET
010070  000002                          RTI                       ;INT. EXIT POINTER TO EI AND EXIT.
010072  022626                   EI:    POPSP2                    ;RESTORE STACK.
010074  104023                          CKERRZ                    ;CHECK FOR ERRORS
010076  104000                          SCOPE                     ;ERROR RETURN
010100  000404                          BR      EK                ;ENDZ RETURN
010102  104012                          ERRORN                    ;ERROR.  INTERRUPT AFTER BLOCK 1101 NOT
010104  006625                          EMSG7                     ;DUE TO ENDZ.
010106  006115                          STAT
010110  177777                          -1
010112  104021                   EK:    STOPDT                    ;ALL STOP
010114  104000                          SCOPE                     ;SCOPE
                                 ;*******************************************************************
010116  000005                   T5:    5                         ;ROUTINE NUMBER 5               *
010120  010254                          T6                        ;ADDRESS OF NEXT ROUTINE        *
010122  000001                          1                         ;TEST ITERATION COUNT           *
010124  010126                          EEA                       ;SCOPE ENTRY POINT              *
                                        .LIST
                                 ;*******************************************************************
                                 ;SEQUENTIALLY SEARCH ALL BLOCK NUMBERS IN REVERSE DIRECTION.
010126  104026                   EEA:   WIND                      ;GO TO FWD ENDZ.
010130  104015                          SVECTR                    ;SET INTERRUPT VECTOR TO EEB.
010132  010164                          EEB
010134  012767  001101  170720          MOV     #577.,BLKRQ       ;START WITH BLK# 577.
010142  012767  001102  170674          MOV     #578.,CTRA        ;# OF BLOCKS TO CHECK TO CTRA.
010150  104017                          SETCOM                    ;ISSUE RNUM!REV!IE!DO.
010152  004103                          RNUM!REV!IE!DO
010154  104000                          SCOPE                     ;SETCOM ERROR.
010156  104016                   EEAA:  DELAY                     ;TIME OUT INTERRUPT.
010160  104027                          NOINT                     ;FAILURE TO INTERRUPT.
010162  104000                          SCOPE
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010164 012716 010172          EEB:  MOV     #EEC,(6)        ;HERE WHEN INTERRUPT OCCURS.
010170 000002                       RTI                     ;EXIT TO EEC.
010172 022626                 EEC:  POPSP2                  ;RESTORE STACK.
010174 104023                       CKERRZ                  ;ERROR OR ENDZ?
010176 104000                       SCOPE                   ;ERROR RETURN.
010200 104053                       PRMEND                  ;PREMATURE REV ENDZ.
010202 104024                       SAVDTR                  ;SAVE TCDT.
010204 026777 170652 170602         CMP     BLKRQ,@TCDT     ;EXPECTED AND ACTUAL BLK#'S SAME?
010212 001407                       BEQ     EED             ;BR IF SAME.
010214 104012                       ERRORN                  ;BLOCK# IN TCDT NOT EQUAL TO
010216 006461                       EMSG2                   ;EXPECTED BLOCK#.
010220 006200                       BLKSB
010222 006057                       CTCDT
010224 006115                       STAT
010226 177777                       -1
010230 104000                       SCOPE
010232 005367 170624          EED:  DEC     BLKRQ           ;DECREMENT EXPECTED BLK#.
010236 005367 170602                DEC     CTRA            ;CHECKED 578 BLOCKS?
010242 001403                       BEQ     EEF             ;BR IF YES.
010244 005277 170536                INC     @TCCM           ;ISSUE DO TO CONTINUE SEARCH.
010250 000742                       BR      EEAA
010252 104000                 EEF:  SCOPE

                              ;*******************************************************************
010254 000006                 T6:   6                       ;ROUTINE NUMBER 6              *
010256 010426                       T7                      ;ADDRESS OF NEXT ROUTINE       *
010260 000001                       1                       ;TEST ITERATION COUNT          *
010262 010264                       FA                      ;SCOPE ENTRY POINT             *
                                    .LIST
                              ;*******************************************************************
                              ;SEARCH FORWARD.  READ EVERY ELEVENTH BLOCK # AND CHECK THAT IT MATCHES
                              ;WITH EXPECTED BLOCK.
010264 104025                 FA:   REWIND                  ;REWIND TO REV ENDZ.
010266 012767 000062 170550         MOV     #50.,CTRA
010274 012767 000013 170544         MOV     #11.,CTRB
010302 012767 000012 170552         MOV     #10.,BLKRQ
010310 104015                       SVECTR                  ;SET INTERRUPT VECTOR TO FB.
010312 010330                       FB
010314 104017                       SETCOM                  ;ISSUE RNUM!FWD!IE!DO
010316 000103                       RNUM!FWD!IE!DO
010320 104000                       SCOPE                   ;SETCOM ERROR.
010322 104016                 FAA:  DELAY                   ;TIME OUT INTERRUPT
010324 104027                       NOINT                   ;FAILURE TO INTERRUPT
010326 104000                       SCOPE                   ;SCOPE.
010330 012716 010336          FB:   MOV     #FC,(6)         ;HERE WHEN INTERRUPT OCCURS. SET
010334 000002                       RTI                     ;EXIT TO FC AND EXIT.
010336 022626                 FC:   POPSP2                  ;RESTORE STACK.
010340 104023                       CKERRZ                  ;CHECK FOR ERRORS
010342 104000                       SCOPE                   ;ERROR RETURN.
010344 104053                       PRMEND                  ;PREMATURE FWD ENDZ.
010346 005367 170474                DEC     CTRB            ;ELEVENTH BLOCK?
010352 001403                       BEQ     FD              ;BR IF YES.
010354 005277 170426          FCA:  INC     @TCCM           ;NO. CONTINUE
010360 000760                       BR      FAA
010362 104024                 FD:   SAVDTR                  ;SAVE TCDT.
010364 026777 170472 170422         CMP     BLKRQ,@TCDT     ;BLKRQ=TCDT?
010372 001402                       BEQ     FE              ;BR IF SAME.
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010374  104034                          WRNGBK                  ;THE BLOCK NOT THE EXPECTED BLOCK.
010376  104000                          SCOPE                   ;SCOPE
010400  062767  000013  170454  FE:     ADD     #11.,BLKRQ      ;SET UP BCKRQ TO NEXT EXPECTED BLOCK.
010406  012767  000013  170432          MOV     #11.,CTRB       ;RESET CTRB TO 11.
010414  005367  170424                  DEC     CTRA            ;DONE 50 TIMES?
010420  001355                          BNE     FCA             ;BR IF NOT.
010422  104021                          STOPDT                  ;DONE TO. ALL STOP.
010424  104000                          SCOPE                   ;SCOPE
                                ;*************************************************************
010426  000007                  T7:     7                       ;ROUTINE NUMBER 7               *
010430  010600                          T10                     ;ADDRESS OF NEXT ROUTINE        *
010432  000001                          1                       ;TEST ITERATION COUNT           *
010434  010436                          GA                      ;SCOPE ENTRY POINT              *
                                        .LIST
                                ;*************************************************************
                                ;SEARCH REVERSE.  READ EVERY 11TH BLOCK # AND CHECK THAT IT MATCHES
                                ;WITH EXPECTED BLOCK.
010436  104026                  GA:     WIND                    ;GO TO FWD ENDZ.
010440  012767  000062  170376          MOV     #50.,CTRA
010446  012767  000013  170372          MOV     #11.,CTRB
010454  012767  001067  170400          MOV     #567.,BLKRQ     ;1ST EXPECTED BLK # TO BLKRQ
010462  104015                          SVECTR                  ;SET INTERRUPT VECTOR TO GB.
010464  010502                          GB
010466  104017                          SETCOM                  ;ISSUE RNUM!REV!IE!DO
010470  004103                          RNUM!REV!IE!DO
010472  104000                          SCOPE                   ;SETCOM ERROR.
010474  104016                  GAA:    DELAY                   ;TIME OUT INTERRUPT
010476  104027                          NOINT                   ;FAILURE TO INTERRUPT
010500  104000                          SCOPE                   ;SCOPE
010502  012716  010510          GB:     MOV     #GC,(6)         ;HERE WHEN INTERRUPT OCCURS. SET
010506  000002                          RTI                     ;EXIT TO GC AND EXIT
010510  022626                  GC:     POPSP2                  ;RESTORE STACK.
010512  104023                          CKERRZ                  ;CHECK FOR ERROR OR ENDZ.
010514  104000                          SCOPE                   ;HERE IF ERROR
010516  104053                          PRMEND                  ;PREMATURE REV ENDZ.
010520  005367  170322                  DEC     CTRB            ;ELEVENTH BLOCK?
010524  001403                          BEQ     GD              ;BR IF YES.
010526  005277  170254          GCA:    INC     @TCCM           ;NO. CONTINUE
010532  000760                          BR      GAA
010534  104024                  GD:     SAVDTR                  ;SAVE TCDT.
010536  026777  170320  170250          CMP     BLKRQ,@TCDT     ;TCDT SAME AS EXPECTED?
010544  001402                          BEQ     GE              ;BR IF YES.
010546  104034                          WRNGBK                  ;NO BLK# IN TCDT NOT SAME AS
010550  104000                          SCOPE                   ;EXPECTED. SCOPE.
010552  162767  000013  170302  GE:     SUB     #11.,BLKRQ      ;SET UP BLKRQ TO NEXT EXPECTED BLOCK.
010560  012767  000013  170260          MOV     #11.,CTRB       ;RESET CTRB TO 11.
010566  005367  170252                  DEC     CTRA            ;DONE 50 TIMES
010572  001355                          BNE     GCA             ;BR IF NOT
010574  104021                          STOPDT                  ;DONE 50.  ALL STOP.
010576  104000                          SCOPE                   ;SCOPE
                                ;*************************************************************
010600  000010                  T10:    10                      ;ROUTINE NUMBER 10              *
010602  010732                          T11                     ;ADDRESS OF NEXT ROUTINE        *
010604  000001                          1.                      ;TEST ITERATION COUNT           *
010606  010610                          HA                      ;SCOPE ENTRY POINT              *
                                        .LIST
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                                        ;*************************************************************
                                        ;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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011012  104000                            SCOPE                       ;ERROR OR ENDZ RETURN
011014  104053                            PRMEND                      ;PREMATURE REV ENDZ.
011016  104021                            STOPDT                      ;ALL STOP
011020  104024                            SAVDTR                      ;SAVE TCDT.
011022  026777  170034  167764            CMP     BLKRQ,@TCDT         ;TCDT SAME AS EXPECTED BLOCK #?
011030  101402                            BLOS    ID                  ;BR IF TCDT EQUAL OR GREATER.
011032  104034                            WRNGBK                      ;BLOCK# READ MORE THAN 5 BLOCKS AWAY
011034  104000                            SCOPE                       ;FROM PREVIOUS BLOCK READ.
011036  017767  167752  170016   ID:      MOV     @TCDT,BLKRQ         ;SAVE CURRENT BLOCK#.
011044  162767  000005  170010            SUB     #5,BLKRQ            ;SET UP FOR NEXT EXPECTED BLOCK
011052  104016                            DELAY                       ;WAIT (INSURE TAPE IS STOPPED).
011054  005367  167764                    DEC     CTRA                ;DONE TIMES REQUIRED?
011060  001341                            BNE     IAA                 ;BR IF NOT.
011062  104000                            SCOPE                       ;DONE.  SCOPE.
                                 ;*********************************************************************
011064  000012                   T12:     12                          ;ROUTINE NUMBER 12                 *
011066  011162                            T13                         ;ADDRESS OF NEXT ROUTINE           *
011070  000001                            1.                          ;TEST ITERATION COUNT              *
011072  011074                            JA                          ;SCOPE ENTRY POINT                 *
                                          .LIST
                                 ;*********************************************************************
                                 ;SEARCH FORWARD AND REVERSE ALL BLOCKS USING SRCHF AND SRCHR SUBS.
011074  012767  001102  167742   JA:      MOV     #578.,CTRA          ;SET UP TO SEARCH 578 BLOCKS
011102  012767  177777  167752            MOV     #-1,BLKRQ           ;STARTING WITH BLOCK 0.
011110  005267  167746           JB:      INC     BLKRQ
011114  104032                            SRCHF                       ;FIND FWD BLOCK # SET IN BLKRQ.
011116  104000                            SCOPE                       ;ERROR IN SRCHF.
011120  005367  167720                    DEC     CTRA                ;FOUND 578 BLOCKS?
011124  001371                            BNE     JB                  ;BR IF NOT.
011126  012767  001102  167710            MOV     #578.,CTRA          ;SET UP TO SEARCH 578 BLOCKS
011134  012767  001102  167720            MOV     #578.,BLKRQ         ;STARTING WITH BLOCK 577.
011142  005367  167714           JC:      DEC     BLKRQ
011146  104033                            SRCHR                       ;FIND REVERSE BLOCK SET IN BLKRQ.
011150  104000                            SCOPE                       ;ERROR IN SRCHR.
011152  005367  167666                    DEC     CTRA                ;578 BLOCKS FOUND?
011156  001371                            BNE     JC                  ;BR IF NOT.
011160  104000                            SCOPE                       ;DONE. SCOPE.
                                 ;*********************************************************************
011162  000013                   T13:     13                          ;ROUTINE NUMBER 13                 *
011164  011240                            T14                         ;ADDRESS OF NEXT ROUTINE           *
011166  000024                            20.                         ;TEST ITERATION COUNT              *
011170  011174                            KA                          ;SCOPE ENTRY POINT                 *
                                          .LIST
                                 ;*********************************************************************
                                 ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATA FWD. DATA IS ALL 0'S.
011172  104030                            RNDBLK                      ;RANDOM BLK# TO BLKRQ.
011174  104044                   KA:      CLEAR                       ;CLEAR 256 WORD WRITE BUFFER TO 0'S.
011176  013350                            WBUF
011200  000400                            256.
011202  104045                            FILL                        ;CLEAR 256 WORD READ BUFFER TO 1'S.
011204  015420                            RBUF
011206  177777                            -1
011210  000400                            256.
011212  104037                            WDATAF                      ;CALL WDATAF SUB TO WRITE FWD 256. WORDS
011214  000400                            256.                        ;STARTING AT ADDR WBUF
011216  013350                            WBUF
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 011220  104041                          RDATAF                  ;CALL RDATAF SUB TO READ FWD 256. WORDS
 011222  000400                          256.                    ;AND STORE AT ADDR STARTING AT RBUF
 011224  015420                          RBUF
 011226  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 011230  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
 011232  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 011234  000400                          256.                    ;ERRORS.
 011236  104000                          SCOPE
                                 ;*******************************************************************
 011240  000014                  T14:    14                      ;ROUTINE NUMBER 14                 *
 011242  011304                          T15                     ;ADDRESS OF NEXT ROUTINE           *
 011244  000024                          20.                     ;TEST ITERATION COUNT              *
 011246  011266                          LA                      ;SCOPE ENTRY POINT                 *
                                         .LIST
                                 ;*******************************************************************
                                 ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATAFWD. BINARY COUNT PATTERN.
 011250  104030                          RNDBLK                  ;RANDOM BLK# TO BLKRQ
 011252  012767  104037  000214          MOV     #WDATAF,SBINTX  ;SET UP WRITE DATA FWD.
 011260  012767  104041  000214          MOV     #RDATAF,SBINTY  ;SET UP READ DATA FWD.
 011266  004767  000166          LA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TEST.
 011272  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 011274  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
 011276  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 011300  000400                          256.                    ;ERRORS.
 011302  104000                          SCOPE
                                 ;*******************************************************************
 011304  000015                  T15:    15                      ;ROUTINE NUMBER 15                 *
 011306  011350                          T16                     ;ADDRESS OF NEXT ROUTINE           *
 011310  000024                          20.                     ;TEST ITERATION COUNT              *
 011312  011332                          MA                      ;SCOPE ENTRY POINT                 *
                                         .LIST
                                 ;*******************************************************************
                                 ;SINGLE BLOCK TRANSFER TEST. WDATA REV, RDATA REV. BINARY COUNT PATTERN.
 011314  104030                          RNDBLK                  ;RANDOM BLK# TO BLKRQ.
 011316  012767  104040  000150          MOV     #WDATAR,SBINTX  ;SET UP WRITE DATA REV.
 011324  012767  104042  000150          MOV     #RDATAR,SBINTY  ;SET UP READ DATA REV.
 011332  004767  000122          MA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TEST.
 011336  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 011340  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
 011342  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 011344  000400                          256.                    ;ERRORS.
 011346  104000                          SCOPE
                                 ;*******************************************************************
 011350  000016                  T16:    16                      ;ROUTINE NUMBER 16                 *
 011352  011414                          T17                     ;ADDRESS OF NEXT ROUTINE           *
 011354  000024                          20.                     ;TEST ITERATION COUNT              *
 011356  011376                          NA                      ;SCOPE ENTRY POINT                 *
                                         .LIST
                                 ;*******************************************************************
                                 ;SINGLE BLOCK TRANSFER TEST. WDATA FWD, RDATA REV. BINARY COUNT PATTERN.
 011360  104030                          RNDBLK                  ;RANDOM BLK# TO BLKRQ.
 011362  012767  104037  000104          MOV     #WDATAF,SBINTX  ;SET UP WRITE DATA FWD.
 011370  012767  104042  000104          MOV     #RDATAR,SBINTY  ;SET UP READ DATA REV.
 011376  004767  000056          NA:     JSR     PC,SBINT        ;GO DO SINGLE BLOCK TRANSFERS.
 011402  104050                          DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
 011404  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF+510.
```

```
 011406  016416                             RBUF+510.                  ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
 011410  000400                             256.                       ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
 011412  104000                             SCOPE

                                     ;*******************************************************************
 011414  000017                      T17:   17                         ;ROUTINE NUMBER 17              *
 011416  011512                             T20                        ;ADDRESS OF NEXT ROUTINE        *
 011420  000024                             20.                        ;TEST ITERATION COUNT           *
 011422  011442                             OA                         ;SCOPE ENTRY POINT              *
                                            .LIST
                                     ;*******************************************************************
                                     ;SINGLE BLOCK TRANSFER TEST. WDATA REV, RDATA FWD. BINARY COUNT PATTERN.
 011424  104030                             RNDBLK                     ;RANDOM BLK# TO BLKRQ.
 011426  012767  104040  000040             MOV     #WDATAR,SBINTX     ;SET UP WRITE DATA REV.
 011434  012767  104041  000040             MOV     #RDATAF,SBINTY     ;SET UP READ DATA FWD.
 011442  004767  000012              OA:    JSR     PC,SBINT           ;GO DO SINGLE BLOCK TRANSFERS.
 011446  104050                             DATCKI                     ;CALL DATCKI TO CHECK DATA STORED AT
 011450  013350                             WBUF                       ;WBUF AGAINST DATA STORED AT RBUF+510.
 011452  016416                             RBUF+510.                  ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
 011454  000400                             256.                       ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
 011456  104000                             SCOPE
                                     ;
 011460  104046                      SBINT: BINFIL                     ;FILL 256 WORD WRITE BUFFER WITH
 011462  013350                             WBUF                       ;BINARY COUNT PATTERN.
 011464  000400                             256.
 011466  104044                             CLEAR                      ;CLEAR 256 WORD READ BUFFER.
 011470  015420                             RBUF
 011472  000400                             256.
 011474  000000                      SBINTX: OPEN                      ;WDATAF OR WDATAR.
 011476  000400                             256.
 011500  013350                             WBUF                       ;ADDR TO START WRITE FROM.
 011502  000000                      SBINTY: OPEN                      ;RDATAF OR RDATAR.
 011504  000400                             256.                       ;READ 256 WORDS
 011506  015420                             RBUF                       ;INTO THIS ADDR AND UP.
 011510  000207                             RTS     PC                 ;EXIT SBINT SUB.

                                     ;*******************************************************************
 011512  000020                      T20:   20                         ;ROUTINE NUMBER 20              *
 011514  011560                             T21                        ;ADDRESS OF NEXT ROUTINE        *
 011516  000024                             20.                        ;TEST ITERATION COUNT           *
 011520  011542                             PA                         ;SCOPE ENTRY POINT              *
                                            .LIST
                                     ;*******************************************************************
                                     ;TWO BLOCK TRANSFER TEST. WDATA FWD, RDATA FWD. BINARY COUNT PATTERN.
 011522  012767  104037  000240             MOV     #WDATAF,DBINTX     ;SET UP WDATAF.
 011530  012767  104041  000272             MOV     #RDATAF,DBINTY     ;SET UP RDATAF.
 011536  005067  000276                     CLR     DBINTZ             ;CLEAR DIFFERENT DIRECTION INDICATOR.
 011542  004767  000200              PA:    JSR     PC,DBINT           ;GO DO 2 BLOCK TRANSFERS.
 011546  104047                             DATCHK                     ;CALL DATCHK SUB TO CHECK DATA STORED AT
 011550  013350                             WBUF                       ;WBUF AGAINST DATA STORED AT RBUF
 011552  015420                             RBUF                       ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 011554  001000                             512.                       ;ERRORS.
 011556  104000                             SCOPE

                                     ;*******************************************************************
 011560  000021                      T21:   21                         ;ROUTINE NUMBER 21              *
 011562  011626                             T22                        ;ADDRESS OF NEXT ROUTINE        *
 011564  000024                             20.                        ;TEST ITERATION COUNT           *
 011566  011610                             QA                         ;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  000230                          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
 011620  015420                                  RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 011622  001000                                  512.                    ;ERRORS.
 011624  104000                                  SCOPE
                                         ;*************************************************************************
 011626  000022                          T22:    22                      ;ROUTINE NUMBER 22                        *
 011630  011676                                  T23                     ;ADDRESS OF NEXT ROUTINE                  *
 011632  000024                                  20.                     ;TEST ITERATION COUNT                     *
 011634  011660                                  RA                      ;SCOPE ENTRY POINT                        *
                                                 .LIST
                                         ;*************************************************************************
                                         ;TWO BLOCK TRANSFER TEST. WDATA FWD, RDATA REV. BINARY COUNT PATTERN.
 011636  012767  104037  000.[illegible]4                  MOV     #WDATAF,DBINTX  ;SET UP WDATAF.
 011644  012767  104042  000156                  MOV     #RDATAR,DBINTY  ;SET UP RDATAR.
 011652  012767  177777  000160                  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.
 011670  017416                                  RBUF+1022.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
 011672  001000                                  512.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
 011674  104000                                  SCOPE
                                         ;*************************************************************************
 011676  000023                          T23:    23                      ;ROUTINE NUMBER 23                        *
 011700  012042                                  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.
 011740  017416                                  RBUF+1022.              ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
 011742  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.
 011752  001000                                  512.
 011754  104044                                  CLEAR                   ;CLEAR 512 WORD READ BUFFER.
 011756  015420                                  RBUF
 011760  001000                                  512.
 011762  012767  000310  167072                  MOV     #200.,BLKRQ     ;200 TO BLOCK REQUIRED.
 011770  000000                          DBINTX: OPEN                    ;WDATAF OR WDATAR.
 011772  001000                                  512.                    ;WRITE 512 WORDS.
 011774  013350                                  WBUF                    ;ADDR TO START WRITE FROM.
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 011776  005767  000036                   TST     DBINTZ            ;DIFF DIR IND SET?
 012002  001412                           BEQ     DBINTY            ;BR IF NOT.
 012004  062767  000001  167050           ADD     #1,BLKRQ          ;ASSUME DT GOING FWD. INC BLKRQ.
 012012  032777  004000  166766           BIT     #REV,@TCCM        ;DT GOING FWD?
 012020  001403                           BEQ     DBINTY            ;BR IF YES.
 012022  162767  000002  167032           SUB     #2,BLKRQ          ;NO. -2 FROM BLKRQ.
 012030  000000                   DBINTY: OPEN                      ;RDATAF OR RDATAR.
 012032  001000                           512.                      ;READ 512 WORDS.
 012034  015420                           RBUF                      ;ADDR TO START READING INTO.
 012036  000207                           RTS     PC                ;EXIT DBINT SUB.
 012040  000000                   DBINTZ: OPEN                      ;DIFFERENT DIRECTION INDICATOR.
                                  ;*****************************************************************
 012042  000024                   T24:    24                        ;ROUTINE NUMBER 24               *
 012044  012124                           T25                       ;ADDRESS OF NEXT ROUTINE         *
 012046  000024                           20.                       ;TEST ITERATION COUNT            *
 012050  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.
 012052  104051                           INBIN                     ;INIT BINARY COUNT.
 012054  104044                           CLEAR                     ;CLEAR 512 WORD WRITE BUFFER.
 012056  013350                           WBUF
 012060  001000                           512.
 012062  104046                   TA:     BINFIL                    ;FILL 384 WORD WRITE BUFFER WITH
 012064  013350                           WBUF                      ;BINARY COUNT PATTERN.
 012066  000600                           384.
 012070  104044                           CLEAR                     ;CLEAR 512 WORD READ BUFFER.
 012072  015420                           RBUF
 012074  001000                           512.
 012076  104037                           WDATAF                    ;CALL WDATAF SUB TO WRITE FWD 384. WORDS
 012100  000600                           384.                      ;STARTING AT ADDR WBUF
 012102  013350                           WBUF
 012104  104041                           RDATAF                    ;CALL RDATAF SUB TO READ FWD 512. WORDS
 012106  001000                           512.                      ;AND STORE AT ADDR STARTING AT RBUF
 012110  015420                           RBUF
 012112  104047                           DATCHK                    ;CALL DATCHK SUB TO CHECK DATA STORED AT
 012114  013350                           WBUF                      ;WBUF AGAINST DATA STORED AT RBUF
 012116  015420                           RBUF                      ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 012120  001000                           512.                      ;ERRORS.
 012122  104000                           SCOPE
                                  ;*****************************************************************
 012124  000025                   T25:    25                        ;ROUTINE NUMBER 25               *
 012126  012172                           T26                       ;ADDRESS OF NEXT ROUTINE         *
 012130  000024                           20.                       ;TEST ITERATION COUNT            *
 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 EMO.
 012134  012767  104037  000232           MOV     #WDATAF,DBINTX    ;SET UP WDATAF.
 012142  012767  104041  000264           MOV     #RDATAF,DBINTY    ;SET UP RDATAF.
 012150  005067  000270                   CLR     DBINTZ            ;CLEAR DIFFERENT DIRECTION INDICATOR.
 012154  004767  000200           UA:     JSR     PC,DBINT          ;GO DO 4 BLOCK TRANSFERS.
 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  013350                                  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  012222                                  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  013350                                  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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012346  104050                        DATCKI                       ;CALL DATCKI TO CHECK DATA STORED AT
012350  005464                        EMO                          ;EMO AGAINST DATA STORED AT WBUF+2046.
012352  017346                        WBUF+2046.                   ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
012354  002000                        1024.                        ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
012356  104000                        SCOPE                        ;SCOPE.
                              ;
012360  104044                QBINT:  CLEAR                        ;CLEAR 1024 WORD READ BUFFER.
012362  013350                        WBUF
012364  002000                        1024.
012366  012767  000310  166466        MOV     #200.,BLKRQ          ;200 TO BLOCK REQUIRED.
012374  000000                QBINTX: OPEN                         ;WDATAF OR WDATAR.
012376  002000                        1024.                        ;WRITE 1024 WORDS.
012400  005464                        EMO                          ;ADDR TO START WRITE FROM.
012402  005767  000036                TST     QBINTZ               ;DIFF DIR IND SET?
012406  001412                        BEQ     QBINTY               ;BR IF NOT.
012410  062767  000003  166444        ADD     #3,BLKRQ             ;ASSUME DT GOING FWD. ADD 3 TO BLKRQ.
012416  032777  004000  166362        BIT     #REV,@TCCM           ;DT GOING FWD?
012424  001403                        BEQ     QBINTY               ;BR IF YES.
012426  162767  000006  166426        SUB     #6,BLKRQ             ;NO. SUB 6 FROM BLKRQ.
012434  000000                QBINTY: OPEN            ;RDATAF OR RDATAR.
012436  002000                        1024.                        ;READ 1024 WORDS.
012440  013350                        WBUF                         ;ADDR TO START READING INTO.
012442  000207                        RTS     PC                   ;EXIT QBINT SUB.
012444  000000                QBINTZ: OPEN                         ;DIFFERENT DIRECTION INDICATOR.
                              ;*******************************************************************
012446  000031                T31:    31                           ;ROUTINE NUMBER 31               *
012450  012472                        T32                          ;ADDRESS OF NEXT ROUTINE         *
012452  000001                        1                            ;TEST ITERATION COUNT            *
012454  012464                        WA                           ;SCOPE ENTRY POINT               *
                                      .LIST
                              ;*******************************************************************
                              ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. DATA ALL 0'S.
012456  012767  013072  000354        MOV     #ZCSB,SBKSBP
012464  004767  000116        WA:     JSR     PC,SBKSUB            ;GO DO ALL BLOCKS TEST.
012470  104000                        SCOPE                        ;SCOPE.
                              ;*******************************************************************
012472  000032                T32:    32                           ;ROUTINE NUMBER 32               *
012474  012516                        T33                          ;ADDRESS OF NEXT ROUTINE         *
012476  000001                        1                            ;TEST ITERATION COUNT            *
012500  012510                        XA                           ;SCOPE ENTRY POINT               *
                                      .LIST
                              ;*******************************************************************
                              ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. EACH BLOCK IS WRITTEN WITH
                              ;ITS OWN BLOCK NUMBER.
012502  012767  013042  000330        MOV     #WCSB,SBKSBP
012510  004767  000072        XA:     JSR     PC,SBKSUB            ;GO DO ALL BLOCKS TEST.
012514  104000                        SCOPE                        ;SCOPE.
                              ;*******************************************************************
012516  000033                T33:    33                           ;ROUTINE NUMBER 33               *
012520  012552                        T34                          ;ADDRESS OF NEXT ROUTINE         *
012522  000001                        1                            ;TEST ITERATION COUNT            *
012524  012536                        YA                           ;SCOPE ENTRY POINT               *
                                      .LIST
                              ;*******************************************************************
                              ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS BINARY COUNT PATTERN.
012526  012767  013062  000304        MOV     #YCSBB,SBKSBP
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012534  104051                          INBIN                   ;INIT BINARY COUNT PATTERN.
012536  104046                  YA:     BINFIL                  ;FILL 512 WORD WRITE BUFFER WITH
012540  013350                          WBUF                    ;BINARY COUNT PATTERN.
012542  001000                          512.
012544  004767  000036                  JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
012550  104000                          SCOPE                   ;SCOPE.

                                ;*******************************************************************
012552  000034                  T34:    34                      ;ROUTINE NUMBER 34                 *
012554  013112                          T35                     ;ADDRESS OF NEXT ROUTINE           *
012556  000005                          5                       ;TEST ITERATION COUNT              *
012560  012572                          ZA                      ;SCOPE ENTRY POINT                 *
                                        .LIST
                                ;*******************************************************************
                                ;DOUBLE BLOCK TRANSFER TEST. ALL BLOCKS. RANDOM DATA.
012562  012767  013062  000250          MOV     #YCSBB,SBKSBP
012570  104055                          INRND                   ;INIT RANDOM NUMBER SUB.
012572  104056                  ZA:     RNDFIL                  ;FILL 512 WORD WRITE BUFFER WITH
012574  013350                          WBUF                    ;RANDOM DATA.
012576  001000                          512.
012600  004767  000002                  JSR     PC,SBKSUB       ;GO DO ALL BLOCKS TEST.
012604  104000                          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.
012606  012767  000221  166230  SBKSUB: MOV     #145.,CTRA      ;SET UP TO WRITE 2 BLOCKS 145 TIMES.
012614  012767  177774  166240          MOV     #-4,BLKRQ       ;STARTING WITH BLOCK 0.
012622  062767  000004  166232  SBKSBA: ADD     #4,BLKRQ
012630  004777  000204                  JSR     PC,@SBKSBP      ;GO SET UP WRITE BUFFER.
012634  104037                          WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 512. WORDS
012636  001000                          512.                    ;STARTING AT ADDR WBUF
012640  013350                          WBUF
012642  005367  166176                  DEC     CTRA            ;WRITTEN 145 TIMES?
012646  001365                          BNE     SBKSBA          ;BR IF NOT.
012650  012767  000220  166166          MOV     #144.,CTRA      ;SET UP TO WRITE 2 BLOCKS IN REV 144 TIMES
012656  012767  001103  166176          MOV     #579.,BLKRQ     ;STARTING WITH BLOCK 575.
012664  162767  000004  166170  SBKSBB: SUB     #4,BLKRQ
012672  004777  000142                  JSR     PC,@SBKSBP      ;GO SET UP WRITE BUFFER.
012676  104040                          WDATAR                  ;CALL WDATAR SUB TO WRITE REV 512. WORDS
012700  001000                          512.                    ;STARTING AT ADDR WBUF
012702  013350                          WBUF
012704  005367  166134                  DEC     CTRA            ;WRITTEN 144 TIMES?
012710  001365                          BNE     SBKSBB          ;BR IF NOT.
012712  012767  000221  166124          MOV     #145.,CTRA      ;SET UP TO READ 2 BLOCKS FWD 145 TIMES
012720  012767  177774  166134          MOV     #-4,BLKRQ       ;STARTING WITH BLOCK 0.
012726  062767  000004  166126  SBKSBC: ADD     #4,BLKRQ
012734  004777  000100                  JSR     PC,@SBKSBP      ;SET WRITE BUFFER WITH CHECK DATA.
012740  104041                          RDATAF                  ;CALL RDATAF SUB TO READ FWD 512. WORDS
012742  001000                          512.                    ;AND STORE AT ADDR STARTING AT RBUF
012744  015420                          RBUF
012746  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
012750  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
012752  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
012754  001000                          512.                    ;ERRORS.
012756  005367  166062                  DEC     CTRA            ;READ 145 TIMES?
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012762  001361                          BNE     SBKSBC          ;BR IF NOT.
012764  012767  000220  166052          MOV     #144.,CTRA      ;SET UP TO READ 2 BLOCKS IN REV 144 TIMES
012772  012767  001103  166062          MOV     #579.,BLKRQ     ;STARTING WITH BLOCK 575.
013000  162767  000004  166054  SBKSBD: SUB     #4,BLKRQ
013006  004777  000026                  JSR     PC,@SBKSBP      ;SET WRITE BUFFER WITH CHECK DATA.
013012  104042                          RDATAR                  ;CALL RDATAR SUB TO READ REV 512. WORDS
013014  001000                          512.                    ;STARTING AT ADDR RBUF
013016  015420                          RBUF
013020  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
013022  013350                          WBUF                    ;WBUF AGAINST DATA STORED AT RBUF
013024  015420                          RBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
013026  001000                          512.                    ;ERRORS.
013030  005367  166010                  DEC     CTRA            ;READ 144 TIMES?
013034  001361                          BNE     SBKSBD          ;BR IF NOT.
013036  000207                          RTS     PC              ;DONE. EXIT.
013040  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.
013042  016767  166014  000004  WCSB:   MOV     BLKRQ,WCSBA     ;BLK# TO WCSBA
013050  104045                          FILL                    ;FILL WRITE BUFFER WITH DATA IN WCSBA.
013052  013350                          WBUF
013054  000000                  WCSBA:  OPEN
013056  001000                          512.
013060  000400                          BR      YCSBB           ;GO CLEAR READ BUFFER.
                                ;SUB TO CLEAR 512 WORD READ BUFFER.
013062  104044                  YCSBB:  CLEAR                   ;CLEAR 512 WORD READ BUFFER.
013064  015420                          RBUF
013066  001000                          512.
013070  000207                          RTS     PC              ;EXIT.
                                ;SUB TO FILL WRITE BUFFER WITH 0'S AND READ BUFFER WITH 1'S
013072  104044                  ZCSB:   CLEAR                   ;CLEAR 512 WORD WRITE BUFFER.
013074  013350                          WBUF
013076  001000                          512.
013100  104045                          FILL                    ;FILL READ BUFFER WITH 1'S.
013102  015420                          RBUF
013104  177777                          -1
013106  001000                          512.
013110  000207                          RTS     PC              ;EXIT.
                                ;*******************************************************************
013112  000035                  T35:    35                      ;ROUTINE NUMBER 35                *
013114  177777                          TLAST                   ;ADDRESS OF NEXT ROUTINE          *
013116  000005                          5                       ;TEST ITERATION COUNT             *
013120  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.
```

```
013160  012767  000110  165656          MOV     #72.,CTRA       ;SET UP TO WRITE 4 BLOCKS REV 72 TIMES
013166  012767  001107  165666          MOV     #583.,BLKRQ     ;STARTING WITH BLOCK 575
013174  162767  000010  165660  C1C:    SUB     #8.,BLKRQ
013202  104040                          WDATAR                  ;CALL WDATAR SUB TO WRITE REV 1024. WORDS
013204  002000                          1024.                   ;STARTING AT ADDR EMO
013206  005464                          EMO
013210  005367  165630                  DEC     CTRA            ;WRITTEN 72 TIMES?
013214  001367                          BNE     C1C             ;BR IF NOT.
013216  012767  000110  165620          MOV     #72.,CTRA       ;SET UP TO READ 4 BLOCKS FWD 72 TIMES.
013224  012767  177770  165630          MOV     #-8.,BLKRQ      ;STARTING WITH BLOCK 0.
013232  062767  000010  165622  C1D:    ADD     #8.,BLKRQ
013240  104044                          CLEAR                   ;CLEAR 1024 WORD READ BUFFER.
013242  013350                          WBUF
013244  002000                          1024.
013246  104041                          RDATAF                  ;CALL RDATAF SUB TO READ FWD 1024. WORDS
013250  002000                          1024.                   ;AND STORE AT ADDR STARTING AT WBUF
013252  013350                          WBUF
013254  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
013256  005464                          EMO                     ;EMO AGAINST DATA STORED AT WBUF
013260  013350                          WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
013262  002000                          1024.                   ;ERRORS.
013264  005367  165554                  DEC     CTRA            ;READ 72 TIMES?
013270  001360                          BNE     C1D             ;BR IF NOT.
013272  012767  000110  165544          MOV     #72.,CTRA       ;SET UP TO READ 4 BLOCKS REV 72 TIMES.
013300  012767  001107  165554          MOV     #583.,BLKRQ     ;STARTING WITH BLOCK 575.
013306  162767  000010  165546  C1E:    SUB     #8.,BLKRQ
013314  104044                          CLEAR                   ;CLEAR 1024 WORD READ BUFFER.
013316  013350                          WBUF
013320  002000                          1024.
013322  104042                          RDATAR                  ;CALL RDATAR SUB TO READ REV 1024. WORDS
013324  002000                          1024.                   ;STARTING AT ADDR WBUF
013326  013350                          WBUF
013330  104047                          DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
013332  005464                          EMO                     ;EMO AGAINST DATA STORED AT WBUF
013334  013350                          WBUF                    ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
013336  002000                          1024.                   ;ERRORS.
013340  005367  165500                  DEC     CTRA            ;READ 72 TIMES?
013344  001360                          BNE     C1E             ;BR IF NOT.
013346  104000                          SCOPE                   ;DONE. SCOPE.
013350                          WBUF:
        015420                          .=WBUF+1064.
015420                          RBUF:
        017440                          .=RBUF+1040.
        000001                          .END
```

K04


```
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          867     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          887     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
```

L04


```
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*   1786
                         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    2548*
                         2549*   2556*   2557*   2564*   2565*   2579*   2580*
BLKSB    006200          1123    1218    1296    1374    1517*   1790    1894
BMOVA    003372          1026*   1028
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    1855    1886    1929
                         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*
```

M04


```
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     2527     2572     2587
DATCK    004250           604     1193#
DATCKA   004300          1200#    1226
DATCKB   004362          1201     1223#
DATCKC   004374          1222     1227#
DATCKI= 104050            607#    2161     2178     2243     2260     2366     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     1776     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
DLYR0  = 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#
```

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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#
EMSGO       006377           1546#    1628
EMSGOA      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   =    000053            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     1638
                             1679     1733     1740     1745     1788     1842     1847     1858     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#
```

B05


```
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   1595#
FWD     = 000200       465#   653   1128   1411   1413   1421   1613   1653   1698   1774   1920   1921   2004
GA        010436      1951   1956#
GAA       010474      1965#  1977
GB        010502      1961   1968#
GC        010510      1969   1970#
GCA       010526      1976#  1986
GD        010534      1975   1979#
GE        010552      1980   1983#
GETBN1  = 104052       611#  1253
GETRDY    001566       493    696    695#   716    735    747
GOOD      006760       673   1593#
GORUN     001646       707#   710
GTAB      007006       680   1599#
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   1998#
HAA       010632      2003#  2025
HB        010646      2002   2009#
HC        010654      2009   2011#
HD        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   1418   1421   1653   1655   1709   1774   1920   1979
                      1921   1963   2004   2042
ILO     = 010000       485#
INBIN   = 104051       609#   701   2295   2443
INBINM    003200       608    984#
INCTCB    006234      1282   1283   1524#
INRND   = 104055       617#  2458
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
KA        011174      2092   2097#
KSTART    001032       505#   696
LA        011266      2119   2126#
LOGIC     002032       743#
```

C05


```
MA        011332          2136    2143#
MACHER    000004           386#    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
NOJNIT    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     909     944     988
                           989     990    1133    1166    1182    1205    1209    1224    1229    1254    1379    1380    1389
                          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*   2196*
                          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#    789     800     820    1331    1401    1672    1718    1752    1781    1827    1954    1985
                          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    1418*
RDBKI     004144      576    1174*
RDBKIA    004176     1175    1177    1179    1181*   1185    1187
RDBKIB    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*   1768    1810    1914    1998
RIND      003224      984*    985     986     988*    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      584     918*
RNUM    = 000002      476*    644    1128    1131    1321    1613    1615    1653    1655    1698    1709    1774    1813
                     1820    1878    1921    1963    2004    2042
RP1       002774      919     923*    930     933*    936*
RP2       002776      922     926     929*    934*    937*
RST03   = 104003      533*   1029
RST05   = 104005      537*
RST05S=   104007      541*    831     846     931     948     957    1019    1054    1227    1237    1247    1259    1438
RSTSS   = 000004      489*    915    1000    1083    1104    1157    1289    1300    1358    1409
RS03      002240      532     789*
RS05      002270      536     800*
RS05S     002264      540     798*
RSSS      002350      392     819*
RTNNO     001036      507*    629*    709     732     749*    755     870
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*    781
                      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*   1048*   1050*   1196*   1203    1233*   1235*
                     1243*   1245*   1252*   1256*
R2       =%000002     427*    779     792*    803*   1007*   1008    1017*   1024*   1035*   1049*   1050    1052*   1197*
                     1225*   1242*   1244
R3       =%000003     428*    778     793*    804*   1009*   1010*   1011*   1012    1025*   1027*   1036*   1046*   1199*
                     1221*
R4       =%000004     429*    777     785*    805*    813     816*    821*    857    1037*   1040*   1043*   1044    1303
R5       =%000005     430*    748*    753     776     784*    785     798     806*    812     815*    816     819     822*
                      843     863    1030*
R6       =%000006     431*    628*    699*    718*
R7       =%000007     432*    704*    756*    961*    966*    968*    970*
```

E05


```
SA        011730           2252     2259#
SAT     = 000000            475#
SAVDTR= 104024              567#    1264     1678     1785     1989     1936     1978     2016     2054
SAVD3 = 104002              531#    1022
SAVD5 = 104C04              535#
SAVDSS= 104006              539#     827      842      918      940      951     1003     1032     1194     1231     1240     1250     1431
SAVSS = 000003              488#     862      998     1068     1091     1098     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     1758     1775     1778     1783     1794     1800     1814     1821     1824
                           1829     1846     1851     1856     1863     1879     1882     1887     1898     1904     1922     1925     1930
                           1940     1946     1964     1967     1972     1982     1988     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     2448     2463     2593
SCOPTR    001034            506#     725      752*
SDTRG     003720            566     1115#
SELDRA    005450           1434     1438#
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     1877     1920     1962     2003     2041
SPBOT = 001000              405#     628      699      718
SQDRV     005400            620     1424#    1428
SQDRVA    005414           1424*    1425*    1427#
SQDRV1    001326            638*     639*     641#     669
SR    = 177570              403#     690      705      709      722      726      730      734      755*     849      906     1162     1179
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        1322    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    1376    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    1987    2015    2053
STPDT   003626         560    1088#
STRTA   001542         633     687#    691
STTCV   002374         552     827#
SVECTR= 104015         553#    702    1658    1706    1727    1769    1817    1836    1873    1918    1960    2001    2039
SV03    002140         530     765#
SV05    002170         534     773#
SV05A   002176         771     774#
SV05B   002212         768     778#
SV05C   002224         767*    770*    773*    783#
SV05S   002160         538     770#
SV5S    002320         390     810#
TA      012062        2290    2299#
TCBA    001012         497#    650*   1117    1274    1387*   1388
TCBASB  006251        1284    1527#
TCBAT   001060         516#    902    1117*
TCCM    001006         495#    646     655     657    1065    1072*   1073    1088*   1093    1100    1135    1317    1324*
                      1332    1340    1346    1352    1363    1365*   1367*   1402    1712*   1719    1798*   1834*   1902*
                      1934*   1976*   2278    2403
TCCMT   001050         512#    890    1065*
TCDT    001014         498#   1116    1337    1342*   1343    1348*   1349    1660*   1676    1685    1704    1724    1725
                      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#    886    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
TENPWR  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    003050         953#    962     971
```

G05


```
TYPC      003070        954     959#
TYPD      003104        956     961     963#    968     970
TYPE    = 104010        543#    630     664     672     681     687     692     713     738     908
TYPF      003120        960     967#
TYPG      003130        969#
T0        007016        505    1605#
T1        007150       1606    1645#
T10       010600       1949    1990#
T11       010732       1991    2028#
T12       011064       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#
VA        012222       2339    2348#
V0      = 000000        454#
V1      = 000004        455#
V2      = 000010        456#
V3      = 000014        457#
V4      = 000020        458#
V5      = 000024        459#
```

```
V6      = 000030        460#
V7      = 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    2408
                       2445    2460    2475    2484    2495    2508    2519    2530    2567    2571    2574    2582    2586
                       2589    2594#   2595
WCNOTO    006217       1269    1521#
WCSB      013042       2431    2517#
WCSBA     013054       2517*   2520#
WDATA   = 000014        481#    653    1411    1416
WDATAF  = 104037        589#   2104    2124    2158    2205    2239    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#   2132    2137#   2149    2154#   2166    2171#   2197    2202#   2214    2219#   2231    2236#
                       2248    2253#   2286    2291#   2316    2321#   2335    2340#   2354    2359#   2373    2378#   2411
                       2416#   2422    2427#   2434    2439#   2449    2454#   2537    2542#
XA        012510       2426    2432#
YA        012536       2438    2444#
YCSBB     013062       2442    2457    2522    2524#
ZA        012572       2453    2459#
ZCSB      013072       2419    2529#
.       = 017440        383#    384     386     388     394     398     401     490#    492#    647     656     965     995
                       1004    1136    1236    1246    2595#   2597#
```

IO5


```
CKDT       383#   2110   2127   2144   2209   2226   2311   2330   2349   2494   2507   2572   2587
CKDTI      383#   2161   2178   2243   2260   2368   2387
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    624    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   2088   2115   2132
          2149    2166   2197   2214   2231   2248   2286   2316   2335   2354   2373   2411   2422   2434   2449
TSTAA      383#   1604   1644   1689   1760   1802   1864   1905   1947   1989   2027   2065   2088   2115   2132
          2149    2166   2197   2214   2231   2248   2286   2316   2335   2354   2373   2411   2422   2434   2449
          2537
WALF       383#
WALR       383#
WDTF       383#   2104   2305   2473   2550
WDTR       383#   2482   2558
```

J05

DZTCCA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ADD	922	926	1008	1011	1042	1043	1050	1342	1388	1941	2022	2277	2402	2471	2489
	2549	2565													
ASL	761	1385													
BCS	1039														
BEQ	623	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
	981	995	1018	1028	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	645	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
	1378	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	515
	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

	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	1869
	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	1869
	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								

```
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)
```

M05

Spooler runtime 10 Seconds, 44 KCS, 278 disk reads, 4 disk writes, 63 pages

[illegible] Date 14-Oct-76 13:12:[illegible] Monitor [illegible]

```
0000[illegible]0000000000000000000000000000000000000000000000000000000000011111111111111111111111111111111111110
00000000111111111[illegible]2222223344444444445555555555666666666677777777778888888888999999999900000000001111111111222222222233312
[illegible]31836[illegible]56789012345678901 2 **
0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000111111111111111111111111111111110
0000000011111111112222222222333333333344444444445555555555666666666677777777778888888888999999999900000000001111111111222222222233312
```