TC11/TU56

TC5-TC11 TEST 5

MD-11-DZTCE-D

EP-DZTCE-D-DL-D

FICHE 1 OF 1

DEC 1977

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MADE IN USA

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZTCE-D-D

PRODUCT NAME: TC5-TC11 TEST 5

DATE: AUGUST 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

REVISED BY: PRODUCT ENHANCEMENT

1. ABSTRACT

TC5 - TC11 TEST 5 IS PART 5 OF A FIVE PROGRAM PACKAGE USED TO TEST THE TC11 DECTAPE CONTROL. TC5 EXERCISES THE TC11 CONTROL AND FROM ONE TO EIGHT SELECTED TRANSPORTS. ALL AVAILABLE CORE STORAGE UP TO 28K IS USED IN ORDER TO EXECUTE THE MAXIMUM NUMBER OF DATA TRANSFERS POSSIBLE.

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.
D. ONE STANDARD PDP-11 FORMAT DECTAPE FOR EACH TRANSPORT TO BE TESTED. OF THE TAPE BLOCKS MUST BE ZERO. IF NECESSARY, REFORMAT THE TAPE.

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 010120. ALL REMAINING CORE STORAGE UP TO 28K IS USED FOR DEVICE BUFFER AREAS.

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. SET WRTM SWITCH OFF, WALL SWITCH TO 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), AND SET SR SWITCHES 0 THROUGH 7 TO INDICATE THE UNITS TO BE TESTED. (SR0 FOR UNIT 0, SR1 FOR UNIT 1, 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 1 HOUR.
B. ONE SINGLE ITERATION PASS (SR11=1) TAKES ABOUT 5 MINUTES.

4.1 RESTART PROCEDURE

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

A. LOAD ADDRESS 001000
B. DO UNIT SETUP AS DESCRIBED IN STEPS A AND B OF USE PROCEDURE.
C. SELECT ANY DESIRED OPTIONS.
D. PRESS START.
E. GO TO STEP H OF USE PROCEDURE.

5. PROGRAM AND/OR OPERATOR ACTION

5.1 NORMAL HALTS

LOC 002464 — COMMON HALT. THIS HALT 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 002016 — 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.

E. THE INSTRUCTION THAT IMMEDIATELY PRECEDES THE ONE REFERENCED 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.

6.2 ERROR PRINTOUTS

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

```
T XXX  PC OYYYYY  ICNT ZZZZ.  UNIT W
XFRCNT XXXXXX  WADDR YYYYYY RADDR ZZZZZZ FPC OVVVVV
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.

XFRCNT XXXXXX WADDR YYYYYY AND RADDR ZZZZZZ INDICATE THE PARAMETERS IN USE AT TIME OF FAILURE.

FPC OVVVVV IS TYPED WHEN THE ERROR CALL IS GENERATED BY A SUBROUTINE, AND IT IS NECESSARY TO INDICATE WHERE THE SUBROUTINE WAS CALLED FROM.

AFTER THE PRINTOUT IS COMPLETED, THE PROGRAM WILL HALT AT COMMON ERROR HALT AT LOC 002500 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. 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.
B. IN A DATA ERROR PRINTOUT THE "WORD #" THAT FAILED REPRESENTS THE POSITION OF THE CORRECT WORD IN THE WRITE 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 REMOVES 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 10 (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)

```
;*************************************************************************
T10:    10              ;ROUTINE NUMBER 10.                              *
        T11             ;ADDRESS OF NEXT ROUTINE                         *
        10.             ;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 "ERRN " SUBROUTINE, WHICH IS CALLED BY AN "ERRORN" STATEMENT AND TYPES THE TEST NUMBER AND PC VALUE WHEN A FAILURE OCCURS.

```
                        !
                                        .LIST   SEQ,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  002342              TRCV:       SVSS                    ;TRACE TRAP
000016  000340                          PRTY7
000020  002372              IOTV:       RSSS                    ;TRAP TO CALL IOX
000022  000340                          PRTY7
000024  000026                          .+2                     ;POWER FAIL TRAP
000026  000000                          HALT
000030  002142              EMTV:       EMTINT                  ;EMT TRAP
000032  000340                          PRTY7
000034  003070              TRPV:       DLY                     ;TRAP TRAP. SIMILAR TO EMT
000036  000000                          PRTY0
                                ;LOC 40 THROUGH 376 ARE FILLED WITH .+2 AND HALT EXCEPT LOC 46 AND 52.
                                ;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
```

```
442  005746  PUSH=005746
443  024646  PUSH2=024646
444  005726  POPSP=005726
445  022626  POPSP2=022626
446  000340  PRTY7=340
447  000300  PRTY6=300
448  000240  PRTY5=240
449  000200  PRTY4=200
450  000140  PRTY3=140
451  000100  PRTY2=100
452  000040  PRTY1=40
453  000000  PRTY0=0
454  000007  BELL=007
455  177777  TLAST=-1
456  000003  TRC=3
457  000040  I=40
458  177777  X=-1
459  100000  A=BIT15
460  040000  B=BIT14
461  020000  C=BIT13
462  000000  V0=0
463  000004  V1=4
464  000010  V2=10
465  000014  V3=14
466  000020  V4=20
467  000024  V5=24
468  000030  V6=30
469  000034  V7=34
470  020000  MAINT=BIT13
471  010000  DINH=BIT12
472  004000  REV=BIT11
473  000000  FWD=0
474  000000  U0=0
475  000400  U1=BIT8
476  001000  U2=BIT9
477  001400  U3=BIT9!BIT8
478  002000  U4=BIT10
479  002400  U5=BIT10!BIT8
480  003000  U6=BIT10!BIT9
481  003400  U7=BIT10!BIT9!BIT8
482  000100  IE=BIT6
483  000000  SAT=0
484  000002  RNUM=BIT1
485  000004  RDATA=BIT2
486  000006  RALL=BIT2!BIT1
487  000010  SST=BIT3
488  000012  WRTM=BIT3!BIT1
489  000014  WDATA=BIT3!BIT2
490  000016  WALL=BIT3!BIT2!BIT1
491  000001  D0=BIT0
492  000200  UPS=BIT7
493  010000  ILO=BIT12
494  004000  SELE=BIT11
495  000000  EMTX=0
496  000003  SAVSS=3
497  000004  RSTSS=4
```

```
                    104400                      DELAY=TRAP
                    000046                      .=46
000046              002054                      LOGIC
                    000052                      .=52
000052              040000                      40000
                    000200                      .=200
000200              000167  001054              JMP     START           ;GO TO START OF PROGRAM.
                    001000                      .=1000
001000              000167  000576              JMP     GETRDY          ;BYPASS INITIAL PRINTOUTS.
001004  177340    TCST:   177340                                      ;TC11 STATUS REGISTER.
001006  177342    TCCM:   177342                                      ;TC11 COMMAND REGISTER.
001010  177344    TCWC:   177344                                      ;TC11 WORD COUNT REGISTER.
001012  177346    TCBA:   177346                                      ;TC11 BUS ADDRESS REGISTER.
001014  177350    TCDT:   177350                                      ;TC11 DATA REGISTER.
001016  000214    TCVTR:  214                                         ;TC11 INTERRUPT VECTOR
001020  000300    TCLVL:  PRTY6                                       ;TC11 INTERRUPT PRIORITY LEVEL.
001022  177564    TPS:    177564                                      ;LSP CSR
001024  177566    TPB:    177566                                      ;LSP BUFFER
001026  000000    ICTR:   OPEN                                        ;CONTAINS CURRENT ITERATION COUNT
001030  000000    ICNT:   OPEN                                        ;CONTAINS ACCUMULATED ITERATION COUNT.
001032  006062    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    TCCMT:  OPEN
001050  000000    TCSTT:  OPEN
001052  000000    TCDTT:  OPEN
001054  000000    TCWCT:  OPEN
001056  000000    TCBAT:  OPEN
001060  000000    BLKRQ:  OPEN
001062  000000    BLKRQS: 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  000000    RBFLIM: OPEN
001102  000000    WBFLIM: OPEN
001104  000000    BFSIZE: OPEN
001106  000000    XFRCNT: OPEN
001110  000000    WADDR:  OPEN
001112  000000    RADDR:  OPEN
001114  000000    VFBLKN: OPEN
001116  000000    VRBLKN: OPEN
001120  000005    ERRLIM: 5
001122            EMTTAB:
001122  001730              .WORD   CHAINN          ;POINTER FOR EMT CALL SCOPE
001124  002436              .WORD   SRSETT          ;POINTER FOR EMT CALL SRESET
001126  002162              .WORD   SV03            ;POINTER FOR EMT CALL SAV03
001130  002262              .WORD   RS03            ;POINTER FOR EMT CALL RST03
001132  002212              .WORD   SV05            ;POINTER FOR EMT CALL SAV05
001134  002312              .WORD   RS05            ;POINTER FOR EMT CALL RST05
001136  002202              .WORD   SV05S           ;POINTER FOR EMT CALL SAV05S
```

```
554  001140  002306                .WORD   BSDSS           ;POINTER FOR EMT CALL BSIOSS
555  001142  002742                .WORD   TYP             ;POINTER FOR EMT CALL TYPE
556  001144  003040                .WORD   TYPS            ;POINTER FOR EMT CALL TYPES
557  001146  002504                .WORD   ERRN            ;POINTER FOR EMT CALL ERRORN
558  001150  003220                .WORD   OACNVV          ;POINTER FOR EMT CALL OACNV
559  001152  003312                .WORD   BDCNVV          ;POINTER FOR EMT CALL BDCNV
560  001154  003560                .WORD   RNGEN           ;POINTER FOR EMT CALL RNDNUM
561  001156  003636                .WORD   INRNDN          ;POINTER FOR EMT CALL INRND
562  001160  003270                .WORD   BMOVV           ;POINTER FOR EMT CALL BMOVE
563  001162  002460                .WORD   CHLT            ;POINTER FOR EMT CALL CHALT
564  001164  002472                .WORD   EHLT            ;POINTER FOR EMT CALL EHALT
565  001166  002416                .WORD   STTCV           ;POINTER FOR EMT CALL SVECTR
566  001170  004354                .WORD   STCOM           ;POINTER FOR EMT CALL SETCOM
567  001172  004314                .WORD   STATS           ;POINTER FOR EMT CALL STATUS
568  001174  004450                .WORD   STPDT           ;POINTER FOR EMT CALL STOPDT
569  001176  004460                .WORD   CKERZ           ;POINTER FOR EMT CALL CKERRZ
570  001200  004524                .WORD   NOINTR          ;POINTER FOR EMT CALL NOINT
571  001202  005160                .WORD   SRCHFF          ;POINTER FOR EMT CALL SRCHF
572  001204  005166                .WORD   SRCHRR          ;POINTER FOR EMT CALL SRCHR
573  001206  005630                .WORD   WDATF           ;POINTER FOR EMT CALL WDATAF
574  001210  005700                .WORD   WDATR           ;POINTER FOR EMT CALL WDATAR
575  001212  005654                .WORD   RDATF           ;POINTER FOR EMT CALL RDATAF
576  001214  005724                .WORD   RDATR           ;POINTER FOR EMT CALL RDATAR
577  001216  005060                .WORD   CWCBA           ;POINTER FOR EMT CALL CKWCBA
578  001220  005006                .WORD   CLEARR          ;POINTER FOR EMT CALL CLEAR
579  001222  005026                .WORD   BINFLL          ;POINTER FOR EMT CALL BINFIL
580  001224  004616                .WORD   DATCK           ;POINTER FOR EMT CALL DATCHK
581  001226  004600                .WORD   DTCKI           ;POINTER FOR EMT CALL DATCKI
582  001230  003122                .WORD   INBINN          ;POINTER FOR EMT CALL INBIN
583  001232  003154                .WORD   GTBIN1          ;POINTER FOR EMT CALL GETBN1
584  001234  003676                .WORD   RNDRVV          ;POINTER FOR EMT CALL RNDRIV
585  001236  003726                .WORD   SELDRR          ;POINTER FOR EMT CALL SELDRV
586  001240  003770                .WORD   RNDXFF          ;POINTER FOR EMT CALL RNDXFR
587  001242  004032                .WORD   XFRSTT          ;POINTER FOR EMT CALL XFRSET
588  001244  004166                .WORD   RNDFBB          ;POINTER FOR EMT CALL RNDFBK
589  001246  004220                .WORD   RNDRBB          ;POINTER FOR EMT CALL RNDRBK
590  001250  004136                .WORD   DRVFLL          ;POINTER FOR EMT CALL DRVFIL
591  001252  004556                .WORD   DTCKSS          ;POINTER FOR EMT CALL DATCKS
592  001254  004262                .WORD   RNDFLL          ;POINTER FOR EMT CALL RNDFIL
593  001256  003654                .WORD   SQDRV           ;POINTER FOR EMT CALL SEQDRV
594
```

```
        001260  012706  001000            START:  MOV     #SPBOT,R6         ;SET BOTTOM OF SP STACK.
        001264  104010                            TYPE                      ;TYPE TITLE.
        001266  007145                            PGTIT
        001270  004767  002126                    JSR     PC,CORSTP         ;GO ASSIGN BUFFER SPACE.
        001274  104043                            INBIN                     ;INIT BINARY COUNT PATTERN.
        001276  104016                            INRND                     ;INIT RANDOM NUMBER GENERATOR.
        001300  005737  000042                    TST     @#42              ;PROGRAM LOADED VIA MONITOR?
        001304  001524                            BEQ     STRTA             ;BR IF NOT.
                                          ;ROUTINE TO DETERMINE TRANSPORTS AVAILABLE FOR TEST.
        001306  012767  000402  001376            MOV     #402,ERRND        ;DISABLE ERROR PRINTOUTS.
        001314  112767  000376  177546            MOVB    #376,UNITS        ;ASSUME DRIVES 1-7 AVAILABLE.
        001322  012700  000010                    MOV     #8.,R0            ;SET UP TO TEST 8 TIMES.
        001326  005267  000010            DTRMN:  INC     SQDRV1
        001332  042767  177770  000002            BIC     #177770,SQDRV1
        001340  104046                            SELDRV                    ;SELECT A TRANSPORT.
        001342  000000                    SQDRV1: OPEN                      ;TRANSPORT #.
        001344  000431                            BR      DTRMNA            ;UNIT NOT AVAILABLE RETURN.
        001346  104023                            SETCOM                    ;REWIND TO REVERSE END ZONE.
        001350  004002                            RNUM+REV
        001352  000437                            BR      DTRMNB            ;ERROR RETURN.
        001354  005777  177426                    TST     @TCCM             ;WAIT.
        001360  100375                            BPL     .-4
        001362  005777  177416                    TST     @TCST             ;END ZONE?
        001366  100031                            BPL     DTRMNB            ;BR IF NOT.
        001370  012777  010210  177414            MOV     #CODEND,@TCBA     ;SET CURRENT ADDR.
        001376  012777  177777  177404            MOV     #-1,@TCWC         ;SET WORD COUNT.
        001404  104023                            SETCOM                    ;YES. ISSUE WRITE DATA COMMAND.
        001406  000015                            WDATA+FWD+DO
        001410  000420                            BR      DTRMNB            ;ERROR RETURN.
        001412  032777  100200  177366            BIT     #BIT15+BIT7,@TCCM       ;WAIT FOR ERROR/READY.
        001420  001774                            BEQ     .-6
        001422  005777  177360                    TST     @TCCM             ;ERROR?
        001426  100411                            BMI     DTRMNB            ;BR IF YES.
        001430  104025                    DTRMNA: STOPDT                    ;STOP DECTAPE.
        001432  005300                            DEC     R0                ;DONE 8 TIMES?
        001434  001334                            BNE     DTRMN             ;BR IF NOT.
        001436  105767  177426                    TSTB    UNITS             ;ANY UNITS AVAILABLE?
        001442  001015                            BNE     DTRMNC            ;BR IF YES.
        001444  104010                            TYPE                      ;TYPE NON AVAILABLE MESSAGE.
        001446  010125                            NOUNIT
        001450  000575                            BR      CHNC              ;GO EXIT.
        001452  032777  014000  177324    DTRMNB: BIT     #BIT12+BIT11,@TCST      ;ILO OR SELE ERROR?
        001460  001763                            BEQ     DTRMNA            ;BR IF NOT.
        001462  016701  177654                    MOV     SQDRV1,R1
        001466  146167  003760  177374            BICB    UNTAB(1),UNITS    ;DESELECT NON AVAILABLE TRANSPORT.
        001474  000755                            BR      DTRMNA
        001476  104010                    DTRMNC: TYPE                      ;TYPE UNITS TO BE TESTED.
        001500  010152                            GOOD
        001502  012767  000001  000010            MOV     #1,CPENA
        001510  012767  000007  177326            MOV     #7,CTRA           ;CHECK UP TO 7 UNITS.
        001516  104046                            SELDRV                    ;SELECT DRIVE.
        001520  000000                    CPENA:  OPEN                      ;UNIT TO BE SELECTED.
        001522  000407                            BR      CPENB             ;UNIT NOT AVAILABLE.
        001524  016700  177336                    MOV     UNITN,R0          ;SUCCESS.
        001530  116067  010200  006437            MOVB    GTAB(0),GTAPES    ;GET ASCII # FOR GOOD TAPE.
```

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                                                TYPE                    ;TYPE # OF UNIT TO TEST.
                                                GTAPES
                                CPENB:          INC     CPENA           ;UPDATE TO NEXT DRIVE.
                                                DEC     CTRA            ;CHECKED ALL DRIVES?
                                                BNE     CPENA-2         ;BR IF NOT.
                                                BR      GETRDY          ;YES.
                                STRTA:          TYPE                    ;TYPE UNIT SELECT INSTRUCTIONS.
                                                INSTI
                                                CHALT                   ;WAIT FOR USER.
                                                MOVB    SR,UNITS        ;GET UNITS TO TEST.
                                                BEQ     STRTA           ;BR IF NO UNITS SELECTED.
                                                TYPE                    ;TYPE SR OPTION MESSAGE.
                                                ASETSR
                                                CHALT                   ;COMMON HALT.
                                GETRDY:         MOV     #1002,ERRND     ;ENABLE ERROR PRINTOUTS
                                                MOV     KSTART,NXTST    ;ADDR OF 1ST ROUTINE TO NXTST
                                GTRDYX:         MOV     #PRTY7,PSW      ;SET PRIORITY 7.
                                                MOV     #SPBOT,R6       ;SET BOTTOM OF STACK.
                                                SRESET                  ;ISSUE RESET.
                                                SVECTR                  ;PRESET DT INTERRUPT VECTOR TO 0.
                                                0
                                                CLR     XFRCNT          ;CLEAR TRANSFER COUNT.
                                                CLR     WADDR           ;CLEAR WRITE ADDR.
                                                CLR     RADDR           ;CLEAR READ ADDR.
                                GTRDYA:         JSR     R7,FORWD        ;ROLL FORWARD TO "NEXT" ROUTINE.
                                GTRDYB:         BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
                                                BNE     GTRDYC          ;BRANCH IF SELECT ROUTINE SWITCH IS SET.
                                GORUN:          JMP     @CURTST         ;GO RUN CURRENT ROUTINE.
                                GTRDYC:         MOV     SR,R0           ;(SR) TO R0
                                                BIC     #177600,R0      ;MASK UNDESIRED BITS
                                                CMPB    RTNNO,R0        ;COMPARE RTNNO TO (R0)
                                                BEQ     GORUN           ;BR IF ROUTINE FOUND.
                                GTRDYD:         CMP     #-1,NXTST       ;NO. CHECK FOR LAST ROUTINE.
                                                BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE.
                                                TYPE                    ;TYPE INCORRECT RTN SELECTED.
                                                AINCRT
                                                CHALT                   ;COMMON HALT.
                                                BR      GETRDY          ;START OVER.
                                CHAINN:         STOPDT
                                                MOV     #SPBOT,R6       ;RESTORE STACK.
                                                INC     ICNT            ;INCREMENT ITERATION COUNT.
                                                BNE     CHNAC           ;BR IF RESULT NOT 0.
                                                COM     ICNT            ;RESULT 0. RESET ICNT TO -1.
                                CHNAC:          BIT     #BIT14,SR       ;CHECK FOR SCOPE OPTION.
                                                BEQ     CHNA            ;BRANCH IF SCOPE SW NOT SET.
                                CHNAB:          JMP     @SCOPTR         ;RETURN TO ROUTINE.
                                CHNA:           BIT     #BIT11,SR       ;TEST INHIBIT ITERATION SWITCH
                                                BNE     CHNAA           ;BRANCH IF INHIBIT ITERATION SW SET.
                                                DEC     ICTR            ;DECREMENT ITERATION COUNT.
                                                BNE     CHNAB           ;BRANCH IF COUNT NOT 0.
                                CHNAA:          BIT     #BIT10,SR       ;ROUTINE END HALT SW SET? (SR10)
                                                BEQ     CHNB            ;BRANCH IF NOT SET.
                                                MOV     RTNNO,R0        ;TEST # TO R0.
                                                HALT                    ;ROUTINE END HALT. TEST # IN LIGHTS.
                                CHNB:           BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
                                                BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
```

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 207  002030  022767  177777  177002            CMP     #-1,NXTST       ;LAST TEST?
 208  002036  001267                            BNE     GTRDYX          ;BRANCH IF NOT LAST TEST.
 209  002040  104010                            TYPE                    ;TYPE PROGRAM END BELL.
 210  002042  007453                            APGEND
 211  002044  013700  000042            CHNC:   MOV     @#42,R0         ;GET CONTENTS OF 42.
 212  002050  001410                            BEQ     HERE            ;BR IF 0.
 213  002052  000005                            RESET                   ;NOT 0. ISSUE RESET.
 214  002054  004710                    LOGIC:  JSR     PC,(0)          ;RETURN TO MONITOR.
 215  002056  000240  000240  000240            .WORD   NOP,NOP,NOP
 216  002064  105767  177000                    TSTB    UNITS           ;ANY UNITS AVAILABLE FOR TESTING?
 217  002070  001765                            BEQ     CHNC            ;BR IF NOT.
 218  002072  000643                    HERE:   BR      GETRDY          ;GO REPEAT PROGRAM.
 219  002074  016705  176740            FORWD:  MOV     NXTST,R5        ;ADDR OF NEXT ROUTINE TO R5.
 220  002100  012567  176732                    MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
 221  002104  012567  176730                    MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE.
 222  002110  012567  176712                    MOV     (5)+,ICTR       ;GET ITERATION COUNT.
 223  002114  012567  176714                    MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
 224  002120  010567  176716            FORWDA: MOV     R5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST.
 225  002124  012767  000001  176676            MOV     #1,ICNT         ;PRESET ICNT TO 1.
 226  002132  016767  176700  175430            MOV     RTNNO,SR        ;DISPLAY ROUTINE #.
 227  002140  000207                            RTS     R7              ;EXIT FORWD SUBROUTINE.
 228                            ;EMT INTERPRETER ROUTINE.
 229  002142  010046            EMTINT: MOV     R0,-(6)         ;PUSH R0.
 230  002144  016600  000002            MOV     2(6),R0         ;GET EMT PC.
 231  002150  014000                    MOV     -(0),R0         ;GET EMT CALL.
 232  002152  006300                    ASL     R0              ;TIMES 2.
 233  002154  016000  171122            MOV     EMTTAB-10000(0),R0      ;FORM EMT ADDR.
 234  002160  000200                    RTS     R0              ;GO TO EMT RTN. RESTORE R0.
 235                            ;SAVE REGS 0 TO 3 SUBROUTINE.
 236  002162  012666  177766    SV03:   MOV     (6)+,-10.(6)    ;MOVE PC UPSTACK.
 237  002166  012666  177766            MOV     (6)+,-10.(6)    ;MOVE STATUS UPSTACK.
 238  002172  012767  000002  000046            MOV     #RTI,SV05C
 239  002200  000415                            BR      SV05B
 240                            ;SUB TO SAVE REGS 0 TO 5 AND PLACE EMT PC IN R5.
 241  002202  012767  000240  000036    SV05S:  MOV     #NOP,SV05C
 242  002210  000403                            BR      SV05A
 243                            ;SUB TO SAVE REGS 0 TO 5.
 244  002212  012767  000002  000026    SV05:   MOV     #RTI,SV05C
 245  002220  012666  177762    SV05A:  MOV     (6)+,-14.(6)    ;MOVE PC AND PSW UPSTACK.
 246  002224  012666  177762            MOV     (6)+,-14.(6)
 247  002230  010546                    MOV     R5,-(6)
 248  002232  010446                    MOV     R4,-(6)
 249  002234  010346            SV05B:  MOV     R3,-(6)
 250  002236  010246                    MOV     R2,-(6)
 251  002240  010146                    MOV     R1,-(6)
 252  002242  010046                    MOV     R0,-(6)
 253  002244  024646                    PUSH2
 254  002246  000002            SV05C:  RTI                     ;RTI OR NOP.
 255  002250  016605  000020            MOV     16.(6),R5       ;EMT PC TO R5.
 256  002254  010504                    MOV     R5,R4
 257  002256  005744                    TST     -(4)
 258  002260  000002                    RTI                     ;EXIT.
 259                            ;RESTORE REGS 0 TO 3 SUBROUTINE.
 260  002262  022626            RS03:   POPSP2
 261  002264  012600                    MOV     (6)+,R0         ;RESTORE REGS 0 TO 4.
 262  002266  012601                    MOV     (6)+,R1
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    763  002270  012602                        MOV     (6)+,R2
    764  002272  012603                        MOV     (6)+,R3
    765  002274  016646  177766                MOV     -10.(6),-(6)    ;MOVE PC AND PSW DOWN STACK.
    766  002300  016646  177766                MOV     -10.(6),-(6)
    767  002304  000002                        RTI                     ;EXIT.
    768                              ;SUB TO SET R5 IN EMT PC AND RESTORE REGS 0 TOS.
    769  002306  010566  000020     RSOSS:     MOV     R5,16.(6)       ;SET EMT PC TO R5 CONTENTS.
    770                              ;SUB TO RESTORE REGS 0 TO 5.
    771  002312  022626              RSOS:      POPSP2
    772  002314  012600                        MOV     (6)+,R0
    773  002316  012601                        MOV     (6)+,R1
    774  002320  012602                        MOV     (6)+,R2
    775  002322  012603                        MOV     (6)+,R3
    776  002324  012604                        MOV     (6)+,R4
    777  002326  012605                        MOV     (6)+,R5
    778  002330  016646  177762                MOV     -14.(6),-(6)    ;MOVE PC AND PSW DOWNSTACK.
    779  002334  016646  177762                MOV     -14.(6),-(6)
    780  002340  000002                        RTI                     ;EXIT.
    781  002342  012666  177772     SV5S:      MOV     (6)+,-6(6)      ;PC AND PSW UPSTACK.
    782  002346  012666  177772                MOV     (6)+,-6(6)
    783  002352  010546                        MOV     R5,-(6)         ;SAVE R5.
    784  002354  010446                        MOV     R4,-(6)         ;SAVE R4.
    785  002356  024646                        PUSH2
    786  002360  016605  000010                MOV     8.(6),R5        ;EMT PC TO R5.
    787  002364  010504                        MOV     R5,R4           ;EMT PC TO R4.
    788  002366  005744                        TST     -(4)
    789  002370  000002                        RTI                     ;EXIT EMT SUB.
    790  002372  010566  000010     RS5S:      MOV     R5,8.(6)        ;R5 TO EMT PC.
    791  002376  022626                        POPSP2
    792  002400  012604                        MOV     (6)+,R4         ;RESTORE R4.
    793  002402  012605                        MOV     (6)+,R5         ;RESTORE R5.
    794  002404  016646  177772                MOV     -6(6),-(6)
    795  002410  016646  177772                MOV     -6(6),-(6)
    796  002414  000002                        RTI                     ;EXIT.
    797                              ;ROUTINE TO SET TC11 INTERRUPT VECTOR AND PRIORITY
    798  002416  104006              STTCV:     SAVOSS
    799  002420  016701  176372                MOV     TCVTR,R1        ;VECTOR TO R1.
    800  002424  012521                        MOV     (5)+,(1)+       ;SET DESIRED VECTOR.
    801  002426  016721  176366                MOV     TCLVL,(1)+      ;SET TC11 PRIORITY.
    802  002432  104007                        RSTOSS
    803  002434  000002                        RTI
    804                              ;ROUTINE TO ISSUE RESET.
    805  002436  010046              SRSETT:    MOV     R0,-(6)         ;PUSH R0.
    806  002440  012700  052525                MOV     #52525,R0       ;DATA TO R0.
    807  002444  005100                        COM     R0              ;COMPLEMENT (R0).
    808  002446  010067  177770                MOV     R0,SRSETT+4     ;(R0) TO SRSETT+4.
    809  002452  000005                        RESET                   ;ISSUE RESET. (R0) IS
    810  002454  012600                        MOV     (6)+,R0         ;RESTORE R0.
    811  002456  000002                        RTI                     ;DISPLAYED. EXIT.
    812                              ;COMMON HALT ROUTINE
    813  002460  104006              CHLT:      SAVOSS
    814  002462  010400                        MOV     R4,R0           ;DEVELOP ADDR OF CALLER.
    815  002464  000000                        HALT                    ;HALT CALL ADDR IN DATA LIGTHS.
    816  002466  104007                        RSTOSS
    817  002470  000002                        RTI                     ;EXIT.
    818                              ;CONDITIONAL ERROR HALT ROUTINE.
```

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819  002472  005767  175072          EHLT:   TST     SR              ;CHECK FOR HALT ON ERROR.
820  002476  100001                          BPL     EHLTA           ;BRANCH IF NO HALT DESIRED.
821  002500  000000                          HALT                    ;HALT.
822  002502  000002                  EHLTA:  RTI                     ;IN DATA LIGHTS.
823  002504  104025                  ERRN:   STOPDT                  ;ALL STOP.
824  002506  010467  176364                  MOV     R4,FPC          ;CONVERT CALL ADDR OF SUB CALLING.
825  002512  104013                          OACNV
826  002514  001076                          FPC
827  002516  010011                          AFPC
828  002520  000006                          6
829  002522  000003                          SAVSS                   ;SAVE REG 5S
830  002524  010567  000166                  MOV     R5,ERRB         ;DETERMINE CALLING ADDR.
831  002530  162767  000002  000160          SUB     #2,ERRB
832  002536  104013                          OACNV                   ;CONVERT CALLING ADDR TO ASCII.
833  002540  002716                          ERRB
834  002542  007020                          APC
835  002544  000006                          6
836  002546  104013                          OACNV                   ;CONVERT TEST # TO ASCII.
837  002550  001036                          RTNNO
838  002552  007010                          ATNUMB
839  002554  000003                          3
840  002556  104014                          BDCNV                   ;CONVERT ICNT TO DECIMAL ASCII.
841  002560  001030                          ICNT
842  002562  007035                          AICNT
843  002564  000005                          5
844  002566  104013                          OACNV                   ;CONVERT UNIT # TO ASCII.
845  002570  001066                          UNITN
846  002572  007051                          AUNIT
847  002574  000001                          1
848  002576  104013                          OACNV                   ;CONVERT BLKRQ TO ASCII.
849  002600  001060                          BLKRQ
850  002602  007601                          ABLKRQ
851  002604  000006                          6
852  002606  104013                          OACNV                   ;CONVERT TCST TO ASCII.
853  002610  001050                          TCSTT
854  002612  007533                          ATCST
855  002614  000006                          6
856  002616  104013                          OACNV                   ;CONVERT TCCM TO ASCII.
857  002620  001046                          TCCMT
858  002622  007517                          ATCCM
859  002624  000006                          6
860  002626  104013                          OACNV                   ;CONVERT TCWC TO ASCII.
861  002630  001054                          TCWCT
862  002632  007465                          ATCWC
863  002634  000006                          6
864  002636  104013                          OACNV                   ;CONVERT TCBA TO ASCII.
865  002640  001056                          TCBAT
866  002642  007502                          ATCBA
867  002644  000006                          6
868  002646  104013                          OACNV                   ;CONVERT TRANSFER COUNT TO ASCII.
869  002650  001106                          XFRCNT
870  002652  007063                          AXFCNT
871  002654  000006                          6
872  002656  104013                          OACNV                   ;CONVERT WRITE ADDR TO ASCII.
873  002660  001110                          WADDR
874  002662  007101                          AWADDR
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                                                6
                                                OACNV                   ;CONVERT READ ADDR TO ASCII.
                                                RADDR
                                                ARADDR
                                                6
                                        MOV     #EMO,ERRB               ;TYPE ERR HEADER MSG IF NOT INHIBITED.
                                ERRNA:  BIT     #BIT13,SR               ;INHIBIT ERR PRINT?
                                ERRND:  BNE     ERRNB                   ;BR TO INHIBIT.
                                        TYPE                            ;TYPE MSG.
                                ERRB:   OPEN                            ;DESIRED MSG ADDR GOES HERE.
                                ERRNB:  MOV     (5)+,ERRB               ;GET ADDR OF NEXT MSG.
                                        CMP     #-1,ERRB                ;TERMINATOR?
                                        BNE     ERRNA                   ;GO TYPE IF NOT TERMINATOR.
                                ERRNC:  EHALT                           ;END OF MSGS. HALT IF REQUIRED.
                                        RST5S                           ;RESTORE REG 5S.
                                        RTI                             ;EXIT EMT SUB.
                                ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
                                TYP:    SAV05S
                                        MOV     (5)+,R0                 ;ADDRESS OF MESSAGE TO R0.
                                TYPA:   MOVB    (0)+,R1                 ;GET CHARACTER
                                        BNE     TYPC                    ;BRANCH IF NOT TERMINATOR..
                                        MOVB    #177,R1                 ;OUTPUT RUBOUT.
                                        JSR     R7,TYPD
                                        RST05S
                                        RTI                             ;TERMINATOR CHAR. DONE. EXIT.
                                TYPC:   CMPB    #45,R1                  ;CHECK FOR"%".
                                        BEQ     TYPF                    ;BRANCH IF"%"
                                        JSR     R7,TYPD                 ;TYPE CHAR IN R1
                                        BR      TYPA
                                TYPD:   MOVB    R1,@TPB                 ;OUTPUT CHARACTER TO PRINTER
                                        TSTB    @TPS                    ;WAIT FOR DONE FLAG.
                                        BPL     .-4
                                        RTS     R7                      ;EXIT
                                TYPF:   MOVB    #15,R1                  ;MOVE CARRIAGE RETURN CODE TO R1
                                        JSR     R7,TYPD                 ;GO TYPE CHAR.
                                TYPG:   MOVB    #12,R1                  ;MOVE LF CODE TO R1.
                                        JSR     R7,TYPD                 ;GO TYPE CHAR.
                                        BR      TYPA
                                ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
                                TYPS:   SAV5S
                                        MOV     (5)+,TYPSB              ;ADDR OF MESSAGE TO TYPSB.
                                        CMP     #-1,TYPSB               ;CHECK FOR TERMINATOR
                                        BNE     TYPSA                   ;BRANCH IF NOT TERMINATOR.
                                        RST5S
                                        RTI                             ;TERMINATOR, EXIT
                                TYPSA:  TYPE                            ;CALL ON TYP SUB TO TYPE MESSAGE
                                TYPSB:  OPEN                            ;ADDRESS OF MESSAGE GOES HERE
                                        BR      TYPS+2                  ;GO PROCESS NEXT MESSAGE
                                ;SUBROUTINE TO DELAY.
                                        DLYR0=DLY+4
                                        DLYR1=DLYA+4
                                DLY:    MOV     #200.,#0
                                DLYA:   MOV     #1000.,#0               ;DELAY COUNT TO DLYR1.
                                DLYB:   DEC     DLYR1
                                        BNE     DLYB
                                        DEC     DLYR0
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                                        BNE     DLYA
                                        RTI                             ;EXIT.
                                ;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
                                INBINN: MOV     #-1,RIND                ;SET ALL VARIABLES
                                        MOV     RIND,PTO
                                        MOV     RIND,PTI
                                        RTI                             ;EXIT.
                                RIND:   OPEN
                                PTO:    OPEN
                                PTI:    OPEN
                                ;SPECIAL BINARY COUNT PATTERN SUBROUTINE
                                GTBIN1: MOV     PTO,PTI                 ;PREVIOUS BIN CHAR TO PT1
                                        COM     PTI
                                        COM     RIND
                                        BNE     .+6
                                        INC     PTI
                                        MOV     PTI,PTO                 ;SAVE BIN CHAR IN PTO
                                        SAV5S
                                        MOV     PTI,(5)+                ;
                                        RST5S
                                        RTI                             ;EXIT.
                                ;EMT SUB TO CONVERT OCTAL TO ASCII.
                                OACNVV: SAVOSS                          ;SAVE REGS.
                                        MOV     @(5)+,R0                ;GET OCTAL VALUE.
                                        MOV     (5)+,R1                 ;GET DESTINATION ADDR.
                                        MOV     (5)+,R2                 ;GET CONVERT COUNT.
                                        ADD     R2,R1                   ;DEVELOP ADDR TO STORE 1ST CHAR.
                                OACNVA: MOV     R0,R3
                                        BIC     #177770,R3              ;ISOLATE LEAST SIGNIFICANT DIGIT.
                                        ADD     #60,R3                  ;CONVERT DIGIT TO ASCII.
                                        MOVB    R3,-(1)                 ;STORE ASCII CHARACTER.
                                        BIC     #7,R0
                                        ROR     R0
                                        ROR     R0
                                        ROR     R0
                                        DEC     R2                      ;DONE ALL DIGITS?
                                        BNE     OACNVA                  ;BRANCH IF NOT DONE.
                                        RST0SS                          ;RESTORE REGS.
                                        RTI                             ;DONE. EXIT.
                                ;EMT SUB TO MOVE VARIABLE NUMBER OF BYTES.
                                BMOVV:  SAVOSS                          ;SAVE REGS.
                                        MOV     (5)+,R1                 ;GET"FROM"ADDRESS
                                        MOV     (5)+,R2                 ;GET"TO"ADDRESS
                                        MOV     (5)+,R3                 ;GET COUNT
                                BMOVA:  MOVB    (1)+,(2)+               ;MOVE BYTE
                                        DEC     R3                      ;DECREMENT COUNT
                                        BNE     BMOVA                   ;BRANCH IF NOT DONE.
                                        RST0SS                          ;RESTORE REGS.
                                        RTI                             ;DONE. EXIT.
                                ;EMT SUB TO CONVERT BINARY TO DECIMAL ASCII.
                                BDCNVV: SAVOSS                          ;SAVE REGS.
                                        MOV     @(5)+,R1                ;GET BINARY VALUE.
                                        MOV     #DECVAL,R0              ;ADDR OF DECVAL TO R0.
                                        MOV     #TENPWR,R2              ;ADDR OF 10 POWER TO R2.
                                        MOV     #5,R3                   ;SET UP FOR 5 CONVERSIONS.
                                BDCNVA: CLR     R4                      ;CLEAR RESULT.
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  987  003334  161201                    BDCNVB: SUB     (2),R1          ;10 POWER FROM VALUE.
  988  003336  103402                            BCS     BDCNVC          ;BR IF UNSUCCESSFUL.
  989  003340  005204                            INC     R4              ;.1 TO RESULT.
  990  003342  000774                            BR      BDCNVB          ;DO IT AGAIN.
  991  003344  061201                    BDCNVC: ADD     (2),R1          ;RESTORE SUBTRACTED VALUE.
  992  003346  062704  000060                    ADD     #60,R4  ;CONVERT RESULT TO ASCII.
  993  003352  110420                            MOVB    R4,(0)+         ;STORE RESULT.
  994  003354  005722                            TST     (2)+            ;UPDATE 10 POWER ADDR.
  995  003356  005303                            DEC     R3              ;DONE 5 TIMES?
  996  003360  001364                            BNE     BDCNVA          ;BR IF NOT.
  997  003362  012501                            MOV     (5)+,R1         ;GET ADDR TO STORE ASCII.
  998  003364  012502                            MOV     (5)+,R2         ;GET # OF DIGITS REQUIRED.
  999  003366  060201                            ADD     R2,R1           ;START WITH LSD.
 1000  003370  114041                    BDCNVD: MOVB    -(0),-(1)       ;TRANSFER CHARACTER.
 1001  003372  005302                            DEC     R2              ;DONE?
 1002  003374  001375                            BNE     BDCNVD          ;BR IF NOT.
 1003  003376  104007                            RSTOSS                  ;RESTORE REGS.
 1004  003400  000002                            RTI                     ;EXIT.
 1005  003402  023420                    TENPWR: 10000.
 1006  003404  001750                            1000.
 1007  003406  000144                            100.
 1008  003410  000012                            10.
 1009  003412  000001                            1
 1010  003414     040     040     040  DECVAL: .BYTE   040,040,040,040,040,040
 1011  003417     040     040     040
 1012                                   ;SUBROUTINE TO ASSIGN BUFFER AREAS PER AVAILABLE CORE.
 1013  003422  012767  003552  174354  CORSTP: MOV     #CORSTB,MACHER  ;SET UP BUS ERROR TRAP POINTER.
 1014  003430  005737  000042                  TST     @#42            ;LOADED  VIA MONITOR?
 1015  003434  001407                            BEQ     CORSTF          ;BR IF NOT.
 1016  003436  022737  002054  000042            CMP     #LOGIC,@#42     ;42=LOGIC?
 1017  003444  001403                            BEQ     CORSTF          ;BR IF YES.
 1018  003446  012701  172000                    MOV     #172000,R1      ;172000 TO INITIAL TEST ADDR.
 1019  003452  000402                            BR      CORSTA
 1020  003454  012701  177500          CORSTF:   MOV     #177500,R1      ;177500 TO INITIAL TEST ADDR.
 1021  003460  162701  020000          CORSTA:   SUB     #20000,R1       ;SUBTRACT 20000 FROM TEST ADDR.
 1022  003464  062711  000000                    ADD     #0,(1)          ;REFERENCE TEST ADDR.
 1023  003470  012767  000006  174306            MOV     #6,MACHER       ;IF NO TRAP CORE IS AVAILABLE.
 1024  003476  010167  175376          CORSTD:   MOV     R1,RBFLIM       ;SET READ BUFFER UPPER LIMIT.
 1025  003502  162701  010210                    SUB     #CODEND,R1      ;COMPUTE AVAILABLE BUFFER SPACE.
 1026  003506  006001                            ROR     R1              ;COMPUTE BUFFER SIZE (READ OR WRITE).
 1027  003510  006001                            ROR     R1
 1028  003512  042701  000001                    BIC     #BIT0,R1
 1029  003516  010167  175362                    MOV     R1,BFSIZE       ;COMPUTED BUFFER SIZE TO BFSIZE.
 1030  003522  006301                            ASL     R1
 1031  003524  062701  010210                    ADD     #CODEND,R1      ;COMPUTE WRITE BUFFER UPPER LIMIT.
 1032  003530  010167  175346                    MOV     R1,WBFLIM       ;AND MOVE TO WBFLIM.
 1033  003534  104013                            OACNV                   ;TYPEOUT HIGHEST TEST ADDR.
 1034  003536  001100                            RBFLIM
 1035  003540  007444                            ACRLIM
 1036  003542  000006                            6
 1037  003544  104010                            TYPE
 1038  003546  007410                            HADRM
 1039  003550  000207                            RTS     PC              ;EXIT.
 1040  003552  012716  003460          CORSTB:   MOV     #CORSTA,(6)     ;SET UP TRAP EXIT.
 1041  003556  000002                            RTI                     ;EXIT BUS ERROR TRAP.
 1042                                   ;EMT RANDOM NUMBER GENERATOR. NUMBER IS STORED AT LOC AFTER SUB CALL.
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1043  003560  104006                  RNGEN:  SAVOSS
1044  003562  016700  000044                  MOV     RP1,R0
1045  003566  006100                          ROL     R0
1046  003570  006100                          ROL     R0
1047  003572  066700  000036                  ADD     RP2,R0
1048  003576  010067  000030                  MOV     R0,RP1
1049  003602  006100                          ROL     R0
1050  003604  006100                          ROL     R0
1051  003606  066700  000022                  ADD     RP2,R0
1052  003612  006100                          ROL     R0
1053  003614  006100                          ROL     R0
1054  003616  010067  000012                  MOV     R0,RP2
1055  003622  016725  000004                  MOV     RP1,(5)+        ;STORE # AT LOC AFTER SUB CALL.
1056  003626  104007                          RSTOSS
1057  003630  000002                          RTI                     ;EXIT.
1058  003632  001233                  RP1:    1233
1059  003634  007622                  RP2:    7622
1060                                  ;EMT SUB TO INITIALIZE RANDOM NUMBER GENERATOR.
1061  003636  012767  001233  177766 INRNDN: MOV     #1233,RP1
1062  003644  012767  007622  177762         MOV     #7622,RP2
1063  003652  000002                          RTI                     ;EXIT.
1064                                  ;EMT SUB TO SELECT SEQUENTIAL DECTAPE UNIT.
1065  003654  005267  000010          SQDRV:  INC     SQDRVA
1066  003660  042767  177770  000002         BIC     #177770,SQDRVA
1067  003666  104046                          SELDRV                  ;SELECT TRANSPORT.
1068  003670  000000                  SQDRVA: OPEN                    ;TRANSPORT NUMBER.
1069  003672  000770                          BR      SQDRV           ;TRANSPORT NOT AVAILABLE RETURN.
1070  003674  000002                          RTI                     ;TRANSPORT SELECTED. EXIT.
1071                                  ;EMT SUB TO SELECT RANDOM DECTAPE UNIT.
1072                                  ;CALL:  RNDRIV
1073  003676  104015                  RNDRVV: RNDNUM                  ;GET RANDOM NUMBER.
1074  003700  000000                  RNDRVA: OPEN                    ;# IS STORED HERE.
1075  003702  042767  177770  177770         BIC     #177770,RNDRVA  ;LIMIT TO 3 LSB.
1076  003710  016767  177764  000002         MOV     RNDRVA,RNDRVB
1077  003716  104046                          SELDRV                  ;SELECT RANDOM UNIT
1078  003720  000000                  RNDRVB: OPEN                    ;NUMBER OF UNIT TO BE SELECTED.
1079  003722  000765                          BR      RNDRVV          ;UNIT NOT AVAILABLE FOR TESTING RETURN.
1080  003724  000002                          RTI                     ;EXIT. UNIT IS SELECTED.
1081                                  ;EMT SUB TO SELECT DECTAPE UNIT SPECIFIED IF AVAILABLE FOR TESTING.
1082                                  ;CALL:  SELDRV  ;CALL SELECT SUBROUTINE.
1083                                  ;       #       ;NUMBER OF UNIT TO BE SELECTED.
1084                                  ;       XXX     ;UNIT NOT AVAILABLE RETURN.
1085                                  ;       NSI     ;RETURN IF UNIT IS SUCCESSFULLY SELECTED.
1086  003726  104006                  SELDRR: SAVOSS
1087  003730  012500                          MOV     (5)+,R0         ;GET NUMBER OF DESIRED UNIT.
1088  003732  136067  003760  175130         BITB    UNTAB(0),UNITS  ;SEE IF UNIT IS TESTABLE.
1089  003740  001405                          BEQ     SELDRA          ;BR IF NOT.
1090  003742  010067  175120                  MOV     R0,UNITN        ;TESTABLE. SAVE UNIT NUMBER.
1091  003746  110067  175113                  MOVB    R0,UNIT+1       ;POSITION UNIT NUMBER FOR LATER IO.
1092  003752  005725                          TST     (5)+
1093  003754  104007                  SELDRA: RSTOSS
1094  003756  000002                          RTI                     ;EXIT.
1095  003760     001     002     004  UNTAB:  .BYTE   BIT0,BIT1,BIT2,BIT3,BIT4,BIT5,BIT6,BIT7
1096  003763     010     020     040
1097  003766     100     200
1098                                  ;EMT SUB TO GENERATE RANDOM TRANSFER COUNT (XFRCNT)
```

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1099  003770  104015                  RNDXFF: RNDNUM                  ;GET RANDOM NUMBER.
1100  003772  000000                  RNDXFA: OPEN                    ;NUMBER IS STORED HERE.
1101  003774  042767  000377  177770          BIC     #377,RNDXFA
1102  004002  005767  177764                  TST     RNDXFA          ;NUMBER MUST NOT BE 0.
1103  004006  001770                          BEQ     RNDXFF          ;BR IF ZERO.
1104  004010  026767  177756  175066          CMP     RNDXFA,BFSIZE   ;COMPARE NUMBER AGAINST BUFFER SIZE.
1105  004016  101364                          BHI     RNDXFF          ;IF LARGER, GET ANOTHER NUMBER.
1106  004020  016767  177746  175060          MOV     RNDXFA,XFRCNT   ;NUMBER TO XFRCNT.
1107  004026  104050                          XFRSET                  ;PERFORM BUFFER AND BLOCK SETUP.
1108  004030  000002                          RTI                     ;EXIT.
1109                                  ;EMT SUB TO SET UP BUFFER ADDRESSES AND FWD AND REV BLOCK NUMBERS
1110                                  ;BASED ON VALUE OF TRANSFER COUNT.
1111  004032  016767  175044  175050  XFRSTT: MOV     WBFLIM,WADDR    ;COMPUTE WRITE ADDRESS.
1112  004040  166767  175042  175042          SUB     XFRCNT,WADDR
1113  004046  166767  175034  175034          SUB     XFRCNT,WADDR
1114  004054  016767  175020  175030          MOV     RBFLIM,RADDR    ;COMPUTE READ ADDRESS.
1115  004062  166767  175020  175022          SUB     XFRCNT,RADDR
1116  004070  166767  175012  175014          SUB     XFRCNT,RADDR
1117  004076  016767  175004  175012          MOV     XFRCNT,VRBLKN   ;COMPUTE NUMBER OF BLOCKS REQUIRED,
1118  004104  105067  175006                  CLRB    VRBLKN          ;AND FWD MAX AND REV MIN BLOCK NUMBERS
1119  004110  000367  175002                  SWAB    VRBLKN          ;
1120  004114  012767  001102  174772          MOV     #1102,VFBLKN
1121  004122  166767  174770  174764          SUB     VRBLKN,VFBLKN   ;MAX FWD BLOCK.
1122  004130  005367  174762                  DEC     VRBLKN          ;MIN REV BLOCK.
1123  004134  000002                          RTI                     ;EXIT.
1124                                  ;EMT SUB TO FILL WRITE BUFFER WITH NUMBER OF DRIVE UNDER TEST.
1125  004136  104006                  DRVFLL: SAVOSS
1126  004140  016700  174744                  MOV     WADDR,R0
1127  004144  016701  174716                  MOV     UNITN,R1
1128  004150  016703  174732                  MOV     XFRCNT,R3
1129  004154  010120                  DRVFLA: MOV     R1,(0)+
1130  004156  005303                          DEC     R3
1131  004160  001375                          BNE     DRVFLA
1132  004162  104007                          RSTOSS
1133  004164  000002                          RTI                     ;EXIT.
1134                                  ;EMT SUB TO SELECT RANDOM FORWARD BLOCK NUMBER.
1135  004166  104015                  RNDFBB: RNDNUM                  ;GET RANDOM NUMBER.
1136  004170  000000                  RDFBBA: OPEN                    ;NUMBER IS STORED HERE.
1137  004172  026767  177772  174714          CMP     RDFBBA,VFBLKN   ;NUMBER MUST NOT BE LARGER THAN VFBLKN.
1138  004200  101372                          BHI     RNDFBB          ;BR IF LARGER. GET ANOTHER NUMBER.
1139  004202  016767  177762  174650          MOV     RDFBBA,BLKRQ    ;NEW BLOCK NUMBER TO BLKRQ.
1140  004210  016767  174644  174644          MOV     BLKRQ,BLKRQS
1141  004216  000002                          RTI                     ;EXIT.
1142                                  ;EMT SUB TO SELECT RANDOM REVERSE BLOCK NUMBER.
1143  004220  104015                  RNDRBB: RNDNUM                  ;GET RANDOM NUMBER.
1144  004222  000000                  RDRBBA: OPEN                    ;NUMBER IS STORED HERE.
1145  004224  026767  174666  177770          CMP     VRBLKN,RDRBBA   ;NUMBER MUST NOT BE SMALLER THAN VRBLKN.
1146  004232  101372                          BHI     RNDRBB          ;BR IF SMALLER. GET ANOTHER NUMBER.
1147  004234  026727  177762  001101          CMP     RDRBBA,#1101    ;NUMBER MUST NOT EXCEED 1101.
1148  004242  101366                          BHI     RNDRBB          ;BR IF LARGER.
1149  004244  016767  177752  174606          MOV     RDRBBA,BLKRQ    ;NEW BLOCK NUMBER TO BLKRQ.
1150  004252  016767  174602  174602          MOV     BLKRQ,BLKRQS
1151  004260  000002                          RTI                     ;EXIT.
1152                                  ;EMT SUB TO FILL WRITE BUFFER WITH RANDOM DATA.
1153  004262  104006                  RNDFLL: SAVOSS
1154  004264  016700  174620                  MOV     WADDR,R0        ;GET STARTING ADDR.
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1155  004270  016701  174612              MOV     XFRCNT,R1       ;GET COUNT.
1156  004274  104015             RNDFLA:  RNDNUM                  ;GET RANDOM NUMBER.
1157  004276  000000             RNDFLB:  OPEN                    ;NUMBER IS STORED HERE.
1158  004300  016720  177772              MOV     RNDFLB,(0)+     ;STORE NUMBER AWAY.
1159  004304  005301                      DEC     R1              ;DONE?
1160  004306  001372                      BNE     RNDFLA          ;BR IF NOT DONE.
1161  004310  104007                      RSTOSS
1162  004312  000002                      RTI                     ;EXIT.
1163                             ;EMT SUB TO SAVE TCCM, TCST, TCDT, TCWC, TCBA.
1164  004314  017767  174464  174526 STATS:  MOV     @TCST,TCSTT     ;SAVE TCST.
1165  004322  017767  174460  174516        MOV     @TCCM,TCCMT     ;SAVE TCCM.
1166  004330  017767  174454  174516        MOV     @TCWC,TCWCT     ;SAVE TCWC.
1167  004336  017767  174452  174506        MOV     @TCDT,TCDTT     ;SAVE TCDT.
1168  004344  017767  174442  174504        MOV     @TCBA,TCBAT     ;SAVE TCBA.
1169  004352  000002                      RTI                     ;EXIT EMT SUB.
1170                             ;EMT SUB TO ISSUE DT COMMAND SPECIFIED AT CALL+2.
1171  004354  005067  174512 STCOM:  CLR     COMND           ;CLEAR PREVIOUS COMMAND
1172  004360  016767  174500  174504        MOV     UNIT,COMND      ;UNIT # TO COMND.
1173  004366  057667  000000  174476        BIS     @(6),COMND      ;SET DESIRED COMMAND IN COMND.
1174  004374  016777  174472  174404        MOV     COMND,@TCCM     ;ISSUE COMMAND.
1175  004402  032777  100200  174376        BIT     #BIT15!BIT7,@TCCM       ;READY AND ERROR BIT CLEAR?
1176  004410  001414                      BEQ     STCOMB          ;BR IF YES.
1177  004412  032767  000001  174452        BIT     #BIT0,COMND     ;WAS THE DO BIT SET IN COMND?
1178  004420  001410                      BEQ     STCOMB          ;BR IF NOT.
1179  004422  000003                      SAVSS
1180  004424  104024                      STATUS                  ;SAVE STATUS.
1181  004426  104012                      ERRORN                  ;ERROR. DO BIT FAILED TO CAUSE CLEARING
1182  004430  010003                      FPCMSG
1183  004432  007735                      STCMSG                  ;OF READY AND/OR ERROR BIT(S). OR ILO,
1184  004434  007511                      STAT                    ;BLOCK MISS, OR DATA MISS ERROR OCCURRED.
1185  004436  177777                      -1
1186  004440  104000                      SCOPE
1187  004442  062716  000002 STCOMB:  ADD     #2,(6)          ;SET UP RETURN.
1188  004446  000002                      RTI                     ;EXIT STCOM SUB.
1189                             ;EMT SUB TO STOP ALL DECTAPES.
1190  004450  042777  000116  174330 STPDT:  BIC     #116,@TCCM      ;ISSUE SAT COMMAND.
1191  004456  000002                      RTI                     ;EXIT EMT SUB.
1192                             ;EMT SUB TO CHECK FOR DECTAPE ERROR OR END ZONE.
1193  004460  000003             CKERZ:   SAVSS
1194  004462  005777  174320              TST     @TCCM           ;ERROR BIT SET?
1195  004466  100404                      BMI     CKERZC          ;BR IF YES.
1196  004470  005725                      TST     (5)+            ;NO. SET UP OK EXIT.
1197  004472  005725             CKERZA:  TST     (5)+
1198  004474  000004             CKERZB:  RSTSS
1199  004476  000002                      RTI                     ;EXIT EMT SUB.
1200  004500  005777  174300 CKERZC:  TST     @TCST           ;ENDZ BIT SET?
1201  004504  100772                      BMI     CKERZA          ;BR IF YES.
1202  004506  104024             CKERZD:  STATUS
1203  004510  104012                      ERRORN                  ;DECTAPE ERROR.
1204  004512  010003                      FPCMSG
1205  004514  007561                      DTERR
1206  004516  007511                      STAT
1207  004520  177777                      -1
1208  004522  000764                      BR      CKERZB
1209                             ;EMT SUB TO HANDLE FAILURE TO INTERRUPT.
1210  004524  000003             NOINTR:  SAVSS
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1211  004526  104024                        STATUS                  ;SAVE STATUS.
1212  004530  104012                        ERRORN                  ;DECTAPE FAIL TO INTERRUPT.
1213  004532  010003                        FPCMSG
1214  004534  007542                        INTFAI
1215  004536  007511                        STAT
1216  004540  177777                        -1
1217  004542  000004                        RSTSS
1218  004544  000002                        RTI                     ;EXIT EMT SUB.
1219                          ;EMT SUB TO CHECK EXPECTED DATA AGAINST ACTUAL DATA AND REPORT ERRORS.
1220  004546  000000          DATIND: OPEN
1221  004550  000000          DATKNT: OPEN                            ;CURRENT WORD NUMBER.
1222  004552  000000          EXPDAT: OPEN
1223  004554  000000          ACTDAT: OPEN
1224  004556  012767  001066  174324  DTCKSS: MOV     #UNITN,WADDR    ;UNIT NUMBER ADDR TO WADDR.
1225  004564  012767  021021  000202          MOV     #021021,DATCKE  ;PREVENT INCREMENT OF S/B ADDR.
1226  004572  005067  177750                  CLR     DATIND
1227  004576  000414                          BR      DATCKK
1228  004600  012767  022041  000166  DTCKI:  MOV     #022041,DATCKE  ;INDICATE DECREMENT OF ACT DATA.
1229  004606  012767  177777  177732          MOV     #-1,DATIND
1230  004614  000405                          BR      DATCKK
1231  004616  012767  022021  000150  DATCK:  MOV     #022021,DATCKE  ;INDICATE INCREMENT OF ACT DATA.
1232  004624  005067  177716                  CLR     DATIND
1233  004630  104006                DATCKK: SAVOSS
1234  004632  016700  174252                  MOV     WADDR,R0        ;GET EXP DATA ADDR.
1235  004636  016701  174250                  MOV     RADDR,R1        ;GET ACT DATA ADDR.
1236  004642  005767  177700                  TST     DATIND          ;CHECK FOR ACT DATA DECREMENT.
1237  004646  001406                          BEQ     DATCKA          ;BR IF NO DECREMENT REQUIRED.
1238  004650  066701  174232                  ADD     XFRCNT,R1       ;YES. COMPUTE UPPER LIMIT OF ACT DATA.
1239  004654  066701  174226                  ADD     XFRCNT,R1
1240  004660  162701  000002                  SUB     #2,R1
1241  004664  016702  174216  DATCKA: MOV     XFRCNT,R2               ;GET # OF WORDS TO CHECK.
1242  004670  012767  000001  177652          MOV     #1,DATKNT       ;SET CURRENT WORD # TO 1.
1243  004676  016703  174216                  MOV     ERRLIM,R3       ;ERR LIMIT TO ERROR COUNTER.
1244  004702  011067  177644  DATCKB: MOV     (0),EXPDAT              ;GET EXP DATA WORD.
1245  004706  011167  177642                  MOV     (1),ACTDAT      ;GET ACT DATA WORD.
1246  004712  026767  177634  177634  DATCKC: CMP     EXPDAT,ACTDAT   ;COMPARE ACT DATA AND EXP DATA.
1247  004720  001423                          BEQ     DATCKD          ;BR IF NOT SAME.
1248  004722  104014                          BDCNV                   ;DATA NOT SAME. CONVERT WORD # TO DECIMAL ASCII.
1249  004724  004550                          DATKNT
1250  004726  007677                          AWDCNT
1251  004730  000004                          4
1252  004732  104013                          OACNV                   ;CONVERT EXP DATA TO ASCII.
1253  004734  004552                          EXPDAT
1254  004736  007712                          ADATSB
1255  004740  000006                          6
1256  004742  104013                          OACNV                   ;CONVERT ACT DATA TO ASCII.
1257  004744  004554                          ACTDAT
1258  004746  007726                          ADATWS
1259  004750  000006                          6
1260  004752  104012                          ERRORN                  ;TYPE DATA ERROR MESSAGE.
1261  004754  010003                          FPCMSG
1262  004756  007572                          BLKSB
1263  004760  007657                          DATERR
1264  004762  177777                          -1
1265  004764  005303                  DEC     R3                      ;NTW ERROR?
1266  004766  001405                  BEQ     DATCKH                  ;BR IF YES.
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1267  004770  005267  177554          DATCKD: INC     DATKNT          ;INCREMENT WORD #
1268  004774  000000                  DATCKE: OPEN
1269  004776  005302                  DATCKG: DEC     R2              ;DONE CHECKING?
1270  005000  001340                          BNE     DATCKB          ;BR IF NOT.
1271  005002  104007                  DATCKH: RSTOSS                  ;DONE.
1272  005004  000002                          RTI                     ;EXIT.
1273                                  ;EMT SUB TO CLEAR SPECIFIED AREA TO 0'S.
1274  005006  104006                  CLEARR: SAVOSS
1275  005010  012500                          MOV     (5)+,R0         ;GET STARTING ADDR.
1276  005012  012501                          MOV     (5)+,R1         ;GET COUNT.
1277  005014  005020                          CLR     (0)+            ;CLEAR WORD.
1278  005016  005301                          DEC     R1              ;DONE?
1279  005020  001375                          BNE     .-4             ;BR IF NOT DONE.
1280  005022  104007                          RSTOSS                  ;DONE
1281  005024  000002                          RTI                     ;EXIT.
1282                                  ;EMT SUB TO FILL AREA WITH BINARY COUNT PATTERN.
1283  005026  104006                  BINFLL: SAVOSS
1284  005030  016700  174054                  MOV     WADDR,R0        ;GET STARTING ADDR.
1285  005034  016701  174046                  MOV     XFRCNT,R1       ;GET COUNT.
1286  005040  104044                  BINFLA: GETBN1                  ;GET BINARY WORD.
1287  005042  000000                  BINFLB: OPEN                    ;BINARY WORD IS STORED HERE.
1288  005044  016720  177772                  MOV     BINFLB,(0)+     ;STORE WORD.
1289  005050  005301                          DEC     R1              ;DONE?
1290  005052  001372                          BNE     BINFLA          ;BR IF NOT DONE.
1291  005054  104007                          RSTOSS                  ;DONE.
1292  005056  000002                          RTI                     ;EXIT.
1293                                  ;EMT SUB TO CHECK THAT WORD COUNT IS 0, AND THAT TCBA CONTENTS
1294                                  ;MATCH THE EXPECTED CONTENTS.
1295  005060  000003                  CWCBA:  SAVSS
1296  005062  012567  174006                  MOV     (5)+,TEMP       ;GET EXPECTED TCBA CONTENTS.
1297  005066  104024                          STATUS                  ;SAVE TCWC AND TCBA.
1298  005070  005777  173714                  TST     @TCWC           ;WORD COUNT 0?
1299  005074  001407                          BEQ     CWCBB           ;BR IF 0 (OK).
1300  005076  104012                          ERRORN                  ;WORD COUNT NOT 0. TYPE
1301  005100  010003                          FPCMSG                  ;CONTENTS OF TCWC AND TCBA.
1302  005102  007610                          WCNOTO
1303  005104  007457                          CTCWC
1304  005106  007474                          CTCBA
1305  005110  177777                          -1
1306  005112  104000                          SCOPE
1307  005114  026777  173764  173670  CWCBB: CMP     TEMP,@TCBA      ;TCBA AND EXPECTED TCBA SAME?
1308  005122  001414                          BEQ     CWCBC           ;BR IF YES (OK).
1309  005124  104013                          OACNV                   ;NO. CONVERT EXPECTED TCBA TO ASCII.
1310  005126  001074                          TEMP
1311  005130  007646                          ATCBAS
1312  005132  000006                          6
1313  005134  104012                          ERRORN                  ;TCBA DOES NOT MATCH EXPECTED
1314  005136  010003                          FPCMSG                  ;TCBA CONTENTS. TYPE EXPECTED TCBA,
1315  005140  007624                          INCTCB                  ;ACTUAL TCBA, AND TCWC.
1316  005142  007640                          TCBASB
1317  005144  007474                          CTCBA
1318  005146  007457                          CTCWC
1319  005150  177777                          -1
1320  005152  104000                          SCOPE
1321  005154  000004                  CWCBC:  RST5S
1322  005156  000002                          RTI                     ;EXIT.
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 1323                                          ;EMT SUBS TO SEARCH FOR DESIRED BLOCK NUMBER. SRCHFF GETS FORWARD
 1324                                          ;BLOCK NUMBERS. SRCHRR GETS REVERSE BLOCK NUMBERS.
 1325  005160  105067  000321          SRCHFF: CLRB    DIRIND          ;SET FORWARD INDICATOR.
 1326  005164  000403                          BR      SRCHA
 1327  005166  112767  177777  000311  SRCHRR: MOVB    #-1,DIRIND      ;SET REVERSE INDICATOR.
 1328  005174  012777  005260  173614  SRCHA:  MOV     #SRCHC,@TCVTR   ;SET INTERRUPT VECTOR TO SRCHC.
 1329  005202  112767  000005  000274          MOVB    #5,REVCNT       ;SET MAX # OF REVERSALS ALLOWED.
 1330  005210  052767  004000  000020          BIS     #REV,SRCHM      ;SET REV BIT IN SRCHM.
 1331  005216  032777  004000  173562          BIT     #REV,@TCCM      ;REV BIT SET IN TCCM?
 1332  005224  001003                          BNE     SRCHAA          ;BR IF YES.
 1333  005226  042767  004000  000002          BIC     #REV,SRCHM      ;NO. CLEAR REV BIT FROM SRCHM.
 1334  005234  104023          SRCHAA: SETCOM                          ;START SEARCH.
 1335  005236  000103          SRCHM:  RNUM!IE!DO
 1336  005240  000402                          BR      SRCHB
 1337  005242  005277  173540  SRCCON: INC     @TCCM                   ;ISSUE DO TO ENABLE RNUM.
 1338  005246  104400          SRCHB:  DELAY                           ;TIME OUT INTERRUPT.
 1339  005250  104400                  DELAY
 1340  005252  104400                  DELAY
 1341  005254  104027                  NOINT                           ;FAILURE TO INTERRUPT.
 1342  005256  104000                  SCOPE
 1343  005260  012716  005266          SRCHC:  MOV     #SRCHD,(6)      ;HERE WHEN INTERRUPT OCCURS.
 1344  005264  000002                  RTI                             ;EXIT TO SRCHD.
 1345  005266  022626          SRCHD:  POPSP2                          ;RESTORE STACK.
 1346  005270  005777  173512          TST     @TCCM                   ;ERROR BIT SET?
 1347  005274  100003                  BPL     SRCHDA                  ;BR IF NOT.
 1348  005276  104026                  CKERRZ                          ;CHECK FOR ERROR/ENDZ.
 1349  005300  104000                  SCOPE                           ;ERROR RETURN, SCOPE.
 1350  005302  000451                  BR      SRCREV                  ;ENDZ, GO REVERSE DIRECTION.
 1351  005304  027767  173504  173546  SRCHDA: CMP     @TCDT,BLKRQ     ;COMPARE BLK# IN TCDT TO REQUIRED BLK.
 1352  005312  001431                  BEQ     SRCF                    ;BR IF BLK FOUND.
 1353  005314  003014                  BGT     SRCHE                   ;BR IF TCDT HIGH.
 1354  005316  032777  004000  173462          BIT     #BIT11,@TCCM    ;TCDT LOW, CHECK DIRECTION.
 1355  005324  001746                  BEQ     SRCCON                  ;BR IF GOING FWD. CONTINUE SAME DIRECTION.
 1356  005326  062777  000003  173460          ADD     #3,@TCDT        ;ADD 3 TO TCDT.
 1357  005334  027767  173454  173516          CMP     @TCDT,BLKRQ     ;LOWER BY 3 OR MORE?
 1358  005342  101435                  BLOS    SRCRVA                  ;GO REVERSE IF LOWER BY 3 OR MORE.
 1359  005344  000736                  BR      SRCCON                  ;NOT LOW ENOUGH. CONTINUE SAME DIRECTION.
 1360  005346  032777  004000  173432  SRCHE:  BIT     #BIT11,@TCCM    ;TCDT HIGH. CHECK DIRECTION.
 1361  005354  001332                  BNE     SRCCON                  ;BR IF IN REVERSE. CONTINUE DIRECTION.
 1362  005356  162777  000003  173430          SUB     #3,@TCDT        ;SUBTRACT 3 FROM TCDT.
 1363  005364  026777  173470  173422          CMP     BLKRQ,@TCDT     ;HIGHER BY 3 OR MORE?
 1364  005372  003425                  BLE     SRCRVB                  ;GO REVERSE IF HIGHER BY 3 OR MORE.
 1365  005374  000722                  BR      SRCCON                  ;NOT HIGH ENOUGH. CONTINUE DIRECTION.
 1366  005376  032777  004000  173402  SRCF:   BIT     #BIT11,@TCCM    ;TCDT EQUAL. CHECK DIRECTION.
 1367  005404  001004                  BNE     SRCHG                   ;BR IF IN REVERSE.
 1368  005406  105767  000073          TSTB    DIRIND                  ;GOING FORWARD. FWD BLK# WANTED?
 1369  005412  001313                  BNE     SRCCON                  ;BR IF FWD BLK# NOT WANTED.
 1370  005414  000002                  RTI                             ;EXIT EMT SUB.
 1371  005416  105767  000063          SRCHG:  TSTB    DIRIND          ;GOING REV. REV BLK# WANTED?
 1372  005422  001707                  BEQ     SRCCON                  ;BR IF REV BLK# NOT WANTED.
 1373  005424  000002                  RTI                             ;REV BLK# WANTED. EXIT.
 1374  005426  032777  004000  173352  SRCREV: BIT     #BIT11,@TCCM    ;REV BIT SET?
 1375  005434  001404                  BEQ     SRCRVB                  ;BR IF NOT.
 1376  005436  042777  004000  173342  SRCRVA: BIC     #BIT11,@TCCM    ;IN REVERSE. SET TO FORWARD.
 1377  005444  000403                  BR      SRCRVC
 1378  005446  052777  004000  173332  SRCRVB: BIS     #BIT11,@TCCM    ;FORWARD. SET TO REVERSE.
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 1379  005454  105367  000024          SRCRVC: DECB    REVCNT          ;FIFTH REVERSAL ISSUED?
 1380  005460  001270                          BNE     SRCCON          ;BR IF NOT.
 1381  005462  104024                          STATUS                  ;YES. ERROR. SAVE STATUS.
 1382  005464  000003                          SAVSS
 1383  005466  104012                          ERRORN                  ;BLK# NOT FOUND WITHIN 5 TAPE
 1384  005470  010003                          FPCMSG                  ;REVERSALS.
 1385  005472  007572                          BLKSB
 1386  005474  007764                          SRCHER
 1387  005476  007511                          STAT
 1388  005500  177777                          -1
 1389  005502  104000                          SCOPE
 1390  005504     000          REVCNT: .BYTE   OPEN
 1391  005505     000          DIRIND: .BYTE   OPEN
 1392                          ;EMT SUBS TO WDATA, RDATA, FORWARD OR REVERSE.
 1393  005506  016777  173374  173274 WRDFR:  MOV     XFRCNT,@TCWC    ;GET WORD COUNT AND SET IN TCWC
 1394  005514  017767  173270  000100        MOV     @TCWC,WRDFRG    ;2(WORD COUNT) TO WRDFRG.
 1395  005522  006367  000074                ASL     WRDFRG
 1396  005526  005477  173256                NEG     @TCWC           ;IN 2'S COMPLEMENT FORM.
 1397  005532  067767  173254  000062        ADD     @TCBA,WRDFRG    ;2(WORD COUNT)+TCBA=FINAL TCBA CONTENTS.
 1398  005540  000000          WRDFRA: OPEN                            ;SRCHF OR SRCHR CALL GOES HERE.
 1399  005542  012777  005600  173246        MOV     #WRDFRC,@TCVTR  ;SET INTERRUPT VECTOR TO WRDFRC.
 1400  005550  104023                        SETCOM                  ;ISSUE WDATA OR RDATA.
 1401  005552  000000          WRDFRB: OPEN                            ;COMMAND GOES HERE.
 1402  005554  104400                        DELAY                   ;WAIT FOR INTERRUPT.
 1403  005556  104400                        DELAY
 1404  005560  104400                        DELAY
 1405  005562  104400                        DELAY
 1406  005564  104400                        DELAY
 1407  005566  104400                        DELAY
 1408  005570  104400                        DELAY
 1409  005572  104400                        DELAY
 1410  005574  104027                        NOINT                   ;FAILURE TO INTERRUPT.
 1411  005576  104000                        SCOPE
 1412  005600  022626          WRDFRC: POPSP2                          ;HERE WHEN INTERRUPT OCCURS.
 1413  005602  022626                  POPSP2
 1414  005604  005777  173176            TST     @TCCM          ;ERROR BIT SET?
 1415  005610  100003                    BPL     WRDFRF          ;BR IF NOT.
 1416  005612  104026                    CKERRZ                  ;CHECK FOR ERRORS.
 1417  005614  104000                    SCOPE                   ;ERROR RETURN.
 1418  005616  000240                    NOP                     ;ENDZ RETURN.
 1419  005620  104036          WRDFRF: CKWCBA                  ;CHECK WORD COUNT AND CURRENT ADDR.
 1420  005622  000000          WRDFRG: OPEN                    ;TCBA SHOULD EQUAL THIS.
 1421  005624  000240          WRDFRE: NOP
 1422  005626  000002                  RTI                     ;EXIT.
 1423  005630  012767  000115  177714 WDATF:  MOV     #WDATA!FWD!IE!DO,WRDFRB
 1424  005636  016777  173246  173146        MOV     WADDR,@TCBA     ;
 1425  005644  012767  104030  177666        MOV     #SRCHF,WRDFRA   ;
 1426  005652  000715                  BR      WRDFR
 1427  005654  012767  000105  177670 RDATF:  MOV     #RDATA!FWD!IE!DO,WRDFRB
 1428  005662  016777  173224  173122        MOV     RADDR,@TCBA     ;
 1429  005670  012767  104030  177642        MOV     #SRCHF,WRDFRA
 1430  005676  000703                  BR      WRDFR
 1431  005700  012767  004115  177644 WDATR:  MOV     #WDATA!REV!IE!DO,WRDFRB
 1432  005706  016777  173176  173076        MOV     WADDR,@TCBA     ;
 1433  005714  012767  104031  177616        MOV     #SRCHR,WRDFRA   ;
 1434  005722  000671                  BR      WRDFR
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1435  005724  012767  004105  177620  RDATR:  MOV     #RDATA!REV!IE!DO,WRDFRB
1436  005732  016777  173154  173036          MOV     RADDR,@TCBA     ;
1437  005740  012767  104031  177572          MOV     #SRCHR,WRDFRA
1438  005746  000657                          BR      WRDFR
1439                          ;SUB TO REWIND AVAILABLE TRANSPORTS.
1440  005750  104002                  MRWIND: SAV03
1441  005752  005067  173102                  CLR     BLKRQ
1442  005756  012700  000010                  MOV     #8.,R0          ;SET UP TO REWIND 8 TRANSPORTS.
1443  005762  005267  000010          MRWNDA: INC     MRWNDB
1444  005766  042767  177770  000002        BIC     #177770,MRWNDB
1445  005774  104046                          SELDRV                  ;SELECT TRANSPORT.
1446  005776  000000                  MRWNDB: OPEN                    ;TRANSPORT NUMBER.
1447  006000  000402                          BR      MRWNDC          ;TRANSPORT NOT AVAILABLE RETURN.
1448  006002  104031                          SRCHR                   ;SEARCH FOR REVERSE BLOCK 0 ON
1449  006004  104025                          STOPDT                  ;SELECTED DRIVE, AND STOP DECTAPE.
1450  006006  005300                  MRWNDC: DEC     R0              ;DONE 8 TRANSPORTS?
1451  006010  001364                          BNE     MRWNDA          ;BR IF NOT.
1452  006012  104003                          RST03
1453  006014  000207                          RTS     PC              ;DONE. EXIT.
1454                          ;SUB TO GET AVAILABLE TRANSPORTS MOVING FORWARD.
1455  006016  104002                  MFWD:   SAV03
1456  006020  012700  000010                  MOV     #8.,R0          ;SET UP TO MOVE 8 TRANSPORTS.
1457  006024  005267  000010          MFWDA:  INC     MFWDB
1458  006030  042767  177770  000002        BIC     #177770,MFWDB
1459  006036  104046                          SELDRV                  ;SELECT TRANSPORT.
1460  006040  000000                  MFWDB:  OPEN                    ;TRANSPORT NUMBER.
1461  006042  000402                          BR      MFWDC           ;TRANSPORT NOT AVAILABLE RETURN.
1462  006044  104023                          SETCOM                  ;ISSUE RNUM!FWD COMMAND.
1463  006046  000002                          RNUM!FWD
1464  006050  005300                  MFWDC:  DEC     R0              ;DONE 8 TRANSPORTS?
1465  006052  001364                          BNE     MFWDA           ;BR IF NOT.
1466  006054  104400                          DELAY                   ;WAIT.
1467  006056  104003                          RST03
1468  006060  000207                          RTS     PC              ;EXIT.
1469          ;*****************************************************************************
1470  006062  000000                  T0:     0                       ;ROUTINE NUMBER 0                *
1471  006064  006236                          T1                      ;ADDRESS OF NEXT ROUTINE         *
1472  006066  000012                          10.                     ;TEST ITERATION COUNT            *
1473  006070  006072                          CA                      ;SCOPE ENTRY POINT               *
1474          ;*****************************************************************************
1475          ;SST COMMAND TEST. CHECK THAT ISSUING SST TO A SPECIFIC TRANSPORT DOES NOT
1476          ;RESULT IN SOME OTHER TRANSPORT STOPPING ALSO.
1477  006072  012700  000010          CA:     MOV     #8.,R0          ;SET UP TO TEST 8  TAPES.
1478  006076  004767  177646          CB:     JSR     PC,MRWIND       ;REWIND ALL TAPES.
1479  006102  004767  177710                  JSR     PC,MFWD         ;GET ALL TAPES MOVING FORWARD.
1480  006106  005267  000010                  INC     CC
1481  006112  042767  177770  000002        BIC     #177770,CC
1482  006120  104046                          SELDRV                  ;SELECT TRANSPORT.
1483  006122  000000                  CC:     OPEN                    ;TRANSPORT NUMBER.
1484  006124  000441                          BR      CF              ;TRANSPORT NOT AVAILABLE RETURN.
1485  006126  104023                          SETCOM                  ;STOP SELECTED TRANSPORT.
1486  006130  000010                          SST
1487  006132  012701  000007                  MOV     #7,R1           ;SET UP TO CHECK OTHER 7 TRANSPORTS.
1488  006136  016767  177760  000014          MOV     CC,CD           ;MOVE # OF UNIT JUST STOPPEE AND INCREMENT IT.
1489  006144  005267  000010          CDA:    INC     CD
1490  006150  042767  177770  000002        BIC     #177770,CD
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1491   006156  104046                          SELDRV                  ;SELECT TRANSPORT.
1492   006160  000000                  CD:     OPEN                    ;TRANSPORT NUMBER.
1493   006162  000420                          BR      CE              ;TRANSPORT NOT AVAILABLE RETURN.
1494   006164  104023                          SETCOM                  ;SELECT TRANSPORT WITH DINH BIT SET.
1495   006166  010002                          DINH!RNUM!FWD
1496   006170  104400                          DELAY                   ;WAIT
1497   006172  032777  000200  172604          BIT     #BIT7,@TCST     ;UPS BIT SET?
1498   006200  001011                          BNE     CE              ;BR IF YES.
1499   006202  104024                          STATUS                  ;SAVE STATUS.
1500   006204  104013                          OACNV                   ;CONVERT # OF UNIT STOPPED TO ASCII.
1501   006206  006125                          CC
1502   006210  010123                          ACEMSG
1503   006212  000001                          1
1504   006214  104012                          ERRORN                  ;SST TO SPECIFIC UNIT RESULTED IN ANOTHER
1505   006216  010064                          CEMSG                   ;ALSO STOPPING.
1506   006220  007511                          STAT
1507   006222  177777                          -1
1508   006224  005301                  CE:     DEC     R1              ;TESTED 7 UNITS?
1509   006226  001346                          BNE     CDA             ;BR IF NOT.
1510   006230  005300                  CF:     DEC     R0              ;STOP TESTED ALL UNITS?
1511   006232  001321                          BNE     CB              ;BR IF NOT.
1512   006234  104000                          SCOPE                   ;YES. SCOPE.
1513                                  ;*******************************************************************************
1514   006236  000001                  T1:     1                       ;ROUTINE NUMBER 1                             *
1515   006240  006376                          T2                      ;ADDRESS OF NEXT ROUTINE                      *
1516   006242  000001                          1                       ;TEST ITERATION COUNT                         *
1517   006244  006246                          AA                      ;SCOPE ENTRY POINT                            *
1518                                  ;*******************************************************************************
1519                                  ;SELECTION TEST. WRITE EACH UNIT'S TAPE WITH THE UNIT'S NUMBER. THEN,
1520                                  ;SEQUENTIALLY READ DATA FROM EACH UNIT. DATA READ SHOULD MATCH UNIT'S NUMBER.
1521   006246  012767  000400  172632  AA:     MOV     #256.,XFRCNT    ;SET UP 256 WORD TRANSFER.
1522   006254  104050                          XFRSET
1523   006256  005067  000006                  CLR     AC
1524   006262  012700  000010                  MOV     #8.,R0
1525   006266  104046                  AB:     SELDRV                  ;SELECT DRIVE.
1526   006270  000000                  AC:     OPEN                    ;NUMBER OF DRIVE TO BE SELECTED.
1527   006272  000402                          BR      AD              ;UNIT NOT AVAILABLE RETURN.
1528   006274  004767  000044                  JSR     PC,AK           ;AVAILABLE. GO WRITE TAPE.
1529   006300  005267  177764          AD:     INC     AC              ;
1530   006304  005300                          DEC     R0              ;ALL UNITS AVAILABLE WRITTEN?
1531   006306  001367                          BNE     AB              ;BR IF NOT
1532   006310  012700  000024                  MOV     #20.,R0         ;SET UP TO READ 20 BLOCKS.
1533   006314  012767  177777  172536          MOV     #-1,BLKRQ       ;STARTING WITH BLOCK 0.
1534   006322  005267  172532          AG:     INC     BLKRQ           ;
1535   006326  104056                          SEQDRV                  ;SELECT SEQUENTIAL TRANSPORT
1536   006330  104034                          RDATAF                  ;CALL RDATAF SUB TO READ FWD THE NUMBER OF WORDS
1537                                          ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
1538                                          ;RADDR AND ABOVE.
1539   006332  104025                          STOPDT                  ;STOP DECTAPE.
1540   006334  104054                          DATCKS                  ;CALL DATCKS SUB TO CHECK DATA SPECIFIED BY LOC RADDR
1541                                          ;AGAINST THE DATA WORD IN LOC UNITN.
1542   006336  005300                          DEC     R0              ;DONE 20 TIMES?
1543   006340  001370                          BNE     AG              ;BR IF NOT.
1544   006342  104000                          SCOPE                   ;DONE. SCOPE.
1545   006344  104053                  AK:     DRVFIL                  ;FILL WRITE BUFFER WITH SELECTED UNIT'S NUMBER.
1546   006346  012701  000024                  MOV     #20.,R1         ;SET UP TO WRITE 20 BLOCKS.
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1547  006352  012767  177777  172500          MOV     #-1,BLKRQ       ;STARTING WITH BLOCK 0.
1548  006360  005267  172474          AL:      INC     BLKRQ           ;
1549  006364  104032                          WDATAF                  ;CALL WDATAF SUB TO WRITE FWD THE # OF WORDS
1550                                                                  ;SET IN LOC XFRCNT, STARTING FROM ADDR SET
1551                                                                  ;IN LOC WADDR.
1552  006366  005301                          DEC     R1              ;20 BLOCKS WRITTEN?
1553  006370  001373                          BNE     AL              ;BR IF NOT.
1554  006372  104026                          STOPDT                  ;STOP DECTAPE.
1555  006374  000207                          RTS     PC              ;EXIT.
1556                                  ;*****************************************************************************
1557  006376  000002                  T2:     2                       ;ROUTINE NUMBER 2                           *
1558  006400  006450                          T3                      ;ADDRESS OF NEXT ROUTINE                    *
1559  006402  000144                          100.                    ;TEST ITERATION COUNT                       *
1560  006404  006420                          DA                      ;SCOPE ENTRY POINT                          *
1561                                  ;*****************************************************************************
1562                                  ;SEQUENTIAL UNIT,RANDOM BLOCK, 3 BLOCK TRANSFERS, FWD WRITE, REV READ.
1563                                  ;  BINARY COUNT PATTERN
1564  006406  012767  001400  172472          MOV     #768.,XFRCNT    ;SET UP 768 WORD TRANSFER.
1565  006414  104050                          XFRSET
1566  006416  104051                          RNDFBK                  ;RANDOM FWD BLOCK NUMBER.
1567  006420  016767  172436  172432  DA:     MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
1568  006426  104040                          BINFIL                  ;BINARY FILL WRITE BUFFER.
1569  006430  104056                          SEQDRV                  ;SELECT SEQUENTIAL TRANSPORT.
1570  006432  104032                          WDATAF                  ;CALL WDATAF SUB TO WRITE FWD THE # OF WORDS
1571                                                                  ;SET IN LOC XFRCNT, STARTING FROM ADDR SET
1572                                                                  ;IN LOC WADDR.
1573  006434  066767  172456  172416          ADD     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ DATA IN REV
1574  006442  104035                          RDATAR                  ;CALL RDATAR SUB TO READ REV THE # OF WORDS
1575                                                                  ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
1576                                                                  ;RADDR AND ABOVE.
1577  006444  104042                          DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
1578                                                                  ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
1579                                                                  ;READ DATA IS CHECKED IN DESCENDING ORDER.
1580  006446  104000                          SCOPE                   ;SCOPE.
1581                                  ;*****************************************************************************
1582  006450  000003                  T3:     3                       ;ROUTINE NUMBER 3                           *
1583  006452  006522                          T4                      ;ADDRESS OF NEXT ROUTINE                    *
1584  006454  000144                          100.                    ;TEST ITERATION COUNT                       *
1585  006456  006472                          EA                      ;SCOPE ENTRY POINT                          *
1586                                  ;*****************************************************************************
1587                                  ;SEQUENTIAL UNIT,RANDOM BLOCK , 3 BLOCK TRANSFERS, REV WRITE, FWD READ.
1588                                  ;  BINARY COUNT PATTERN.
1589  006460  012767  001400  172420          MOV     #768.,XFRCNT    ;SET 768 WORD TRANSFER.
1590  006466  104050                          XFRSET
1591  006470  104052                          RNDRBK                  ;RANDOM REV BLOCK NUMBER.
1592  006472  016767  172364  172360  EA:     MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
1593  006500  104040                          BINFIL                  ;BINARY FILL WRITE BUFFER
1594  006502  104056                          SEQDRV                  ;SELECT SEQUENTIAL TRANSPORT.
1595  006504  104033                          WDATAR                  ;CALL WDATAR SUB TO WRITE REV THE NUMBER OF WORDS
1596                                                                  ;SET IN LOC XFRCNT, FROM ADDR SET IN LOC
1597                                                                  ;WADDR AND ABOVE.
1598  006506  166767  172404  172344          SUB     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ DATA FWD.
1599  006514  104034                          RDATAF                  ;CALL RDATAF SUB TO READ FWD THE NUMBER OF WORDS
1600                                                                  ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
1601                                                                  ;RADDR AND ABOVE.
1602  006516  104042                          DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
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                                                                ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
                                                                ;READ DATA IS CHECKED IN DESCENDING ORDER.
 006520  104000                         SCOPE                   ;SCOPE.
                                ;*****************************************************************
 006522  000004                 T4:     4                       ;ROUTINE NUMBER 4                *
 006524  006574                         T5                      ;ADDRESS OF NEXT ROUTINE         *
 006526  000144                         100.                    ;TEST ITERATION COUNT            *
 006530  006544                         FA                      ;SCOPE ENTRY POINT               *
                                ;*****************************************************************
                                ;SEQUENTIAL UNIT, RANDOM BLOCK, 3 BLOCK TRANSFERS, FWD WRITE, REV READ.
                                ; RANDOM DATA.
 006532  012767  001400  172346         MOV     #768.,XFRCNT    ;SET UP 768 WORD TRANSFER.
 006540  104050                         XFRSET
 006542  104051                         RNDFBK                  ;RANDOM FWD BLOCK NUMBER.
 006544  016767  172312  172306 FA:     MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
 006552  104055                         RNDFIL                  ;RANDOM FILL WRITE BUFFER
 006554  104056                         SEQDRV                  ;SELECT SEQUENTIAL TRANSPORT.
 006556  104032                         WDATAF                  ;CALL WDATAF SUB TO WRITE FWD THE # OF WORDS
                                                                ;SET IN LOC XFRCNT, STARTING FROM ADDR SET
                                                                ;IN LOC WADDR.
 006560  066767  172332  172272         ADD     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ IN REV.
 006566  104035                         RDATAR                  ;CALL RDATAR SUB TO READ REV THE # OF WORDS
                                                                ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
                                                                ;RADDR AND ABOVE.
 006570  104042                         DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
                                                                ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
                                                                ;READ DATA IS CHECKED IN DESCENDING ORDER.
 006572  104000                         SCOPE
                                ;*****************************************************************
 006574  000005                 T5:     5                       ;ROUTINE NUMBER 5                *
 006576  006646                         T6                      ;ADDRESS OF NEXT ROUTINE         *
 006600  000144                         100.                    ;TEST ITERATION COUNT            *
 006602  006616                         GA                      ;SCOPE ENTRY POINT               *
                                ;*****************************************************************
                                ;SEQUENTIAL UNIT, RANDOM BLOCK, 3 BLOCK TRANSFERS, REV WRITE, FWD READ.
                                ; RANDOM DATA.
 006604  012767  001400  172274         MOV     #768.,XFRCNT    ;SET UP 768 WORD TRANSFER.
 006612  104050                         XFRSET
 006614  104052                         RNDRBK                  ;RANDOM REV BLOCK NUMBER.
 006616  016767  172240  172234 GA:     MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
 006624  104055                         RNDFIL                  ;RANDOM FILL WRITE BUFFER.
 006626  104056                         SEQDRV                  ;SELECT SEQUENTIAL TRANSPORT.
 006630  104033                         WDATAR                  ;CALL WDATAR SUB TO WRITE REV THE NUMBER OF WORDS
                                                                ;SET IN LOC XFRCNT, FROM ADDR SET IN LOC
                                                                ;WADDR AND ABOVE.
 006632  166767  172260  172220         SUB     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ FWD.
 006640  104034                         RDATAF                  ;CALL RDATAF SUB TO READ FWD THE NUMBER OF WORDS
                                                                ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
                                                                ;RADDR AND ABOVE.
 006642  104042                         DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
                                                                ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
                                                                ;READ DATA IS CHECKED IN DESCENDING ORDER.
 006644  104000                         SCOPE                   ;SCOPE.
                                ;*****************************************************************
 006646  000006                 T6:     6                       ;ROUTINE NUMBER 6                *
 006650  006724                         T7                      ;ADDRESS OF NEXT ROUTINE         *
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1659  006652  000372                          250.                    ;TEST ITERATION COUNT                    *
1660  006654  006674                          HA                      ;SCOPE ENTRY POINT                       *
1661                                  ;*************************************************************************
1662                                  ;RANDOM UNIT, RANDOM LENGTH TRANSFERS, FWD WRITE, REV READ. RANDOM DATA.
1663                                  ;ALL FWD WRITE TRANSFERS START AT BLOCK 0.
1664  006656  016767  172222  172222          MOV     BFSIZE,XFRCNT
1665  006664  104050                          XFRSET
1666  006666  104055                          RNDFIL                  ;RANDOM FILL WRITE BUFFER.
1667  006670  005067  172166                  CLR     BLKRQS          ;TRANSFERS START AT BLOCK 0.
1668  006674  104047                  HA:     RNDXFR                  ;RANDOM TRANSFER COUNT.
1669  006676  016767  172160  172154          MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
1670  006704  104045                          RNDRIV                  ;RANDOM TRANSPORT.
1671  006706  104032                          WDATAF                  ;CALL WDATAF SUB TO WRITE FWD THE # OF WORDS
1672                                                                  ;SET IN LOC XFRCNT, STARTING FROM ADDR SET
1673                                                                  ;IN LOC WADDR.
1674  006710  056767  172202  172142          ADD     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ REV.
1675  006716  104035                          RDATAR                  ;CALL RDATAR SUB TO READ REV THE # OF WORDS
1676                                                                  ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
1677                                                                  ;RADDR AND ABOVE.
1678  006720  104042                          DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
1679                                                                  ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
1680                                                                  ;READ DATA IS CHECKED IN DESCENDING ORDER.
1681  006722  104000                          SCOPE                   ;SCOPE
1682                                  ;*************************************************************************
1683  006724  000007                  T7:     7                       ;ROUTINE NUMBER 7                        *
1684  006726  177777                          TLAST                   ;ADDRESS OF NEXT ROUTINE                 *
1685  006730  000372                          250.                    ;TEST ITERATION COUNT                    *
1686  006732  006754                          IA                      ;SCOPE ENTRY POINT                       *
1687                                  ;*************************************************************************
1688                                  ;RANDOM UNIT, RANDOM LENGTH TRANSFERS, REV WRITE, FWD READ. RANDOM DATA.
1689                                  ;ALL REV WRITE TRANSFERS START AT BLOCK 1101
1690  006734  016767  172144  172144          MOV     BFSIZE,XFRCNT
1691  006742  104050                          XFRSET
1692  006744  104055                          RNDFIL                  ;RANDOM FILL WRITE BUFFER.
1693  006746  012767  001101  172106          MOV     #1101,BLKRQS    ;TRANSFERS START AT BLOCK 1101
1694  006754  104047                  IA:     RNDXFR                  ;RANDOM TRANSFER COUNT.
1695  006756  016767  172100  172074          MOV     BLKRQS,BLKRQ    ;RESTORE BLKRQ CONTENTS.
1696  006764  104045                          RNDRIV                  ;RANDOM TRANSPORT.
1697  006766  104033                          WDATAR                  ;CALL WDATAR SUB TO WRITE REV THE NUMBER OF WORDS
1698                                                                  ;SET IN LOC XFRCNT, FROM ADDR SET IN LOC
1699                                                                  ;WADDR AND ABOVE.
1700  006770  166767  172122  172062          SUB     VRBLKN,BLKRQ    ;CHANGE BLK NUM TO READ FWD.
1701  006776  104034                          RDATAF                  ;CALL RDATAF SUB TO READ FWD THE NUMBER OF WORDS
1702                                                                  ;SET IN LOC XFRCNT, INTO ADDR SET IN LOC
1703                                                                  ;RADDR AND ABOVE.
1704  007000  104042                          DATCKI                  ;CALL DATCKI TO CHECK DATA SPECIFIED BY LOC
1705                                                                  ;WADDR AGAINST DATA SPECIFIED BY LOC RADDR +2(XFRCNT)-2
1706                                                                  ;READ DATA IS CHECKED IN DESCENDING ORDER.
1707  007002  104000                          SCOPE                   ;SCOPE.
1708  007004  022445  020124          EMO:    .ASCII  '%%T '
1709  007010  020040  020040  050040  ATNUMB: .ASCII  '     PC '
1710  007016  020103
1711  007020  020040  020040  020040  APC:    .ASCII  '         ICNT '
1712  007026  020040  041511  052116
1713  007034      040
1714  007035      040  020040  020040  AICNT:  .ASCII  '      .'
```

```
1715  007042      056
1716  007043      040  047125  052111          .ASCII  ' UNIT '
1717  007050      040
1718  007051      040     040          AUNIT:  .ASCII  '  '
1719  007053      045  043130  041522          .ASCII  '%XFRCNT '
1720  007060  052116      040
1721  007063      040  020040  020040  AXFCNT: .ASCII  '        WADDR '
1722  007070  020040  053440  042101
1723  007076  051104      040
1724  007101      040  020040  020040  AWADDR: .ASCII  '        RADDR '
1725  007106  020040  051040  042101
1726  007114  051104      040
1727  007117      040  020040  020040  ARADDR: .ASCIZ  '      '
1728  007124  000040
1729  007126  022445  047111  040526  AINCRT: .ASCIZ  '%%INVALID TEST'
1730  007134  044514  020104  042524
1731  007142  052123      000
1732  007145      045  052045  032503  PGTIT:  .ASCIZ  '%%TC5 - TC11 TEST 5%%'
1733  007152  026440  052040  030503
1734  007160  020061  042524  052123
1735  007166  032440  022445      000
1736  007173      045  052123  047101  INST1:  .ASCII  '%STANDARD TAPES ON UNITS'
1737  007200  040504  042122  052040
1738  007206  050101  051505  047440
1739  007214  020116  047125  052111
1740  007222      123
1741  007223      045  042522  047515          .ASCII  '%REMOTE, WRITE ENABLE'
1742  007230  042524  020054  051127
1743  007236  052111  020105  047105
1744  007244  041101  042514
1745  007250  053445  046101  051514          .ASCII  '%WALLSW: OFF, WRTMSW: OFF'
1746  007256  035127  047440  043106
1747  007264  020054  051127  046524
1748  007272  053523  020072  043117
1749  007300      106
1750  007301      045  042523  042514          .ASCII  '%SELECT UNITS WITH SR7 - SR0. '
1751  007306  052103  052440  044516
1752  007314  051524  053440  052111
1753  007322  020110  051123  020067
1754  007330  020055  051123  027060
1755  007336      040
1756  007337      120  042522  051523          .ASCIZ  'PRESS CONT%'
1757  007344  041440  047117  022524
1758  007352      000
1759  007353      045  042523  020124  ASETSR: .ASCIZ  '%SET SR OPTIONS. NORMAL SR=0'
1760  007360  051123  047440  052120
1761  007366  047511  051516  020056
1762  007374  047516  046522  046101
1763  007402  051440  036522  000060
1764  007410  044045  043511  042510  HADRM:  .ASCII  '%HIGHEST LOC FOR TRANSFERS: '
1765  007416  052123  046040  041517
1766  007424  043040  051117  052040
1767  007432  040522  051516  042506
1768  007440  051522  020072
1769  007444  020040  020040  020040  ACRLIM: .ASCIZ  '      '
1770  007452      000
```

```
007453     007                 APGEND: .BYTE   007,
007454  025045     000                 .ASCIZ  '%*'
007457     040  041524  041527 CTCWC:  .ASCII  ' TCWC '
007464     040
007465     040  020040  020040 ATCWC:  .ASCIZ  '      '
007472  000040
007474  052040  041103  020101 CTCBA:  .ASCII  ' TCBA '
007502  020040  020040  020040 ATCBA:  .ASCIZ  '      '
007510     000
007511     040  041524  046503 STAT:   .ASCII  ' TCCM '
007516     040
007517     040  020040  020040 ATCCM:  .ASCII  '          TCST '
007524  020040  041524  052123
007532     040
007533     040  020040  020040 ATCST:  .ASCIZ  '      '
007540  000040
007542  047040  020117  052104 INTFAI: .ASCIZ  ' NO DT INTRPT '
007550  044440  052116  050122
007556  020124     000

007561     040  052104  042440 DTERR:  .ASCIZ  ' DT ERR '
007566  051122  000040
007572  041040  045514  050522 BLKSB:  .ASCII  ' BLKRQ '
007600     040
007601     040  020040  020040 ABLKRQ: .ASCIZ  '      '
007606  000040
007610  041524  041527  047040 WCNOTO: .ASCIZ  'TCWC NOT 0 '
007616  052117  030040  000040
007624  041524  040502  053440 INCTCB: .ASCIZ  'TCBA WRONG '
007632  047522  043516  000040
007640  052040  041103  020101 TCBASB: .ASCII  ' TCBA '
007646  020040  020040  020040 ATCBAS: .ASCIZ  '      '
007654  020040     000
007657     040  040504  040524 DATERR: .ASCII  ' DATA ERR  WORD '
007664  042440  051122  020040
007672  047527  042122     040
007677     040  020040  027040 AWDCNT: .ASCII  '     .  S/B '
007704  020040  027523  020102
007712  020040  020040  020040 ADATSB: .ASCII  '          WAS '
007720  020040  040527  020123
007726  020040  020040  020040 ADATWS: .ASCIZ  '       '
007734     000
007735     122  054504  042457 STCMSG: .ASCIZ  'RDY/ERR NOT 0 AFTER DO'
007742  051122  047040  052117
007750  030040  040440  052106
007756  051105  042040  000117
007764  041040  045514  047040 SRCHER: .ASCIZ  ' BLK NOT FOUND'
007772  052117  043040  052517
010000  042116     000
010003     040  043040  041520 FPCMSG: .ASCII  '  FPC '
010010     040
010011     040  020040  020040 AFPC:   .ASCIZ  '        %'
010016  020040  000045
010022  052445  051520  041040 BEMSG:  .ASCIZ  '%UPS BIT NOT SET WITHIN 20 MSECS.'
010030  052111  047040  052117
010036  051440  052105  053440
```

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 1827  010044  052111  044510  020116
 1828  010052  030062  046440  042523
 1829  010060  051503  000056
 1830  010064  052445  044516  020124  CEMSG:   .ASCII  '%UNIT STOPPED WITH SST TO UNIT '
 1831  010072  052123  050117  042520
 1832  010100  020104  044527  044124
 1833  010106  051440  052123  052040
 1834  010114  020117  047125  052111
 1835  010122     040
 1836  010123     040     000          ACEMSG: .ASCIZ  ' '
 1837  010125     045  047516  052440  NOUNIT: .ASCIZ  '%NO UNITS AVAILABLE.'
 1838  010132  044516  051524  040440
 1839  010140  040526  046111  041101
 1840  010146  042514  000056
 1841  010152  053445  046111  020114  GOOD:   .ASCIZ  '%WILL TEST UNITS: '
 1842  010160  042524  052123  052440
 1843  010166  044516  051524  020072
 1844  010174     000
 1845  010175     040  000054          GTAPES: .ASCIZ  ' ,'
 1846  010200     060     061     062  GTAB:   .BYTE   '0,'1,'2,'3,'4,'5,'6,'7
 1847  010203     063     064     065
 1848  010206     066     067
 1849                                  .EVEN
 1850  010210  000000                  CODEND: OPEN
 1851          000001                          .END
```

```
A       = 100000   459#
AA        006246  1517    1521#
AB        006266  1525#   1531
ABLKRQ    007601   850    1795#
AC        006270  1523*   1526#   1529*
ACEMSG    010123  1502    1836#
ACRLIM    007444  1035    1769#
ACTDAT    004554  1223#   1245*   1246    1257
AD        006300  1527    1529#
ADATSB    007712  1254    1809#
ADATWS    007726  1258    1811#
AFPC      010011   827    1822#
AG        006322  1534#   1543
AICNT     007035   842    1714#
AINCRT    007126   686    1729#
AK        006344  1528    1545#
AL        006360  1548#   1553
APC       007020   834    1711#
APGEND    007453   710    1771#
ARADDR    007117   878    1727#
ASETSR    007353   663    1759#
ATCBA     007502   866    1778#
ATCBAS    007646  1311    1802#
ATCCM     007517   858    1782#
ATCST     007533   854    1785#
ATCWC     007465   862    1775#
ATNUMB    007010   838    1709#
AUNIT     007051   846    1718#
AWADDR    007101   874    1724#
AWDCNT    007677  1250    1807#
AXFCNT    007063   870    1721#
B       = 040000   460#
BDCNV   = 104014   560#    840    1248
BDCNVA    003332   986#    996
BDCNVB    003334   987#    990
BDCNVC    003344   988     991#
BDCNVD    003370  1000#   1002
BDCNVV    003312   559     981#
BELL    = 000007   454#
BEMSG     010022  1824#
BFSIZE    001104   539#   1029*   1104    1664    1690
BINFIL= 104040   580#   1568    1593
BINFLA    005040  1286#   1290
BINFLB    005042  1287#   1288
BINFLL    005026   579    1283#
BIT0    = 000001   432#    491    1028    1095    1177
BIT1    = 000002   431#    484     486     488     490    1095
BIT10   = 002000   422#    478     479     480     481     701
BIT11   = 004000   421#    472     494     637     697    1354    1360    1366    1374    1376    1378
BIT12   = 010000   420#    471     493     637
BIT13   = 020000   419#    461     470     881
BIT14   = 040000   418#    460     694
BIT15   = 100000   416     417#    459     625    1175
BIT2    = 000004   430#    485     486     489     490    1095
BIT3    = 000010   429#    487     488     489     490    1095
BIT4    = 000020   428#   1095
```

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BIT5   = 000040   427#  1095
BIT6   = 000100   426#   482  1095
BIT7   = 000200   425#   492   625  1095  1175  1497
BIT8   = 000400   424#   475   477   479   481
BIT9   = 001000   423#   476   477   480   481   676   705
BLKRQ    001060   529#   849  1139* 1140  1149* 1150  1351  1357  1363  1441* 1533* 1534* 1547*
                 1548* 1567* 1573* 1592* 1598* 1617* 1623* 1642* 1648* 1669* 1674* 1695* 1700*
BLKRQS   001062   530#  1140* 1150* 1567  1592  1617  1642  1667* 1669  1693* 1695
BLKSB    007572  1262  1385  1793#
BMOVA    003300   975#   977
BMOVE  = 104017   563#
BMOVV    003270   562   971#
C      = 020000   461#
CA       006072  1473  1477#
CB       006076  1478#  1511
CC       006122  1480*  1481*  1483#  1488  1501
CD       006160  1488*  1489*  1490*  1492#
CDA      006144  1489#  1509
CE       006224  1493  1498  1508#
CEMSG    010064  1505  1830#
CF       006230  1484  1510#
CHAINN   001730   547   689#
CHALT  = 104020   564#   659   664   687
CHLT     002460   563   813#
CHNA     001764   695   697#
CHNAA    002002   698   701#
CHNAB    001760   696#  700
CHNAC    001750   692   694#
CHNB     002020   702   705#
CHNC     002044   636   711#  717
CKERRZ= 104026   570#  1348  1416
CKERZ    004460   569  1193#
CKERZA   004472  1197#  1201
CKERZB   004474  1198#  1208
CKERZC   004500  1195  1200#
CKERZD   004506  1202#
CKWCBA= 104036   578#  1419
CLEAR  = 104037   579#
CLEARR   005006   578  1274#
CODEND   010210   620  1025  1031  1850#
COMND    001072   534#  1171*  1172*  1173#  1174  1177
CORSTA   003460  1019  1021#  1040
CORSTB   003552  1013  1040#
CORSTD   003476  1024#
CORSTF   003454  1015  1017  1020#
CORSTP   003422   599  1013#
CPENA    001520   644*  647#  653*  655
CPENB    001542   648  653#
CTCBA    007474  1304  1317  1777#
CTCWC    007457  1303  1318  1773#
CTRA     001044   523#  645*  654*
CURTST   001042   522#  678  724*
CWCBA    005060   577  1295#
CWCBB    005114  1299  1307#
CWCBC    005154  1308  1321#
DA       006420  1560  1567#
```

```
DATCHK= 104041   581#
DATCK   004616   580     1231#
DATCKA  004664  1237     1241#
DATCKB  004702  1244#    1270
DATCKC  004712  1246#
DATCKD  004770  1247     1267#
DATCKE  004774  1225*    1228*   1231*   1268#
DATCKG  004776  1269#
DATCKH  005002  1266     1271#
DATCKI= 104042   582#    1577    1602    1627    1652    1678    1704
DATCKK  004630  1227     1230    1233#
DATCKS= 104054   592#    1540
DATERR  007657  1263     1804#
DATIND  004546  1220#    1226*   1229*   1232*   1236
DATKNT  004550  1221#    1242*   1249    1267*
DECVAL  003414   983     1010#
DELAY = 104400   498#    1338    1339    1340    1402    1403    1404    1405    1406    1407    1408    1409    1466
                1496
DINH  = 010000   471#    1495
DIRIND  005505  1325*    1327*   1368    1371    1391#
DLY     003070   407      924     926#
DLYA    003076   925      927*    931
DLYB    003104   928#     929
DLYRO = 003074   924#     930*
DLYR1 = 003102   925#     928*
DO    = 000001   491#     623     1335    1423    1427    1431    1435
DRVFIL= 104053   591#    1545
DRVFLA  004154  1129#    1131
DRVFLL  004136   590     1125#
DTCKI   004600   581     1228#
DTCKSS  004556   591     1224#
DTERR   007561  1205     1791#
DTRMN   001326   608#     631
DTRMNA  001430   612      629#    638     641
DTRMNB  001452   615      619     624     628     637#
DTRMNC  001476   633      642#
EA      006472  1585     1592#
EHALT = 104021   565#     888
EHLT    002472   564      819#
EHLTA   002502   820      822#
EMTINT  002142   405      729#
EMTTAB  001122   546#     733
EMTV    000030   405#
EMTX  = 000057   495#     548#    549#    550#    551#    552#    553#    554#    555#    556#    557#    558#    559#
                560#     561#    562#    563#    564#    565#    566#    567#    568#    569#    570#    571#    572#
                573#     574#    575#    576#    577#    578#    579#    580#    581#    582#    583#    584#    585#
                586#     587#    588#    589#    590#    591#    592#    593#    594#
EMO     007004   880     1708#
ERRB    002716   830*     831*    833     880*    884#    885*    886
ERRLIM  001120   545#    1243
ERRN    002504   557      823#
ERRNA   002704   881#     887
ERRNB   002720   882      885#
ERRNC   002734   888#
ERRND   002712   605*     665*    882#
ERRORN= 104012   558#    1181    1203    1212    1260    1300    1313    1383    1504
```

```
EXPDAT  004552          1222#   1244*   1246    1253
FA      006544          1610    1617#
FORWD   002074           675     719#
FORWDA  002120           724#
FPC     001076           536#    824*    826
FPCMSG  010003          1182    1204    1213    1261    1301    1314    1384    1820#
FWD   = 000000           473#    623     1423    1427    1463    1495
GA      006616          1635    1642#
GETBN1= 104044           584#   1286
GETRDY  001602           506     656     665.1   688     706     718
GOOD    010152           643    1841#
GORUN   001666           678#    682
GTAB    010200           650    1846#
GTAPES  010175           650*    652    1845#
GTBIN1  003154           583     942#
GTRDYA  001652           675#    684
GTRDYB  001656           676#
GTRDYC  001672           677     679#
GTRDYD  001710           683#
GTRDYX  001616           667#    708
HA      006674          1660    1668#
HADRM   007410          1038    1764#
HERE    002072           712     718#
I     = 000040           457#
IA      006754          1686    1694#
ICNT    001030           517#    691*    693*    725*    841
ICTR    001026           516#    699*    722*
IE    = 000100           482#   1335    1423    1427    1431    1435
ILO   = 010000           493#
INBIN = 104043           583#    600
INBINN  003122           582     934#
INCTCB  007624          1315    1799#
INRMD = 104016           562#    601
INRMON  003636           561    1061#
INST1   007173           658    1736#
INTFAI  007542          1214    1787#
IOTV    000020           401#
KSTART  001032           518#    666
LOGIC   002054           500     714#    1016
MACHER  000004           395#   1013*   1023*
MAINT = 020000           470#
MANUAL= 100000           416#
MFWD    006016          1455#   1479
MFWDA   006024          1457#   1465
MFWDB   006040          1457*   1458*   1460#
MFWDC   006050          1461    1464#
MRWIND  005750          1440#   1478
MRWNDA  005762          1443#   1451
MRWNDB  005776          1443*   1444*   1446#
MRWNDC  006006          1447    1450#
NOINT = 104027           571#   1341    1410
NOINTR  004524           570    1210#
NOP   = 000240           414#    715     741
NOUNIT  01012S           635    1837#
NXTST   001040           521#    666*    683     707     719     721*
OACNV = 104013           559#    825     832     836     844     848     852     856     860     864     868     872     876
```

```
                    1033    1252    1256    1309    1500
OACNVA  003232       958#    967
OACNVV  003220       558     953#
OPEN  = 000000       415#    516     517     519     520     521     522     523     524     525     526     527     528
                     529     530     531     532     533     534     535     536     537     538     539     540     541
                     542     543     544     611     647     884     921     938     939     940    1068    1074    1078
                    1100    1136    1144    1157    1220    1221    1222    1223    1268    1287    1390    1391    1398
                    1401    1420    1446    1460    1483    1492    1526    1850
PGTIT   007145       598    1732#
POPSP  = 005726      444#
POPSP2 = 022626      445#    760     771     791    1345    1412    1413
PRTY0  = 000000      408     453#
PRTY1  = 000040      452#
PRTY2  = 000100      451#
PRTY3  = 000140      450#
PRTY4  = 000200      449#
PRTY5  = 000240      448#
PRTY6  = 000300      447#    513
PRTY7  = 000340      400     402     406     446#    667
PSW    = 177776      412#    667*
PTO     003150       935*    939#    942     947*
PTI     003152       936*    940#    942*    943*    946*    947     949
PUSH   = 005746      442#
PUSH2  = 024646      443#    753     785
RADDR   001112       542#    674*    877    1114*   1115*   1116*   1235    1428    1436
RALL   = 000006      486#
RBFLIM  001100       537#   1024*   1034    1114
RDATA  = 000004      485#   1427    1435
RDATAF = 104034      576#   1536    1599    1649    1701
RDATAR = 104035      577#   1574    1624    1675
RDATF   005654       575    1427#
RDATR   005724       576    1435#
RDFBBA  004170      1136#   1137    1139
RDRBBA  004222      1144#   1145    1147    1149
REV    = 004000       472#    614    1330    1331    1333    1431    1435
REVCNT  005504      1329*   1379*   1390#
RIND    003146       934*    935     936     938#    944*
RNDFBB  004166       588    1135#   1138
RNDFBK= 104051       589#   1566    1616
RNDFIL= 104055       593#   1618    1643    1666    1692
RNDFLA  004274      1156#   1160
RNDFLB  004276      1157#   1158
RNDFLL  004262       592    1153#
RNDNUM= 104015       561#   1073    1099    1135    1143    1156
RNDRBB  004220       589    1143#   1146    1148
RNDRBK= 104052       590#   1591    1641
RNDRIV= 104045       585#   1670    1696
RNDRVA  003700      1074#   1075*   1076
RNDRVB  003720      1076*   1078#
RNDRVV  003676       584    1073#   1079
RNDXFA  003772      1100#   1101*   1102    1104    1106
RNDXFF  003770       586    1099#   1103    1105
RNDXFR= 104047       587#   1668    1694
RNGEN   003560       560    1043#
RNUM   = 000002       484#    614    1335    1463    1495
RP1     003632      1044    1048*   1055    1058#   1061*
```

```
RP2      003634  1047    1051    1054*   1059*   1062*
RST03  = 104003   551#    1452    1467
RST05  = 104005   553#
RST05S = 104007   555#    802     816     898     968     978     1003    1056    1093    1132    1161    1271    1280
                  1291
RST5S  = 000004   497#    889     918     950     1198    1217    1321
RS03     002262   550     760#
RS05     002312   552     771#
RS05S    002306   554     769#
RS5S     002372   401     790#
RTNNO    001036   520#    681     703     720*    726     837
SAT    = 000000   483#
SAV03  = 104002   550#    1440    1455
SAV05  = 104004   552#
SAV05S = 104006   554#    798     813     892     953     971     981     1043    1086    1125    1153    1233    1274
                  1283
SAV5S  = 000003   496#    829     914     948     1179    1193    1210    1295    1382
SCOPE  = 104000   548#    1186    1306    1320    1342    1349    1389    1411    1417    1512    1544    1580    1605
                  1630    1655    1681    1707
SCOPTR   001034   519#    696     723*
SELDRA   003754   1089    1093#
SELDRR   003726   585     1086#
SELDRV= 104046    586#    610     646     1067    1077    1445    1459    1482    1491    1525
SELE   = 004000   494#
SEQDRV= 104056    594#    1535    1569    1594    1619    1644
SETCOM= 104023    567#    613     622     1334    1400    1462    1485    1494
SPBOT  = 001000   413#    596     668     690
SQDRV    003654   593     1065#   1069
SQDRVA   003670   1065*   1066*   1068#
SQDRV1   001342   608*    609*    611#    639
SR     = 177570   411#    660     676     679     694     697     701     705     726*    819     881
SRCCON   005242   1337#   1355    1359    1361    1365    1369    1372    1380
SRCF     005376   1352    1366#
SRCHA    005174   1326    1328#
SRCHAA   005234   1332    1334#
SRCHB    005246   1336    1338#
SRCHC    005260   1328    1343#
SRCHD    005266   1343    1345#
SRCHDA   005304   1347    1351#
SRCHE    005346   1353    1360#
SRCHER   007764   1386    1817#
SRCHF  = 104030   572#    1425    1429
SRCHFF   005160   571     1325#
SRCHG    005416   1367    1371#
SRCHH    005236   1330*   1333*   1335#
SRCHR  = 104031   573#    1433    1437    1448
SRCHRR   005166   572     1327#
SRCREV   005426   1350    1374#
SRCRVA   005436   1358    1376#
SRCRVB   005446   1364    1375    1378#
SRCRVC   005454   1377    1379#
SRESET= 104001    549#    669
SRSETT   002436   548     805#    808*
SST    = 000010   487#    1486
START    001260   504     596#
STAT     007511   1184    1206    1215    1387    1506    1780#
```

```
STATS   004314            567    1164#
STATUS= 104024            568#   1180   1202   1211   1297   1381   1499
STCMSG  007735           1183    1813#
STCOM   004354            566    1171#
STCOMB  004442           1176    1178   1187#
STOPDT= 104025            569#    629    689    823   1449   1539   1554
STPDT   004450            568    1190#
STRTA   001556            603     657#   661
STTCV   002416            565     798#
SVECTR= 104023            566#    670
SVO3    002162            549     736#
SVO5    002212            551     744#
SVO5A   002220            742     745#
SVO5B   002234            739     749#
SVO5C   002246            738#    741#   744#   754#
SVO5S   002202            553     741#
SVSS    002342            399     781#
TCBA    001012            510#    620#   1168   1307   1397   1424#  1428#  1432#  1436#
TCBASB  007640           1316    1801#
TCBAT   001056            528#    865    1168#
TCCM    001006            508#    616     625    627   1165   1174#  1175   1190#  1194   1331   1337#  1346   1354
                         1360    1366   1374   1376#  1378#  1414
TCCMT   001046            524#    857    1165#
TCDT    001014            511#   1167   1351   1356#  1357   1362#  1363
TCDTT   001052            526#   1167#
TCLVL   001020            513#    801
TCST    001004            507#    618     637   1164   1200   1497
TCSTT   001050            525#    853    1164#
TCVTR   001016            512#    799    1328#  1399#
TCWC    001010            509#    621#   1166   1298   1393#  1394   1396#
TCWCT   001054            527#    861    1166#
TEMP    001074            535#   1296#  1307   1310
TEMPWR  003402            984    1005#
TLAST = 177777            455#   1684
TPB     001024            515#    904#
TPS     001022            514#    905
TRC   = 000003            456#
TRCV    000014            399#
TRPV    000034            407#
TYP     002742            555     892#
TYPA    002746            894#    903    912
TYPC    002766            895     900#
TYPD    003002            897     902    904#   909    911
TYPE  = 104010            556#    597    634    642    651    657    662    685    709    883    920    1037
TYPES = 104011            557#
TYPF    003016            901     905#
TYPG    003026            910#
TYPS    003040            556     914#   922
TYPSA   003062            917     920#
TYPSB   003064            915#    916    921#
TO      006062            518    1470#
T1      006236           1471    1514#
T2      006376           1515    1557#
T3      006450           1558    1582#
T4      006522           1583    1607#
T5      006574           1608    1632#
```

DZTCED.P11 31-AUG-77 14:08 CROSS REFERENCE TABLE -- USER SYMBOLS

```
I6          006646          1633    1657*
I7          006724          1658    1683*
UNIT        001064           531*   1091*   1172
UNITN       001066           532*    649     845    1090*   1127    1224
UNITS       001070           533*    606*    632     640*    660*    716    1088
UNTAB       003760           640    1088    1095*
UPS     =   000200           492*
U0      =   000000           474*
U1      =   000400           475*
U2      =   001000           476*
U3      =   001400           477*
U4      =   002000           478*
U5      =   002400           479*
U6      =   003000           480*
U7      =   003400           481*
VFBLKN      001114           543*   1120*   1121*   1137
VRBLKN      001116           544*   1117*   1118*   1119*   1121    1122*   1145    1573    1598    1623    1648    1674    1700
V0      =   000000           462*
V1      =   000004           463*
V2      =   000010           464*
V3      =   000014           465*
V4      =   000020           466*
V5      =   000024           467*
V6      =   000030           468*
V7      =   000034           469*
WADDR       001110           541*    673*    873    1111*   1112*   1113*   1126    1154    1224*   1234    1284    1424    1432
WALL    =   000016           490*
WBFLIM      001102           538*   1032*   1111
WCNOTO      007610          1302    1797*
WDATA   =   000014           489*    623    1423    1431
WDATAF  =   104032           574*   1549    1570    1620    1671
WDATAR  =   104033           575*   1595    1645    1697
WDATF       005630           573    1423*
WDATR       005700           574    1431*
WRDFR       005506          1393*   1426    1430    1434    1438
WRDFRA      005540          1398*   1425*   1429*   1433*   1437*
WRDFRB      005552          1401*   1423*   1427*   1431*   1435*
WRDFRC      005600          1399    1412*
WRDFRE      005624          1421*
WRDFRF      005620          1415    1419*
WRDFRG      005622          1394*   1395*   1397*   1420*
WRTM    =   000012           488*
X       =   000007           458*   1469    1474*   1513    1518*   1556    1561*   1581    1586*   1606    1611*   1631    1636*
                            1656   1661*   1682    1687*
XFRCNT      001106           540*    672*    869    1106*   1112    1113    1115    1116    1117    1128    1155    1238    1239
                            1241   1285    1393    1521*   1564*   1589*   1614*   1639*   1664*   1690*
XFRSET=     104050           588*   1107    1522    1565    1590    1615    1640    1665    1691
XFRSTT      004032           587    1111*
.       =   010212           392*    393     395     397     403     410     499*    501*    503*    505*    617     626     906
                             945   1279
```

DZTCED.P11 31-AUG-77 14:08 CROSS REFERENCE TABLE -- MACRO NAMES

```
CKDI      392#
CKDTI     392#  1577  1602  1627  1652  1678  1704
CKDTS     392#  1540
EMTDEF    392#   547   548   549   550   551   552   553   554   555   556   557   558   559   560
          561    562   563   564   565   566   567   568   569   570   571   572   573   574   575
          576    577   578   579   580   581   582   583   584   585   586   587   588   589   590
          591    592   593
RDTF      392#  1536  1599  1649  1701
RDTR      392#  1574  1624  1675
TSTA      392#  1469  1513  1556  1581  1606  1631  1656
TSTAA     392#  1469  1513  1556  1581  1606  1631  1656  1682
WDTF      392#  1549  1570  1620  1671
WDTR      392#  1595  1645  1697

. ABS.  010212     000

 ERRORS DETECTED:  0

 DZTCED,DZTCED/CRF/SOL/DOC=DZTCED.P11
 RUN-TIME:  2  4  .8 SECONDS
 RUN-TIME RATIO: 71/7=9.9
 CORE USED:  9K  (17 PAGES)

 DOCUMENT PAGES:  45
```