TC11

TC4 READ and WRITE ALL

MD-11-DZTCD-A

EF DZTCD A DL A

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZTCD-C-D
PRODUCT NAME: TC4 - TC11 TEST 4
DATE: JUNE 15, 1973
MAINTAINER: DIAGNOSTIC GROUP
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THIS MAINDEC OBSOLETES MAINDEC-11-D3DC

TC4 - TC11 TEST 4 IS PART 4 OF A FIVE PROGRAM PACKAGE
USED TO TEST THE TC11 DECTAPE CONTROL.

1. ABSTRACT

TC4 - TC11 TEST 4 IS PART 4 OF A FIVE PROGRAM PACKAGE USED TO TEST THE TC11 DECTAPE CONTROL. TC4 TESTS AND EXERCISES THE TC11 CONTROL AND FROM ONE TO EIGHT SELECTED TRANSPORTS. TC4 CONCENTRATES ON TESTING FOR CORRECT OPERATION OF THE READ ALL AND WRITE ALL COMMANDS, AND CHECKS FOR CORRECT OPERATION OF THE PARITY CIRCUITS.

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. AT LEAST ONE STANDARD PDP-11 FORMAT DECTAPE. THE GUARD AREAS 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 017500.

3. LOADING PROCEDURE

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

4. USE PROCEDURE

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

THIS PROGRAM'S SR OPTIONS ARE:

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

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

EXECUTION TIME:

A. ONE NORMAL ERROR FREE PASS TAKES APPROXIMATELY 36 MINUTES.
B. ONE SINGLE ITERATION PASS (SR11=1) TAKES ABOUT 7 MINUTES.

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

4.1 RESTART PROCEDURE

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

A. LOAD ADDRESS 001000
B. 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 002432 — COMMON HALT. THIS HALT IS CONTAINED IN A SUBROUTINE THAT IS CALLED BY THOSE PARTS OF THE PROGRAM THAT REQUIRE THAT THE PROCESSOR STOP. THIS HALT NORMALLY OCCURS UPON COMPLETION OF NON-ERROR PRINTOUTS. THE CONSOLE DATA LIGHTS DISPLAY THE ADDRESS OF INSTRUCTION THAT GENERATED THE HALT REQUEST.

LOC 001764 — ROUTINE END HALT. THIS HALT OCCURS UPON COMPLETION OF THE CURRENT TEST ROUTINE IF SR10 IS SET. THE CONSOLE DATA LIGHTS DISPLAY THE NUMBER OF THE TEST JUST COMPLETED.

5.2 NORMAL PRINTOUTS

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

6. ERRORS

ERRORS ARE REPORTED IN THIS PROGRAM BY THE FOLLOWING METHODS:

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

6.1 UNCONDITIONAL ERROR HALTS

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

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

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

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

(6.1 CONT'D)

E. THE INSTRUCTION THAT IMMEDIATELY PRECEDES THE ONE 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. ANY FURTHER STEPS REQUIRED TO DIAGNOSE AN AN UNCONDITIONAL ERROR HALT ARE NOT WITHIN THE SCOPE OF THIS PROGRAM.

6.2 ERROR PRINTOUTS

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

T XXX PC OYYYYY ICNT ZZZZ. UNIT W 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.
UNITW	IS THE UNIT 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 002446 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 IF SET, WILL REMOVE ALL ERROR PRINTOUTS.

*****NOTE*****

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

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

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

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

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

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

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

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

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

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

C. PROCEED TO USE THE PROGRAM, OR

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

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

8. DESCRIPTION

THIS PROGRAM IS ORGANIZED INTO THREE MAIN SECTIONS:

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

8.1 CONTROL ROUTINE

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

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

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

8.2 TEST ROUTINES

THE ACTUAL TESTING IS PERFORMED BY A SET OF TEST ROUTINES THAT ARE NUMBERED SEQUENTIALLY FROM 0 TO 7 (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)

```
;*********************************************************************
T3:     3               ;ROUTINE NUMBER 3.                           *
        T4              ;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 "ERR " 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  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  002310                  TRCV:   SV5S                    ;TRACE TRAP
000016  000340                          PRTY7
000020  002340                  IOTV:   RS5S                    ;TRAP TO CALL IOX
000022  000340                          PRTY7
000024  000026                          .+2                     ;POWER FAIL TRAP
000026  000000                          HALT
000030  002110                  EMTV:   EMTINT                  ;EMT TRAP
000032  000340                          PRTY7
000034  002756                  TRPV:   DLY                     ;TRAP TRAP. SIMILAR TO EMT
000036  000000                          PRTY0
                                ;LOC 40 THROUGH 376 ARE FILLED WITH .+2 AND HALT.
                                ;EQUATE STATEMENTS
                                        SR=177570
                                        PSW=177776
                                        SPBOT=1000
                                        NOP=240
                                        OPEN=0
                                        MANUAL=BIT15
                                        BIT15=100000
                                        BIT14=40000
                                        BIT13=20000
                                        BIT12=10000
                                        BIT11=4000
                                        BIT10=2000
                                        BIT9=1000
                                        BIT8=400
                                        BIT7=200
                                        BIT6=100
                                        BIT5=40
                                        BIT4=20
                                        BIT3=10
                                        BIT2=4
                                        BIT1=2
                                        BIT0=1
                                        R0=%0
                                        R1=%1
                                        R2=%2
                                        R3=%3
                                        R4=%4
                                        R5=%5
                                        R6=%6
                                        R7=%7
                                        PC=%7
```

```
   431          005746                          PUSH=005746
   432          024646                          PUSH2=024646
   433          005726                          POPSP=005726
   434          022626                          POPSP2=022626
   435          000340                          PRTY7=340
   436          000300                          PRTY6=300
   437          000240                          PRTY5=240
   438          000200                          PRTY4=200
   439          000140                          PRTY3=140
   440          000100                          PRTY2=100
   441          000040                          PRTY1=40
   442          000000                          PRTY0=0
   443          000007                          BELL=007
   444          177777                          TLAST=-1
   445          000003                          TRC=3
   446          000040                          I=40
   447          177777                          X=-1
   448          100000                          A=BIT15
   449          040000                          B=BIT14
   450          020000                          C=BIT13
   451          000000                          V0=0
   452          000004                          V1=4
   453          000010                          V2=10
   454          000014                          V3=14
   455          000020                          V4=20
   456          000024                          V5=24
   457          000030                          V6=30
   458          000034                          V7=34
   459          020000                          MAINT=BIT13
   460          010000                          DINH=BIT12
   461          004000                          REV=BIT11
   462          000000                          FWD=0
   463          000000                          U0=0
   464          000400                          U1=BIT8
   465          001000                          U2=BIT9
   466          001400                          U3=BIT9!BIT8
   467          002000                          U4=BIT10
   468          002400                          U5=BIT10!BIT8
   469          003000                          U6=BIT10!BIT9
   470          003400                          U7=BIT10!BIT9!BIT8
   471          000100                          IE=BIT6
   472          000000                          SAT=0
   473          000002                          RNUM=BIT1
   474          000004                          RDATA=BIT2
   475          000006                          RALL=BIT2!BIT1
   476          000010                          SST=BIT3
   477          000012                          WRTM=BIT3!BIT1
   478          000014                          WDATA=BIT3!BIT2
   479          000016                          WALL=BIT3!BIT2!BIT1
   480          000001                          DO=BIT0
   481          000200                          UPS=BIT7
   482          010000                          ILO=BIT12
   483          004000                          SELE=BIT11
   484          000000                          EMTX=0
   485          000003                          SAV5S=3
   486          000004                          RST5S=4
```

```
         104400                         DELAY=TRAP
         000200                         .=200
000200   000167   001036                JMP     START           ;GO TO START OF PROGRAM.
         001000                         .=1000
001000   000167   000554                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   006644                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                UNIT:    OPEN
001064   000000                UNITN:   OPEN
001066   000000                UNITS:   OPEN
001070   000000                COMND:   OPEN
001072   000000                TEMP:    OPEN
001074   000000                FPC:     OPEN
001076   000000                LPBG:    OPEN
001100   000000                LPBT:    OPEN
001102   000000                LPB:     OPEN
001104   000000                ELPB:    OPEN
001106   000005                ERRLIM:  5
001110   000310                BLKNUM:  200.
001112   000000                ALLPAR:  OPEN
001114                         EMTTAB:
001114   001674                         .WORD   CHAINN          ;POINTER FOR EMT CALL SCOPE
001116   002404                         .WORD   SRSETT          ;POINTER FOR EMT CALL SRESET
001120   002130                         .WORD   SV03            ;POINTER FOR EMT CALL SAV03
001122   002230                         .WORD   RS03            ;POINTER FOR EMT CALL RST03
001124   002160                         .WORD   SV05            ;POINTER FOR EMT CALL SAV05
001126   002260                         .WORD   RS05            ;POINTER FOR EMT CALL RST05
001130   002150                         .WORD   SV05S           ;POINTER FOR EMT CALL SAV05S
001132   002254                         .WORD   RS05S           ;POINTER FOR EMT CALL RST05S
001134   002660                         .WORD   TYP             ;POINTER FOR EMT CALL TYPE
001136   002452                         .WORD   ERRN            ;POINTER FOR EMT CALL ERRORN
001140   003106                         .WORD   OACNVV          ;POINTER FOR EMT CALL OACNV
001142   003200                         .WORD   BDCNVV          ;POINTER FOR EMT CALL BDCNV
001144   003156                         .WORD   BMOVV           ;POINTER FOR EMT CALL BMOVE
001146   002426                         .WORD   CHLT            ;POINTER FOR EMT CALL CHALT
```

```
543  001150  002440                .WORD   EHLT        ;POINTER FOR EMT CALL EHALT
544  001152  002364                .WORD   STTCV       ;POINTER FOR EMT CALL SVECTR
545  001154  003350                .WORD   STCOM       ;POINTER FOR EMT CALL SETCOM
546  001156  003310                .WORD   STATS       ;POINTER FOR EMT CALL STATUS
547  001160  003444                .WORD   STPDT       ;POINTER FOR EMT CALL STOPDT
548  001162  003454                .WORD   CKERZ       ;POINTER FOR EMT CALL CKERRZ
549  001164  003544                .WORD   NOINTR      ;POINTER FOR EMT CALL NOINT
550  001166  004344                .WORD   SRCHFF      ;POINTER FOR EMT CALL SRCHF
551  001170  004352                .WORD   SRCHRR      ;POINTER FOR EMT CALL SRCHR
552  001172  005010                .WORD   WDATF       ;POINTER FOR EMT CALL WDATAF
553  001174  005036                .WORD   WDATR       ;POINTER FOR EMT CALL WDATAR
554  001176  005020                .WORD   RDATF       ;POINTER FOR EMT CALL RDATAF
555  001200  005046                .WORD   RDATR       ;POINTER FOR EMT CALL RDATAR
556  001202  005064                .WORD   RDTFSS      ;POINTER FOR EMT CALL RDATFS
557  001204  004244                .WORD   CWCBA       ;POINTER FOR EMT CALL CKWCBA
558  001206  004176                .WORD   CLEARR      ;POINTER FOR EMT CALL CLEAR
559  001210  004216                .WORD   BINFLL      ;POINTER FOR EMT CALL BINFIL
560  001212  003642                .WORD   DATCK       ;POINTER FOR EMT CALL DATCHK
561  001214  003632                .WORD   DTCKI       ;POINTER FOR EMT CALL DATCKI
562  001216  003616                .WORD   ADATCK      ;POINTER FOR EMT CALL ADTCK
563  001220  003606                .WORD   ADATCI      ;POINTER FOR EMT CALL ADTCKI
564  001222  003010                .WORD   INBINN      ;POINTER FOR EMT CALL INBIN
565  001224  003042                .WORD   GTBIN1      ;POINTER FOR EMT CALL GETBN1
566  001226  005110                .WORD   WALLFF      ;POINTER FOR EMT CALL WALLF
567  001230  005126                .WORD   WALLRR      ;POINTER FOR EMT CALL WALLR
568  001232  005264                .WORD   RALLFF      ;POINTER FOR EMT CALL RALLF
569  001234  005302                .WORD   RALLRR      ;POINTER FOR EMT CALL RALLR
570  001236  006560                .WORD   SQDRV       ;POINTER FOR EMT CALL SEQDRV
571  001240  006602                .WORD   SELDRR      ;POINTER FOR EMT CALL SELDRV
572
```

```
                                ;ROUTINE TO DETERMINE TRANSPORTS AVAILABLE FOR TEST.
001242  012706  001000  START:  MOV     #SPBOT,R6       ;SET BOTTOM OF SP STACK.
001246  005067  177564          CLR     RTNNO
001252  104010                  TYPE                    ;TYPE TITLE.
001254  010333                  PGIIT
001256  005737  000042          TST     @#42            ;PROGRAM LOADED VIA MONITOR?
001262  001524                  BEQ     STRTA           ;BR IF NOT.
001264  012767  000402  001336  MOV     #402,ERRND      ;DISABLE ERROR PRINTOUTS.
001272  112767  000376  177566  MOVB    #376,UNITS      ;ASSUME DRIVES 1-7 AVAILABLE.
001300  012700  000010          MOV     #8.,R0          ;SET UP TO TEST 8 TIMES.
001304  005267  000010  DTRMN:  INC     SQDRV1
001310  042767  177770  000002  BIC     #177770,SQDRV1
001316  104052                  SELDRV                  ;SELECT A TRANSFORT.
001320  000000          SQDRV1: OPEN                    ;TRANSPORT #.
001322  000431                  BR      DTRMNA          ;UNIT NOT AVAILABLE RETURN.
001324  104020                  SETCOM                  ;REWIND TO REVERSE END ZONE.
001326  004002                  RNUM+REV
001330  000437                  BR      DTRMNB          ;ERROR RETURN.
001332  005777  177450          TST     @TCCM           ;WAIT.
001336  100375                  BPL     .-4
001340  005777  177440          TST     @TCST           ;END ZONE?
001344  100031                  BPL     DTRMNB          ;BR IF NOT.
001346  012777  011276  177436  MOV     #WBUF0,@TCBA    ;SET CURRENT ADDR.
001354  012777  177777  177426  MOV     #-1,@TCWC       ;SET WORD COUNT.
001362  104020                  SETCOM                  ;YES. ISSUE WRITE DATA COMMAND.
001364  000015                  WDATA+FWD+DO
001366  000420                  BR      DTRMNB          ;ERROR RETURN.
001370  032777  100200  177410  BIT     #BIT15+BIT7,@TCCM       ;WAIT FOR ERROR/READY.
001376  001774                  BEQ     .-6
001400  005777  177402          TST     @TCCM           ;ERROR?
001404  100411                  BMI     DTRMNB          ;BR IF YES.
001406  104022          DTRMNA: STOPDT                  ;STOP DECTAPE.
001410  005300                  DEC     R0              ;DONE 8 TIMES?
001412  001334                  BNE     DTRMN           ;BR IF NOT.
001414  105767  177446          TSTB    UNITS           ;ANY UNITS AVAILABLE?
001420  001015                  BNE     DTRMNC          ;BR IF YES.
001422  104010                  TYPE                    ;TYPE NON AVAILABLE MESSAGE.
001424  011060                  NOUNIT
001426  000571                  BR      CHNC            ;GO EXIT.
001430  032777  014000  177346  DTRMNB: BIT    #BIT12+BIT11,@TCST      ;ILO OR SELE ERROR?
001436  001763                  BEQ     DTRMNA          ;BR IF NOT.
001440  016701  177654          MOV     SQDRV1,R1
001444  146167  006634  177414  BICB    UNTAB(1),UNITS  ;DESELECT NON AVAILABLE TRANSPORT.
001452  000755                  BR      DTRMNA
001454  104010          DTRMNC: TYPE                    ;TYPE UNITS TO BE TESTED.
001456  011226                  GOOD
001460  012767  000001  000010  MOV     #1,CPENA
001466  012767  000007  177350  MOV     #7,CTRA         ;CHECK UP TO 7 UNITS.
001474  104052                  SELDRV                  ;SELECT DRIVE.
001476  000000          CPENA:  OPEN                    ;UNIT TO BE SELECTED.
001500  000407                  BR      CPENB           ;UNIT NOT AVAILABLE.
001502  016700  177356          MOV     UNITN,R0        ;SUCCESS.
001506  116067  011254  007535  MOVB    GTAB(0),GTAPES  ;GET ASCII # FOR GOOD TAPE.
001514  104010                  TYPE                    ;TYPE # OF UNIT TO TEST.
001516  011251                  GTAPES
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  629  001520  005267  177752          CPENB:  INC     CPENA           ;UPDATE TO NEXT DRIVE.
  630  001524  005367  177314                  DEC     CTRA            ;CHECKED ALL DRIVES?
  631  001530  001361                          BNE     CPENA-2         ;BR IF NOT.
  632  001532  000412                          BR      GETRDY          ;YES.
  633  001534  104010                  STRTA:  TYPE                    ;TYPE UNIT SELECT INSTRUCTIONS.
  634  001536  010361                          INST1
  635  001540  104015                          CHALT                   ;WAIT FOR USER.
  636  001542  116767  176022  177316          MOVB    SR,UNITS        ;GET UNITS.
  637  001550  001771                          BEQ     STRTA           ;BR IF NON SELECTED.
  638  001552  104010                          TYPE                    ;TYPE SR OPTION MESSAGE.
  639  001554  010541                          ASETSR
  640  001556  104015                          CHALT                   ;COMMON HALT.
  641  001560  012767  001002  001042  GETRDY: MOV     #1002,ERRND     ;ENABLE ERROR PRINTOUTS.
  642  001566  016767  177240  177244          MOV     KSTART,NXTST    ;ADDR OF 1ST ROUTINE TO NXTST
  643  001574  012767  000340  176174  GTRDYX: MOV     #PRTY7,PSW      ;SET PRIORITY 7.
  644  001602  012706  001000                  MOV     #SPBOT,R6       ;SET BOTTOM OF STACK.
  645  001606  104001                          SRESET                  ;ISSUE RESET.
  646  001610  104043                          INBIN                   ;INITIALIZE BINARY COUNT.
  647  001612  005067  177274                  CLR     ALLPAR          ;CLEAR PARITY ERROR ALLOWED INDICATOR.
  648  001616  104017                          SVECTR                  ;PRESET DT INTERRUPT VECTOR TO 0.
  649  001620  000000                          0
  650  001622  004767  000214  GTRDYA: JSR     R7,FORWD        ;ROLL FORWARD TO "NEXT" ROUTINE.
  651  001626  032767  001000  175734  GTRDYB: BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
  652  001634  001003                          BNE     GTRDYC          ;BRANCH IF SELECT ROUTINE SWITCH IS SET.
  653  001636  104051                  GORUN:  SEQDRV                  ;SELECT SEQUENTIAL DRIVE.
  654  001640  000177  177176                  JMP     @CURTST         ;GO RUN CURRENT ROUTINE.
  655  001644  126767  177166  175716  GTRDYC: CMPB    RTNNO,SR        ;COMPARE RTNNO TO SR.
  656  001652  001771                          BEQ     GORUN           ;BR IF ROUTINE FOUND.
  657  001654  022767  177777  177156  GTRDYD: CMP     #-1,NXTST       ;NO. CHECK FOR LAST ROUTINE.
  658  001662  001357                          BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE.
  659  001664  104010                          TYPE                    ;TYPE INCORRECT RTN SELECTED.
  660  001666  010314                          AINCRT
  661  001670  104015                          CHALT                   ;COMMON HALT.
  662  001672  000732                          BR      GETRDY          ;START OVER.
  663  001674  104022                  CHAINN: STOPDT
  664  001676  012706  001000                  MOV     #SPBOT,R6       ;RESTORE STACK.
  665  001702  005267  177122                  INC     ICNT            ;INCREMENT ITERATION COUNT.
  666  001706  001002                          BNE     CHNAC           ;BR IF RESULT NOT 0.
  667  001710  005167  177114                  COM     ICNT            ;RESULT 0. RESET ICNT TO -1.
  668  001714  032767  040000  175646  CHNAC:  BIT     #BIT14,SR       ;CHECK FOR SCOPE OPTION.
  669  001722  001403                          BEQ     CHNA            ;BRANCH IF SCOPE SW NOT SET.
  670  001724  104051                  CHNAB:  SEQDRV                  ;SELECT SEQUENTIAL DRIVE.
  671  001726  000177  177102                  JMP     @SCOPTR         ;RETURN TO ROUTINE.
  672  001732  032767  004000  175630  CHNA:   BIT     #BIT11,SR       ;TEST INHIBIT ITERATION SWITCH
  673  001740  001003                          BNE     CHNAA           ;BRANCH IF INHIBIT ITERATION SW SET.
  674  001742  005367  177060                  DEC     ICTR            ;DECREMENT ITERATION COUNT.
  675  001746  001366                          BNE     CHNAB           ;BRANCH IF COUNT NOT 0.
  676  001750  032767  002000  175612  CHNAA:  BIT     #BIT10,SR       ;ROUTINE END HALT SW SET? (SR10)
  677  001756  001403                          BEQ     CHNB            ;BRANCH IF NOT SET.
  678  001760  016700  177052                  MOV     RTNNO,R0        ;TEST # TO R0.
  679  001764  000000                          HALT                    ;ROUTINE END HALT. TEST # IN LIGHTS.
  680  001766  032767  001000  175574  CHNB:   BIT     #BIT9,SR        ;CHECK SELECT ROUTINE SWITCH
  681  001774  001271                          BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
  682  001776  022767  177777  177034          CMP     #-1,NXTST       ;LAST TEST?
  683  002004  001273                          BNE     GTRDYX          ;BRANCH IF NOT LAST TEST.
  684  002006  104010                          TYPE                    ;TYPE PROGRAM END BELL.
```

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                                        APGEND
002010  010576
002012  013700  000042          CHNC:   MOV     @#42,R0         ;GET CONTENTS OF 42.
002016  001410                          BEQ     HERE            ;BR IF 0.
002020  000005                          RESET                   ;NOT 0. ISSUE RESET.
002022  004710                  LOGIC:  JSR     PC,(0)          ;RETURN TO MONITOR.
002024  000240  000240  000240          .WORD   NOP,NOP,NOP
002032  105767  177030                  TSTB    UNITS           ;ANY UNITS AVAILABLE FOR TESTING?
002036  001765                          BEQ     CHNC            ;BR IF NOT.
002040  000647                  HERE:   BR      GETRDY          ;GO REPEAT PROGRAM.
002042  016705  176772          FORWD:  MOV     NXTST,R5        ;ADDR OF NEXT ROUTINE TO R5.
002046  012567  176764                  MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
002052  012567  176762                  MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE.
002056  012567  176744                  MOV     (5)+,ICTR       ;GET ITERATION COUNT.
002062  012567  176746                  MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
002066  010567  176750          FORWDA: MOV     R5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST.
002072  012767  000001  176730          MOV     #1,ICNT         ;PRESET ICNT TO 1.
002100  016767  176732  175462          MOV     RTNNO,SR        ;DISPLAY ROUTINE #.
002106  000207                          RTS     R7              ;EXIT FORWD SUBROUTINE.

                        ;EMT INTERPRETER ROUTINE.
002110  010046          EMTINT: MOV     R0,-(6)         ;PUSH R0.
002112  016600  000002          MOV     2(6),R0         ;GET EMT PC.
002116  014000                  MOV     -(0),R0         ;GET EMT CALL.
002120  006300                  ASL     R0              ;TIMES 2.
002122  016000  171114          MOV     EMTTAB-10000(0),R0      ;FORM EMT ADDR.
002126  000200                  RTS     R0              ;GO TO EMT RTN. RESTORE R0.

                        ;SAVE REGS 0 TO 3 SUBROUTINE.
002130  012666  177766  SV03:   MOV     (6)+,-10.(6)    ;MOVE PC UPSTACK.
002134  012666  177766          MOV     (6)+,-10.(6)    ;MOVE STATUS UPSTACK.
002140  012767  000002  000046          MOV     #RTI,SV05C
002146  000415                  BR      SV05B

                        ;SUB TO SAVE REGS 0 TO 5 AND PLACE EMT PC IN R5.
002150  012767  000240  000036  SV05S:  MOV     #NOP,SV05C
002156  000403                  BR      SV05A

                        ;SUB TO SAVE REGS 0 TO 5.
002160  012767  000002  000026  SV05:   MOV     #RTI,SV05C
002166  012666  177762  SV05A:  MOV     (6)+,-14.(6)    ;MOVE PC AND PSW UPSTACK.
002172  012666  177762          MOV     (6)+,-14.(6)
002176  010546                  MOV     R5,-(6)
002200  010446                  MOV     R4,-(6)
002202  010346          SV05B:  MOV     R3,-(6)
002204  010246                  MOV     R2,-(6)
002206  010146                  MOV     R1,-(6)
002210  010046                  MOV     R0,-(6)
002212  024646                  PUSH2
002214  000002          SV05C:  RTI                     ;RTI OR NOP.
002216  016605  000020          MOV     16.(6),R5       ;EMT PC TO R5.
002222  010504                  MOV     R5,R4
002224  005744                  TST     -(4)
002226  000002                  RTI                     ;EXIT.

                        ;RESTORE REGS 0 TO 3 SUBROUTINE.
002230  022626          RS03:   POPSP2
002232  012600                  MOV     (6)+,R0         ;RESTORE REGS 0 TO 4.
002234  012601                  MOV     (6)+,R1
002236  012602                  MOV     (6)+,R2
002240  012603                  MOV     (6)+,R3
002242  016646  177766          MOV     -10.(6),-(6)    ;MOVE PC AND PSW DOWN STACK.
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                                                MOV     -10.(6),-(6)
                                                RTI                             ;EXIT.
                                ;SUB TO SET R5 IN EMT PC AND RESTORE REGS 0 TO5.
                        RS05S:  MOV     R5,16.(6)               ;SET EMT PC TO R5 CONTENTS.
                                ;SUB TO RESTORE REGS 0 TO 5.
                        RS05:   POPSP2
                                MOV     (6)+,R0
                                MOV     (6)+,R1
                                MOV     (6)+,R2
                                MOV     (6)+,R3
                                MOV     (6)+,R4
                                MOV     (6)+,R5
                                MOV     -14.(6),-(6)            ;MOVE PC AND PSW DOWNSTACK.
                                MOV     -14.(6),-(6)
                                RTI                             ;EXIT.
                        SV5S:   MOV     (6)+,-6(6)              ;PC AND PSW UPSTACK.
                                MOV     (6)+,-6(6)
                                MOV     R5,-(6)                 ;SAVE R5.
                                MOV     R4,-(6)                 ;SAVE R4.
                                PUSH2
                                MOV     8.(6),R5                ;EMT PC TO R5.
                                MOV     R5,R4                   ;EMT PC TO R4.
                                TST     -(4)
                                RTI                             ;EXIT EMT SUB.
                        RS5S:   MOV     R5,8.(6)                ;R5 TO EMT PC.
                                POPSP2
                                MOV     (6)+,R4                 ;RESTORE R4.
                                MOV     (6)+,R5                 ;RESTORE R5.
                                MOV     -6(6),-(6)
                                MOV     -6(6),-(6)
                                RTI                             ;EXIT.
                        ;ROUTINE TO SET TC11 INTERRUPT VECTOR AND PRIORITY
                        STTCV:  SAV05S
                                MOV     TCVTR,R1                ;VECTOR TO R1.
                                MOV     (5)+,(1)+               ;SET DESIRED VECTOR.
                                MOV     TCLVL,(1)+              ;SET TC11 PRIORITY.
                                RST05S
                                RTI
                        ;ROUTINE TO ISSUE RESET.
                        SRSETT: MOV     R0,-(6)                 ;PUSH R0.
                                MOV     #52525,R0               ;DATA TO R0.
                                COM     R0                      ;COMPLEMENT (R0).
                                MOV     R0,SRSETT+4             ;(R0) TO SRSETT+4.
                                RESET                           ;ISSUE RESET. (R0) IS
                                MOV     (6)+,R0                 ;RESTORE R0.
                                RTI                             ;DISPLAYED. EXIT.
                        ;COMMON HALT ROUTINE
                        CHLT:   SAV05S
                                MOV     R4,R0                   ;DEVELOP ADDR OF CALLER.
                                HALT                            ;HALT CALL ADDR IN DATA LIGTHS.
                                RST05S
                                RTI                             ;EXIT.
                        ;CONDITIONAL ERROR HALT ROUTINE.
                        EHLT:   TST     SR                      ;CHECK FOR HALT ON ERROR.
                                BPL     EHLTA                   ;BRANCH IF NO HALT DESIRED.
                                HALT                            ;HALT.
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797  002450  000002                    EHLTA:  RTI                     ;IN DATA LIGHTS.
798  002452  104022                    ERRN:   STOPDT                  ;ALL STOP.
799  002454  010467  176414                    MOV     R4,FPC          ;CONVERT CALL ADDR OF SUB CALLING.
800  002460  104012                            OACNV
801  002462  001074                            FPC
802  002464  011215                            AFPC
803  002466  000006                            6
804  002470  000003                            SAV5S                   ;SAVE REG 5S
805  002472  010567  000136                    MOV     R5,ERRB         ;DETERMINE CALLING ADDR.
806  002476  162767  000002  000130            SUB     #2,ERRB
807  002504  104012                            OACNV                   ;CONVERT CALLING ADDR TO ASCII.
808  002506  002634                            ERRB
809  002510  010260                            APC
810  002512  000006                            6
811  002514  104012                            OACNV                   ;CONVERT TEST # TO ASCII.
812  002516  001036                            RTNNO
813  002520  010250                            ATNUMB
814  002522  000003                            3
815  002524  104013                            BDCNV                   ;CONVERT ICNT TO DECIMAL ASCII.
816  002526  001030                            ICNT
817  002530  010275                            AICNT
818  002532  000005                            5
819  002534  104012                            OACNV                   ;CONVERT UNIT NUMBER TO ASCII.
820  002536  001064                            UNITN
821  002540  010312                            AUNIT
822  002542  000001                            1
823  002544  104012                            OACNV                   ;CONVERT BLKRQ TO ASCII.
824  002546  001060                            BLKRQ
825  002550  010724                            ABLKRQ
826  002552  000006                            6
827  002554  104012                            OACNV                   ;CONVERT TCST TO ASCII.
828  002556  001050                            TCSTT
829  002560  010656                            ATCST
830  002562  000006                            6
831  002564  104012                            OACNV                   ;CONVERT TCCM TO ASCII.
832  002566  001046                            TCCMT
833  002570  010642                            ATCCM
834  002572  000006                            6
835  002574  104012                            OACNV                   ;CONVERT TCWC TO ASCII.
836  002576  001054                            TCWCT
837  002600  010610                            ATCWC
838  002602  000006                            6
839  002604  104012                            OACNV                   ;CONVERT TCBA TO ASCII.
840  002606  001056                            TCBAT
841  002610  010625                            ATCBA
842  002612  000006                            6
843  002614  012767  010244  000012            MOV     #EMO,ERRB       ;TYPE ERR HEADER MSG IF NOT INHIBITED.
844  002622  032767  020000  174740  ERRNA:    BIT     #BIT13,SR       ;INHIBIT ERR PRINT?
845  002630  001002                    ERRND:  BNE     ERRNB           ;BR TO INHIBIT.
846  002632  104010                            TYPE                    ;TYPE MSG.
847  002634  000000                    ERRB:   OPEN                    ;DESIRED MSG ADDR GOES HERE.
848  002636  012567  177772            ERRNB:  MOV     (5)+,ERRB       ;GET ADDR OF NEXT MSG.
849  002642  022767  177777  177764            CMP     #-1,ERRB        ;TERMINATOR?
850  002650  001364                            BNE     ERRNA           ;GO TYPE IF NOT TERMINATOR.
851  002652  104016                    ERRNC:  EHALT                   ;END OF MSGS. HALT IF REQUIRED.
852  002654  000004                            RST5S                   ;RESTORE REG 5S.
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                                        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 DELAY.
                                        DLYR0=DLY+4
                                        DLYR1=DLYA+4
                                DLY:    MOV     #5000.,#0
                                DLYA:   MOV     #1000.,#0               ;DELAY COUNT TO DLYR1.
                                DLYB:   DEC     DLYR1                   ;DLYR1 -1.
                                        BNE     DLYB
                                        DEC     DLYR0                   ;DEC DLYR0.
                                        BNE     DLYA
                                        RTI                             ;EXIT.
                                ;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
                                INBINN: MOV     #-1,RIND                ;SET ALL VARIABLES
                                        MOV     RIND,PT0
                                        MOV     RIND,PT1
                                        RTI                             ;EXIT.
                                RIND:   OPEN
                                PT0:    OPEN
                                PT1:    OPEN
                                ;SPECIAL BINARY COUNT PATTERN SUBROUTINE
                                GTBIN1: MOV     PT0,PT1                 ;PREVIOUS BIN CHAR TO PT1
                                        COM     PT1
                                        COM     RIND
                                        BNE     .+6
                                        INC     PT1
                                        MOV     PT1,PT0                 ;SAVE BIN CHAR IN PT0
                                        SAV5S
                                        MOV     PT1,(5)+                ;
                                        RST5S
                                        RTI                             ;EXIT.
                                ;EMT SUB TO CONVERT OCTAL TO ASCII.
                                OACNVV: SAV05S                          ;SAVE REGS.
                                        MOV     @(5)+,R0                ;GET OCTAL VALUE.
                                        MOV     (5)+,R1                 ;GET DESTINATION ADDR.
```

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                                                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.
                                                RSTOSS                  ;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.
                                                RSTOSS                  ;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.
                                        BDCNVB: SUB     (2),R1          ;10 POWER FROM VALUE.
                                                BCS     BDCNVC          ;BR IF UNSUCCESSFUL.
                                                INC     R4              ;;1 TO RESULT.
                                                BR      BDCNVB          ;DO IT AGAIN.
                                        BDCNVC: ADD     (2),R1          ;RESTORE SUBTRACTED VALUE.
                                                ADD     #60,R4  ;CONVERT RESULT TO ASCII.
                                                MOVB    R4,(0)+         ;STORE RESULT.
                                                TST     (2)+            ;UPDATE 10 POWER ADDR.
                                                DEC     R3              ;DONE 5 TIMES?
                                                BNE     BDCNVA          ;BR IF NOT.
                                                MOV     (5)+,R1         ;GET ADDR TO STORE ASCII.
                                                MOV     (5)+,R2         ;GET # OF DIGITS REQUIRED.
                                                ADD     R2,R1           ;START WITH LSD.
                                        BDCNVD: MOVB    -(0),-(1)       ;TRANSFER CHARACTER.
                                                DEC     R2              ;DONE?
                                                BNE     BDCNVD          ;BR IF NOT.
                                                RSTOSS                  ;RESTORE REGS.
                                                RTI                     ;EXIT.
                                        TENPWR: 10000.
                                                1000.
                                                100.
                                                10.
                                                1
                                        DECVAL: .BYTE   040,040,040,040,040,040
```

```
                                ;EMT SUB TO SAVE TCCM, TCST, TCDT,TCWC,TCBA.
003310  017767  175470  175532 STATS:  MOV     @TCST,TCSTT     ;SAVE TCST.
003316  017767  175464  175522        MOV     @TCCM,TCCMT     ;SAVE TCCM.
003324  017767  175460  175522        MOV     @TCWC,TCWCT     ;SAVE TCWC.
003332  017767  175456  175512        MOV     @TCDT,TCDTT     ;SAVE TCDT.
003340  017767  175446  175510        MOV     @TCBA,TCBAT     ;SAVE TCBA.
003346  000002                       RTI                     ;EXIT EMT SUB.
                                ;EMT SUB TO ISSUE DT COMMAND SPECIFIED AT CALL+2.
003350  005067  175514       STCOM:  CLR     COMND           ;CLEAR PREVIOUS COMMAND
003354  016767  175502  175506       MOV     UNIT,COMND      ;UNIT # TO COMND.
003362  057667  000000  175500       BIS     @(6),COMND      ;SET DESIRED COMMAND IN COMND.
003370  016777  175474  175410       MOV     COMND,@TCCM     ;ISSUE COMMAND.
003376  032777  100200  175402       BIT     #BIT15!BIT7,@TCCM       ;READY AND ERROR BIT CLEAR?
003404  001414                       BEQ     STCOMB          ;BR IF YES.
003406  032767  000001  175454       BIT     #BIT0,COMND     ;WAS THE DO BIT SET IN COMND?
003414  001410                       BEQ     STCOMB          ;BR IF NOT.
003416  000003                       SAV5S
003420  104021                       STATUS                  ;SAVE STATUS.
003422  104011                       ERRORN                  ;ERROR. DO BIT FAILED TO CAUSE CLEARING
003424  011207                       FPCMSG
003426  011105                       STCMSG                  ;OF READY AND/OR ERROR BIT(S). OR ILO,
003430  010634                       STAT                    ;BLOCK MISS, OR DATA MISS ERROR OCCURRED.
003432  177777                       -1
003434  104000                       SCOPE
003436  062716  000002       STCOMB: ADD     #2,(6)          ;SET UP RETURN.
003442  000002                       RTI                     ;EXIT STCOM SUB.
                                ;EMT SUB TO STOP ALL DECTAPES.
003444  042777  000116  175334 STPDT:  BIC     #116,@TCCM      ;ISSUE SAT COMMAND.
003452  000002                       RTI                     ;EXIT EMT SUB.
                                ;EMT SUB TO CHECK FOR DECTAPE ERROR OR END ZONE.
003454  000003       CKERZ:  SAV5S
003456  005777  175324               TST     @TCCM           ;ERROR BIT SET?
003462  100406                       BMI     CKERZC          ;BR IF YES.
003464  005725                       TST     (5)+            ;NO. SET UP OK EXIT.
003466  005725       CKERZA: TST     (5)+
003470  000004       CKERZB: RST5S
003472  005067  175414               CLR     ALLPAR          ;CLEAR PARITY ERR ALLOWED INDICATOR.
003476  000002                       RTI                     ;EXIT EMT SUB.
003500  005777  175300       CKERZC: TST     @TCST           ;ENDZ BIT SET?
003504  100770                       BMI     CKERZA          ;BR IF YES.
003506  005767  175400               TST     ALLPAR          ;PARITY ERR ALLOWED?
003512  001404                       BEQ     CKERZD          ;PARITY ERR NOT ALLOWED.
003514  032777  040000  175262       BIT     #BIT14,@TCST    ;PARITY ERR SET?
003522  001360                       BNE     CKERZA-2        ;BR IF YES.
003524  104021       CKERZD: STATUS
003526  104011                       ERRORN                  ;DECTAPE ERROR.
003530  011207                       FPCMSG
003532  010704                       DTERR
003534  010634                       STAT
003536  010715                       BLKSB
003540  177777                       -1
003542  000752                       BR      CKERZB
                                ;EMT SUB TO HANDLE FAILURE TO INTERRUPT.
003544  000003       NOINTR: SAV5S
003546  104021                       STATUS                  ;SAVE STATUS.
003550  104011                       ERRORN                  ;DECTAPE FAIL TO INTERRUPT.
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1021  003552  011207                        FPCMSG
1022  003554  010665                        INTFAI
1023  003556  010634                        STAT
1024  003560  177777                        -1
1025  003562  000004                        RSTSS
1026  003564  000002                        RTI                     ;EXIT EMT SUB.
1027                          ;EMT SUB TO CHECK EXPECTED DATA AGAINST ACTUAL DATA AND REPORT ERRORS.
1028  003566  000000          DATKNT: OPEN                          ;CURRENT WORD NUMBER.
1029  003570  000000          ERRCTR: OPEN                          ;ERROR COUNTER.
1030  003572  000000          WRDCNT: OPEN                          ;# OF WORDS TO CHECK.
1031  003574  000000          BEXPDT: OPEN
1032  003576  000000          EXPDAT: OPEN
1033  003600  000000          BACTDT: OPEN
1034  003602  000000          ACTDAT: OPEN
1035  003604     000          CKINDA: .BYTE   OPEN                  ;INCR/DECR INDICATOR.
1036  003605     000          CKINDB: .BYTE   OPEN                  ;16/18 BIT DATA INDICATOR
1037  003606  112767  177777  177770 ADATCI: MOVB    #-1,CKINDA     ;INDICATE DECREMENT OF ACT DATA.
1038  003614  000402                 BR      ADATCK+4
1039  003616  105067  177762        ADATCK: CLRB    CKINDA         ;INDICATE INCREMENT OF ACT DATA.
1040  003622  112767  177777  177755        MOVB    #-1,CKINDB     ;INDICATE 18 BIT DATA CHECK.
1041  003630  000410                 BR      DATCKK
1042  003632  112767  177777  177744 DTCKI:  MOVB    #-1,CKINDA     ;INDICATE DECREMENT OF ACT DATA.
1043  003640  000402                 BR      DATCK+4
1044  003642  105067  177736        DATCK:  CLRB    CKINDA         ;INDICATE INCREMENT OF ACT DATA.
1045  003646  105067  177733                CLRB    CKINDB         ;INDICATE 16 BIT DATA CHECK.
1046  003652  104006                DATCKK: SAVOSS
1047  003654  012500                        MOV     (5)+,R0        ;GET EXP DATA ADDR.
1048  003656  012501                        MOV     (5)+,R1        ;GET ACT DATA ADDR.
1049  003660  105767  177721              TSTB    CKINDB         ;16 OR 18 BIT DATA?
1050  003664  001402                        BEQ     DATCKA         ;BR IF 16 BIT DATA.
1051  003666  012502                        MOV     (5)+,R2        ;GET BEXP DATA ADDR.
1052  003670  012503                        MOV     (5)+,R3        ;GET BACT DATA ADDR.
1053  003672  012567  177674       DATCKA: MOV     (5)+,WRDCNT    ;GET # OF WORDS TO CHECK.
1054  003676  012767  000001  177662        MOV     #1,DATKNT      ;SET CURRENT WORD # TO 1.
1055  003704  016767  175176  177656        MOV     ERRLIM,ERRCTR  ;ERR LIMIT TO ERROR COUNTER.
1056  003712  005067  177656       DATCKB: CLR     BEXPDT
1057  003716  005067  177656               CLR     BACTDT
1058  003722  011067  177650               MOV     (0),EXPDAT     ;GET EXP DATA WORD.
1059  003726  011167  177650               MOV     (1),ACTDAT     ;GET ACT DATA WORD.
1060  003732  105767  177647               TSTB    CKINDB         ;16 OR 18 BIT DATA?
1061  003736  001412                        BEQ     DATCKC         ;BR IF 16 BIT DATA.
1062  003740  111267  177630               MOVB    (2),BEXPDT     ;GET BEXP DATA BYTE.
1063  003744  111367  177630               MOVB    (3),BACTDT     ;GET BACT DATA BYTE.
1064  003750  042767  177774  177616        BIC     #177774,BEXPDT ;ISOLATE 2 LSD IN BEXPDT AND
1065  003756  042767  177774  177614        BIC     #177774,BACTDT ;BACTDT.
1066  003764  026767  177606  177610 DATCKC: CMP     EXPDAT,ACTDAT  ;COMPARE ACT DATA AND EXP DATA.
1067  003772  001004                        BNE     DATCKD         ;BR IF NOT SAME.
1068  003774  026767  177574  177576        CMP     BEXPDT,BACTDT  ;SAME. COMPARE BACT AND BEXP DATA.
1069  004002  001450                        BEQ     DATCKE         ;BR IF SAME.
1070  004004  104013               DATCKD: BDCNV                  ;DATA NOT SAME. CONVERT WORD # TO DECIMAL ASCII.
1071  004006  003566                       DATKNT
1072  004010  011022                       AWDCNT
1073  004012  000004                       4
1074  004014  006167  177556               ROL     EXPDAT         ;SET UP DATA FOR CONVERSION AND TYPEOUT.
1075  004020  006167  177550               ROL     BEXPDT
1076  004024  006067  177546               ROR     EXPDAT
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1077   004030   006167   177546                ROL     ACTDAT
1078   004034   006167   177540                ROL     BACTDT
1079   004040   006067   177536                ROR     ACTDAT
1080   004044   104012                         OACNV                   ;CONVERT BEXP DATA TO ASCII.
1081   004046   003574                         BEXPDT
1082   004050   011035                         ADATSB
1083   004052   000001                         1
1084   004054   104012                         OACNV                   ;CONVERT EXP DATA TO ASCII.
1085   004056   003576                         EXPDAT
1086   004060   011036                         ADATSB+1
1087   004062   000005                         5
1088   004064   104012                         OACNV                   ;CONVERT BACT DATA TO ASCII.
1089   004066   003600                         BACTDT
1090   004070   011051                         ADATWS
1091   004072   000001                         1
1092   004074   104012                         OACNV                   ;CONVERT ACT DATA TO ASCII.
1093   004076   003602                         ACTDAT
1094   004100   011052                         ADATWS+1
1095   004102   000005                         5
1096   004104   104011                         ERRORN                  ;TYPE DATA ERROR MESSAGE.
1097   004106   011207                         FPCMSG
1098   004110   010715                         BLKSB
1099   004112   011002                         DATERR
1100   004114   177777                         -1
1101   004116   005367   177446                DEC     ERRCTR          ;NTH ERROR?
1102   004122   001423                         BEQ     DATCKH          ;BR IF YES.
1103   004124   005267   177436       DATCKE:  INC     DATKNT          ;INCREMENT WORD #
1104   004130   105767   177450                TSTB    CKINDA          ;INCR/DECR?
1105   004134   001406                         BEQ     DATCKF          ;BR TO INCR.
1106   004136   105767   177443                TSTB    CKINDB
1107   004142   001401                         BEQ     .+4
1108   004144   122243                         CMPB    (2)+,-(3)       ;INCR-DECR DATA ADDRESSES.
1109   004146   022041                         CMP     (0)+,-(1)
1110   004150   000405                         BR      DATCKG
1111   004152   105767   177427       DATCKF:  TSTB    CKINDB
1112   004156   001401                         BEQ     .+4
1113   004160   122223                         CMPB    (2)+,(3)+       ;INCR-INCR DATA ADDRESSES.
1114   004162   022021                         CMP     (0)+,(1)+
1115   004164   005367   177402       DATCKG:  DEC     WRDCNT          ;DONE CHECKING?
1116   004170   001250                         BNE     DATCKB          ;BR IF NOT.
1117   004172   104007       DATCKH:  RST05S                          ;DONE.
1118   004174   000002                         RTI                     ;EXIT.
1119                         ;EMT SUB TO CLEAR SPECIFIED AREA TO 0'S.
1120   004176   104006       CLEARR:  SAV05S
1121   004200   012500                         MOV     (5)+,R0         ;GET STARTING ADDR.
1122   004202   012501                         MOV     (5)+,R1         ;GET COUNT.
1123   004204   005020                         CLR     (0)+            ;CLEAR WORD.
1124   004206   005301                         DEC     R1              ;DONE?
1125   004210   001375                         BNE     .-4             ;BR IF NOT DONE.
1126   004212   104007                         RST05S                  ;DONE
1127   004214   000002                         RTI                     ;EXIT.
1128                         ;EMT SUB TO FILL AREA WITH BINARY COUNT PATTERN.
1129   004216   104006       BINFLL:  SAV05S
1130   004220   012500                         MOV     (5)+,R0         ;GET STARTING ADDR.
1131   004222   012501                         MOV     (5)+,R1         ;GET COUNT.
1132   004224   104044       BINFLA:  GETBN1                          ;GET BINARY WORD.
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1133  004226  000000                BINFLB: OPEN                    ;BINARY WORD IS STORED HERE.
1134  004230  016720  177772                MOV     BINFLB,(0)+     ;STORE WORD.
1135  004234  005301                       DEC     R1              ;DONE?
1136  004236  001372                       BNE     BINFLA          ;BR IF NOT DONE.
1137  004240  104007                       RSTOSS                  ;DONE.
1138  004242  000002                       RTI                     ;EXIT.
1139                                ;EMT SUB TO CHECK THAT WORD COUNT IS 0, AND THAT TCBA CONTENTS
1140                                ;MATCH THE EXPECTED CONTENTS.
1141  004244  000003                CWCBA:  SAVSS
1142  004246  012567  174620               MOV     (5)+,TEMP       ;GET EXPECTED TCBA CONTENTS.
1143  004252  104021                       STATUS                  ;SAVE TCWC AND TCBA.
1144  004254  005777  174530               TST     @TCWC           ;WORD COUNT 0?
1145  004260  001407                       BEQ     CWCBB           ;BR IF 0 (OK).
1146  004262  104011                       ERRORN                  ;WORD COUNT NOT 0. TYPE
1147  004264  011207                       FPCMSG                  ;CONTENTS OF TCWC AND TCBA.
1148  004266  010733                       WCNOTO
1149  004270  010602                       CTCWC
1150  004272  010617                       CTCBA
1151  004274  177777                       -1
1152  004276  104000                       SCOPE
1153  004300  026777  174566  174504 CWCBB: CMP     TEMP,@TCBA      ;TCBA AND EXPECTED TCBA SAME?
1154  004306  001414                       BEQ     CWCBC           ;BR IF YES (OK).
1155  004310  104012                       OACNV                   ;NO. CONVERT EXPECTED TCBA TO ASCII.
1156  004312  001072                       TEMP
1157  004314  010771                       ATCBAS
1158  004316  000006                       6
1159  004320  104011                       ERRORN                  ;TCBA DOES NOT MATCH EXPECTED
1160  004322  011207                       FPCMSG                  ;TCBA CONTENTS. TYPE EXPECTED TCBA,
1161  004324  010747                       INCTCB                  ;ACTUAL TCBA, AND TCWC.
1162  004326  010763                       TCBASB
1163  004330  010617                       CTCBA
1164  004332  010602                       CTCWC
1165  004334  177777                       -1
1166  004336  104000                       SCOPE
1167  004340  000004                CWCBC: RST5S
1168  004342  000002                       RTI                     ;EXIT.
1169                                ;EMT SUBS TO SEARCH FOR DESIRED BLOCK NUMBER. SRCHFF GETS FORWARD
1170                                ;BLOCK NUMBERS. SRCHRR GETS REVERSE BLOCK NUMBERS.
1171  004344  105067  000315        SRCHFF: CLRB    DIRIND          ;SET FORWARD INDICATOR.
1172  004350  000403                       BR      SRCHA
1173  004352  112767  177777  000305 SRCHRR: MOVB    #-1,DIRIND      ;SET REVERSE INDICATOR.
1174  004360  012777  004440  174430 SRCHA:  MOV     #SRCHC,@TCVTR   ;SET INTERRUPT VECTOR TO SRCHC.
1175  004366  112767  000005  000270        MOVB    #5,REVCNT       ;SET MAX # OF REVERSALS ALLOWED.
1176  004374  052767  004000  000020        BIS     #REV,SRCHM      ;SET REV BIT IN SRCHM.
1177  004402  032777  004000  174376        BIT     #REV,@TCCM      ;REV BIT SET IN TCCM?
1178  004410  001003                       BNE     SRCHAA          ;BR IF YES.
1179  004412  042767  004000  000002        BIC     #REV,SRCHM      ;NO. CLEAR REV BIT FROM SRCHM.
1180  004420  104020                SRCHAA: SETCOM                  ;START SEARCH.
1181  004422  000103                SRCHM:  RNUM!IE!DO
1182  004424  000402                       BR      SRCHB
1183  004426  005277  174354        SRCCON: INC     @TCCM           ;ISSUE DO TO ENABLE RNUM.
1184  004432  104400                SRCHB:  DELAY                   ;TIME OUT INTERRUPT.
1185  004434  104024                       NOINT                   ;FAILURE TO INTERRUPT.
1186  004436  104000                       SCOPE
1187  004440  012716  004446        SRCHC:  MOV     #SRCHD,(6)      ;HERE WHEN INTERRUPT OCCURS.
1188  004444  000002                       RTI                     ;EXIT TO SRCHD.
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1189  004446  022626                    SRCHD:  POPSP2                  ;RESTORE STACK.
1190  004450  005777  174332                    TST     @TCCM           ;ERROR BIT SET?
1191  004454  100003                            BPL     SRCHDA          ;BR IF NOT.
1192  004456  104023                            CKERRZ                  ;CHECK FOR ERROR/ENDZ.
1193  004460  104000                            SCOPE                   ;ERROR RETURN. SCOPE.
1194  004462  000451                            BR      SRCREV          ;ENDZ. GO REVERSE DIRECTION.
1195  004464  027767  174324  174366  SRCHDA: CMP     @TCDT,BLKRQ     ;COMPARE BLK# IN TCDT TO REQUIRED BLK.
1196  004472  001431                            BEQ     SRCF            ;BR IF BLK FOUND.
1197  004474  003014                            BGT     SRCHE           ;BR IF TCDT HIGH.
1198  004476  032777  004000  174302            BIT     #BIT11,@TCCM    ;TCDT LOW. CHECK DIRECTION.
1199  004504  001750                            BEQ     SRCCON          ;BR IF GOING FWD. CONTINUE SAME DIRECTION.
1200  004506  062777  000003  174300            ADD     #3,@TCDT        ;ADD 3 TO TCDT.
1201  004514  027767  174274  174336            CMP     @TCDT,BLKRQ     ;LOWER BY 3 OR MORE?
1202  004522  101435                            BLOS    SRCRVA          ;GO REVERSE IF LOWER BY 3 OR MORE.
1203  004524  000740                            BR      SRCCON          ;NOT LOW ENOUGH. CONTINUE SAME DIRECTION.
1204  004526  032777  004000  174252  SRCHE:  BIT     #BIT11,@TCCM    ;TCDT HIGH. CHECK DIRECTION.
1205  004534  001334                            BNE     SRCCON          ;BR IF IN REVERSE. CONTINUE DIRECTION.
1206  004536  162777  000003  174250            SUB     #3,@TCDT        ;SUBTRACT 3 FROM TCDT.
1207  004544  026777  174310  174242            CMP     BLKRQ,@TCDT     ;HIGHER BY 3 OR MORE?
1208  004552  003425                            BLE     SRCRVB          ;GO REVERSE IF HIGHER BY 3 OR MORE.
1209  004554  000724                            BR      SRCCON          ;NOT HIGH ENOUGH. CONTINUE DIRECTION.
1210  004556  032777  004000  174222  SRCF:   BIT     #BIT11,@TCCM    ;TCDT EQUAL. CHECK DIRECTION.
1211  004564  001004                            BNE     SRCHG           ;BR IF IN REVERSE.
1212  004566  105767  000073                    TSTB    DIRIND          ;GOING FORWARD. FWD BLK# WANTED?
1213  004572  001315                            BNE     SRCCON          ;BR IF FWD BLK# NOT WANTED.
1214  004574  000002                            RTI                     ;EXIT EMT SUB.
1215  004576  105767  000063            SRCHG:  TSTB    DIRIND          ;GOING REV. REV BLK# WANTED?
1216  004602  001711                            BEQ     SRCCON          ;BR IF REV BLK# NOT WANTED.
1217  004604  000002                            RTI                     ;REV BLK# WANTED. EXIT.
1218  004606  032777  004000  174172  SRCREV: BIT     #BIT11,@TCCM    ;REV BIT SET?
1219  004614  001404                            BEQ     SRCRVB          ;BR IF NOT.
1220  004616  042777  004000  174162  SRCRVA: BIC     #BIT11,@TCCM    ;IN REVERSE. SET TO FORWARD.
1221  004624  000403                            BR      SRCRVC
1222  004626  052777  004000  174152  SRCRVB: BIS     #BIT11,@TCCM    ;FORWARD. SET TO REVERSE.
1223  004634  105367  000024            SRCRVC: DECB    REVCNT          ;FIFTH REVERSAL ISSUED?
1224  004640  001272                            BNE     SRCCON          ;BR IF NOT.
1225  004642  104021                            STATUS                  ;YES. ERROR. SAVE STATUS.
1226  004644  000003                            SAV5S
1227  004646  104011                            ERRORN                  ;BLK# NOT FOUND WITHIN 5 TAPE
1228  004650  011207                            FPCMSG                  ;REVERSALS.
1229  004652  010715                            BLKSB
1230  004654  011134                            SRCHER
1231  004656  010634                            STAT
1232  004660  177777                            -1
1233  004662  104000                            SCOPE
1234  004664     000            REVCNT: .BYTE   OPEN
1235  004665     000            DIRIND: .BYTE   OPEN
1236                            ;EMT SUBS TO WDATA, RDATA, FORWARD OR REVERSE.
1237  004666  012767  005067  000072  WRDFR:  MOV     #5067,WRDFRZ
1238  004674  000003            WRDFRN: SAV5S
1239  004676  012577  174106                    MOV     (5)+,@TCWC      ;GET WORD COUNT AND SET IN TCWC
1240  004702  017767  174102  000072            MOV     @TCWC,WRDFRG    ;2(WORD COUNT) TO WRDFRG.
1241  004710  006367  000066                    ASL     WRDFRG
1242  004714  005477  174070                    NEG     @TCWC           ;IN 2'S COMPLEMENT FORM.
1243  004720  012577  174066                    MOV     (5)+,@TCBA      ;SET ADDR IN TCBA.
1244  004724  067767  174062  000050            ADD     @TCBA,WRDFRG    ;2(WORD COUNT)+TCBA=FINAL TCBA CONTENTS.
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1245  004732  000000                WRDFRA: OPEN                            ;SRCHF OR SRCHR CALL GOES HERE.
1246  004734  012777  004754  174054        MOV     #WRDFRC,@TCVTR        ;SET INTERRUPT VECTOR TO WRDFRC.
1247  004742  104020                        SETCOM                          ;ISSUE WDATA OR RDATA.
1248  004744  000000                WRDFRB: OPEN                            ;COMMAND GOES HERE.
1249  004746  104400                        DELAY                           ;TIMEOUT INTERRUPT.
1250  004750  104024                        NOINT                           ;FAILURE TO INTERRUPT.
1251  004752  104000                        SCOPE
1252  004754  022626                WRDFRC: POPSP2                          ;HERE WHEN INTERRUPT OCCURS.
1253  004756  022626                WRDFRD: POPSP2                          ;RESTORE STACK.
1254  004760  005777  174022              TST     @TCCM                   ;ERROR BIT SET?
1255  004764  100005                      BPL     WRDFRF                  ;BR IF NOT.
1256  004766  005067  174120        WRDFRZ: CLR     ALLPAR                  ;
1257  004772  104023                        CKERRZ                          ;CHECK FOR ERRORS.
1258  004774  104000                        SCOPE                           ;ERROR RETURN.
1259  004776  000240                        NOP                             ;ENDZ RETURN.
1260  005000  104034                WRDFRF: CKWCBA                          ;CHECK WORD COUNT AND CURRENT ADDR.
1261  005002  000000                WRDFRG: OPEN                            ;TCBA SHOULD EQUAL THIS.
1262  005004  000004                WRDFRE: RST5S
1263  005006  000002                        RTI                             ;EXIT.
1264  005010  012767  000115  177726 WDATF:  MOV     #WDATA!FWD!IE!DO,WRDFRB
1265  005016  000403                        BR      RDATF+6
1266  005020  012767  000105  177716 RDATF:  MOV     #RDATA!FWD!IE!DO,WRDFRB
1267  005026  012767  104025  177676        MOV     #SRCHF,WRDFRA
1268  005034  000714                        BR      WRDFR
1269  005036  012767  004115  177700 WDATR:  MOV     #WDATA!REV!IE!DO,WRDFRB
1270  005044  000403                        BR      RDATR+6
1271  005046  012767  004105  177670 RDATR:  MOV     #RDATA!REV!IE!DO,WRDFRB
1272  005054  012767  104026  177650        MOV     #SRCHR,WRDFRA
1273  005062  000701                        BR      WRDFR
1274  005064  012767  005167  177674 RDTFSS: MOV     #5167,WRDFRZ
1275  005072  012767  000105  177644        MOV     #RDATA!FWD!IE!DO,WRDFRB
1276  005100  012767  104025  177624        MOV     #SRCHF,WRDFRA
1277  005106  000672                        BR      WRDFRN
1278                                ;WRITE ALL SUBROUTINE.  FORWARD OR REVERSE.
1279                                ;CALL:  WALLF OR WALLR  ;WRITE ALL FORWARD OR REVERSE
1280                                ;       COUNT           ;TRANSFER COUNT
1281                                ;       DADDR           ;DATA ADDR
1282                                ;       EDADDR          ;EXTENDED DATA ADDR.
1283  005110  012767  000117  000056 WALLFF: MOV     #WALL!FWD!IE!DO,CWALLB  ;SETUP WRITE ALL FORWARD
1284  005116  012767  104025  000036        MOV     #SRCHF,CWALLA
1285  005124  000406                        BR      CWALL
1286  005126  012767  004117  000040 WALLRR: MOV     #WALL!REV!IE!DO,CWALLB  ;SETUP WRITE ALL REVERSE
1287  005134  012767  104026  000020        MOV     #SRCHR,CWALLA
1288  005142  104006                CWALL:  SAV05S
1289  005144  005077  173640              CLR     @TCWC                   ;ZERO TCWC
1290  005150  005077  173636              CLR     @TCBA                   ;ZERO TCBA
1291  005154  012500                      MOV     (5)+,R0                 ;TRANSFER COUNT TO R0.
1292  005156  012501                      MOV     (5)+,R1                 ;DATA ADDR TO R1.
1293  005160  012502                      MOV     (5)+,R2                 ;EXTENDED DATA ADDR TO R2.
1294  005162  000000                CWALLA: OPEN                            ;SRCHF OR SRCHR CALL.
1295  005164  012777  005204  173624        MOV     #CWALLC,@TCVTR          ;SET INTERRUPT VECTOR TO CWALLC.
1296  005172  104020                        SETCOM                          ;ISSUE WALLF OR WALLR
1297  005174  000000                CWALLB: OPEN                            ;COMMAND GOES HERE.
1298  005176  104400                        DELAY                           ;WAIT FOR INTERRUPT
1299  005200  104024                        NOINT                           ;FAILURE TO INTERRUPT.
1300  005202  104000                        SCOPE
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1301   005204  112277  173574          CWALLC: MOVB    (2)+,@TCST      ;HERE ON INTERRUPT. LOAD EXTENDED DATA BITS IN TCST
1302   005210  012177  173600                  MOV     (1)+,@TCDT      ;LOAD DATA IN TCDT
1303   005214  005777  173566                  TST     @TCCM           ;ERROR BIT SET?
1304   005220  100003                          BPL     CWALLD          ;BR IF NO ERROR.
1305   005222  104023                          CKERRZ                  ;GO CHECK ON ERROR.
1306   005224  104000                          SCOPE                   ;ERROR RETURN.
1307   005226  000240                          NOP                     ;ENDZ RETURN.
1308   005230  005300                  CWALLD: DEC     R0              ;ALL TRANSFERS DONE?
1309   005232  001401                          BEQ     CWALLE          ;BR IF YES.
1310   005234  000002                          RTI                     ;NO.  EXIT INTERRUPT
1311   005236  042777  000100  173542  CWALLE: BIC     #IE,@TCCM       ;DISABLE INTERRUPT.
1312   005244  032777  001000  173532  1$:     BIT     #1000,@TCST     ;WAIT FOR DATA MISS.
1313   005252  001774                          BEQ     1$              ;BR IF NONE YET.
1314   005254  022626                  CWALLF: POPSP2                  ;RESTORE STACK TO STATE BEFORE DELAY.
1315   005256  022626                          POPSP2
1316   005260  104007                          RSTOSS                  ;RESTORE REGS.
1317   005262  000002                          RTI                     ;EXIT WALL SUBROUTINE
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1318                                    ;READ ALL SUBROUTINE.  FORWARD OR REVERSE.
1319                                    ;CALL:  RALLF OR RALLR  ;READ ALL FORWARD OR REVERSE
1320                                    ;       COUNT           ;TRANSFER COUNT
1321                                    ;       DADDR           ;DATA ADDR
1322                                    ;       EDADDR          ;EXTENDED DATA ADDR.
1323                                    ;
1324  005264  012767  000107  000056  RALLFF: MOV     #RALL!FWD!IE!DO,CRALLB  ;SETUP READ ALL FORWARD.
1325  005272  012767  104025  000036          MOV     #SRCHF,CRALLA
1326  005300  000406                   RALLRR: BR      CRALL
1327  005302  012767  004107  000040          MOV     #RALL!REV!IE!DO,CRALLB  ;SETUP READ ALL REVERSE.
1328  005310  012767  104026  000020          MOV     #SRCHR,CRALLA
1329  005316  104006                   CRALL:  SAVOSS
1330  005320  005077  173464                   CLR     @TCWC           ;ZERO TCWC
1331  005324  005077  173462                   CLR     @TCBA           ;ZERO TCBA
1332  005330  012500                           MOV     (5)+,R0         ;TRANSFER COUNT TO R0.
1333  005332  012501                           MOV     (5)+,R1         ;DATA ADDR TO R1
1334  005334  012502                           MOV     (5)+,R2         ;EXTENDED DATA ADDR TO R2.
1335  005336  000000                   CRALLA: OPEN                    ;SRCHF OR SRCHR CALL.
1336  005340  012777  005360  173450          MOV     #CRALLC,@TCVTR  ;SET INTERRUPT VECTOR TO CRALLC.
1337  005346  104020                           SETCOM                  ;ISSUE RALLF OR RALLR
1338  005350  000000                   CRALLB: OPEN                    ;COMMAND GOES HERE.
1339  005352  104400                           DELAY                   ;WAIT FOR INTERRUPT
1340  005354  104024                           NOINT                   ;FAILURE TO INTERRUPT.
1341  005356  104000                           SCOPE
1342  005360  117722  173420          CRALLC: MOVB    @TCST,(2)+      ;STORE EXTENDED DATA BITS
1343  005364  017721  173424                   MOV     @TCDT,(1)+      ;STORE DATA
1344  005370  005777  173412                   TST     @TCCM           ;ERROR BIT SET?
1345  005374  100003                           BPL     CRALLD          ;BR IF NO ERROR.
1346  005376  104023                           CKERRZ                  ;GO CHECK ON ERROR.
1347  005400  104000                           SCOPE                   ;ERROR RETURN.
1348  005402  000240                           NOP                     ;ENDZ RETURN.
1349  005404  005300                   CRALLD: DEC     R0              ;ALL TRANSFERS DONE?
1350  005406  001401                           BEQ     CRALLE          ;BR IF YES.
1351  005410  000002                           RTI                     ;NO.  EXIT INTERRUPT
1352  005412  112777  000002  173366  CRALLE: MOVB    #RNUM,@TCCM     ;STOP RALL BY SWITCHING TO RNUM COMMAND.
1353  005420  022626                   CRALLF: POPSP2                  ;RESTORE STACK TO STATE BEFORE DELAY.
1354  005422  022626                           POPSP2
1355  005424  104007                           RSTOSS                  ;RESTORE REGS.
1356  005426  000002                           RTI                     ;EXIT RALL SUBROUTINE
```

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1357
1358                                    ;SUBROUTINE TO CALCULATE FORWARD CHECKSUM FOR 256 WORD DATA BLOCK.
1359                                    ;2 MSB BITS OF 6 BIT CHKSUM ARE STORED AT LOC ELPB (RIGHT JUSIFIED)
1360                                    ;THE OTHER 4 BITS ARE STORED AT LOC LPB (LEFT JUSTIFIED)
1361                                    ;SUBROUTINE CALL IS:    JSR     R5,PARITY       ;CALL TO PARITY SUBROUTINE
1362                                    ;                       ADDR            ;ADDR OF DATA STRING
1363                                    ;                       EADR            ;ADDR OF EXTENDED DATA STRING.
1364  005430  104002                   PARITY: SAV03
1365  005432  005067  173444                   CLR     LPB             ;CLEAR CHECKSUM WORDS.
1366  005436  005067  173442                   CLR     ELPB
1367  005442  012500                           MOV     (5)+,R0         ;DATA STRING ADDR TO R0.
1368  005444  012502                           MOV     (5)+,R2         ;EXTENDED DATA STRING ADDR TO R2.
1369  005446  012767  000400  000166           MOV     #256.,PARCTR    ;SETUP TO COMPUTE PARITY FOR 256 WORDS.
1370  005454  012067  000160           PARTYA: MOV     (0)+,PWORD      ;MOVE DATA WORD TO PWORD
1371  005460  016701  000154                   MOV     PWORD,R1        ;AND TO R1.
1372  005464  112203                           MOVB    (2)+,R3         ;EXTENDED DATA BYTE TO R3.
1373  005466  006003                           ROR     R3
1374  005470  006001                           ROR     R1
1375  005472  006003                           ROR     R3
1376  005474  006001                           ROR     R1
1377  005476  000301                           SWAB    R1              ;PREPARE TO COMPUTE PARITY ON 6 MOST SIGNIFICANT
1378  005500  004767  000150                   JSR     PC,ASR2         ;BITS. INCLUDES EXTENDED BITS 16 AND 17.
1379  005504  042701  177700                   BIC     #177700,R1
1380  005510  004767  000146                   JSR     PC,BITCOM       ;GO COMPUTE PARITY.
1381  005514  016701  000120                   MOV     PWORD,R1        ;PREPARE CENTER 6 BITS FOR PARITY COMPUTATION
1382  005520  004767  000120                   JSR     PC,ASR6
1383  005524  042701  177700                   BIC     #177700,R1
1384  005530  004767  000126                   JSR     PC,BITCOM       ;GO COMPUTE PARITY
1385  005534  016701  000100                   MOV     PWORD,R1        ;PREPARE 6 LEAST SIGNIGICANT BITS FOR PARITY
1386  005540  042701  177700                   BIC     #177700,R1      ;COMPUTATION
1387  005544  004767  000112                   JSR     PC,BITCOM       ;GO COMPUTE PARITY.
1388  005550  005367  000066                   DEC     PARCTR          ;DONE 256 TIMES?
1389  005554  001337                           BNE     PARTYA          ;BR IF NOT.
1390  005556  104003                           RST03
1391  005560  005167  173316                   COM     LPB
1392  005564  042767  177700  173310           BIC     #177700,LPB     ;MOVE 2 MOST SIGNIFICANT BITS OF
1393  005572  016767  173304  173300           MOV     LPB,LPBT        ;SAVE COMPUTED PARITY.
1394  005600  016767  173276  173270           MOV     LPB,LPBG
1395  005606  000367  173270           XPARTY: SWAB    LPB             ;COMPUTED PARITY TO ELPB (RIGHT JUSTIFIED)
1396  005612  012767  000004  000022           MOV     #4,PARCTR       ;AND 4 LEAST SIGNIFICANT TO LPB (LEFT JUSTIFIED)
1397  005620  006367  173256           PARTYB: ASL     LPB
1398  005624  006167  173254                   ROL     ELPB
1399  005630  005367  000006                   DEC     PARCTR
1400  005634  001371                           BNE     PARTYB
1401  005636  000205                           RTS     R5              ;EXIT.
1402  005640  000000                   PWORD:  OPEN
1403  005642  000000                   PARCTR: OPEN
1404  005644  006201                   ASR6:   ASR     R1              ;ENTRY TO SHIFT RIGHT 6 REG 1 SUB.
1405  005646  006201                           ASR     R1
1406  005650  006201                           ASR     R1              ;ENTRY TO SHIFT RIGHT 4 REG 1 SUB
1407  005652  006201                           ASR     R1
1408  005654  006201                   ASR2:   ASR     R1
1409  005656  006201                           ASR     R1
1410  005660  000207                           RTS     PC              ;EXIT SHIFT RIGHT SUB.
1411  005662  016767  173214  000040   BITCOM: MOV     LPB,LPBY        ;SUBROUTINE TO COMPUTE 6 BIT PARITY
1412  005670  016767  173206  000034           MOV     LPB,LPBZ
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1413  005676  005167  000030                    COM     LPBZ
1414  005702  040167  000022                    BIC     R1,LPBY
1415  005706  040167  000020                    BIC     R1,LPBZ
1416  005712  046767  000012  173162            BIC     LPBY,LPB
1417  005720  056767  000006  173154            BIS     LPBZ,LPB
1418  005726  000207                            RTS     PC
1419  005730  000000                    LPBY:   OPEN
1420  005732  000000                    LPBZ:   OPEN
1421                                    ;SUBROUTINE TO PERFORM COMPLEMENT OBVERSE ON DATA SPECIFIED.
1422                                    ;SUBROUTINE CALL:       JSR     R5,OBVERS ;CALL TO SUBROUTINE
1423                                    ;                       ADDR              ;ADDR OF DATA STRING
1424                                    ;                       EADR              ;ADDR OF EXTENDED DATA STRING
1425                                    ;                       COUNT             ;NUMBER OF WORDS TO PROCESS.
1426  005734  104002                    OBVERS: SAV03
1427  005736  012500                            MOV     (5)+,R0         ;GET ADDR OF DATA STRING TO R0
1428  005740  012501                            MOV     (5)+,R1         ;ADDR OF EXTENDED DATA TO R1.
1429  005742  012567  000102                    MOV     (5)+,OBVCNT     ;COUNT TO OBVCNT
1430  005746  012767  000006  000076    OBVA:   MOV     #6,OBVCTR
1431  005754  011002                            MOV     (0),R2          ;DATA WORD TO R2
1432  005756  111103                            MOVB    (1),R3          ;EXTENDED DATA BYTE TO R3.
1433  005760  005102                            COM     R2
1434  005762  005103                            COM     R3
1435  005764  005010                            CLR     (0)             ;CLEAR DESTINATION WORD.
1436  005766  105011                            CLRB    (1)
1437  005770  006003                            ROR     R3
1438  005772  006002                    OBVB:   ROR     R2
1439  005774  006003                            ROR     R3
1440  005776  006002                            ROR     R2
1441  006000  006003                            ROR     R3
1442  006002  006002                            ROR     R2
1443  006004  006110                            ROL     (0)
1444  006006  106111                            ROLB    (1)
1445  006010  006103                            ROL     R3
1446  006012  006110                            ROL     (0)
1447  006014  106111                            ROLB    (1)
1448  006016  006103                            ROL     R3
1449  006020  006110                            ROL     (0)
1450  006022  106111                            ROLB    (1)
1451  006024  005367  000022                    DEC     OBVCTR          ;DONE 6 TIMES?
1452  006030  001360                            BNE     OBVB            ;BR IF NOT DONE.
1453  006032  005720                            TST     (0)+            ;UPDATE DATA ADDRESSES.
1454  006034  005201                            INC     R1
1455  006036  005367  000006                    DEC     OBVCNT          ; DONE?
1456  006042  001341                            BNE     OBVA            ;BR IF NOT.
1457  006044  104003                            RST03
1458  006046  000205                            RTS     R5              ;EXIT
1459  006050  000000                    OBVCNT: OPEN
1460  006052  000000                    OBVCTR: OPEN
1461                                    ;SUBROUTINEWRITE DATA, READ DATA. SINGLE BLOCK. BINARY COUNT.
1462  006054  005067  000112            RWFBK1: CLR     RWFIND          ;SET SINGLE BLOCK INDICATOR.
1463  006060  000403                            BR      RWFBKA
1464                                    ;SUBROUTINE TO WRITE DATA, READ DATA. 2 BLOCKS. BINARY COUNT.
1465  006062  012767  177777  000102    RWFBK2: MOV     #-1,RWFIND              ;SET 2 BLOCK INDICATOR.
1466  006070  004767  000312            RWFBKA: JSR     PC,BINFLO       ;BIN FILL 256 WORD WRITE BUFFER 0.
1467  006074  016767  173010  172756            MOV     BLKNUM,BLKRQ
1468  006102  104027                            WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 256. WORDS
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1469  006104  000400                        256.                    ;STARTING AT ADDR WBUF0
1470  006106  011276                        WBUF0
1471  006110  104032                        RDATAR                  ;CALL RDATAR SUB TO READ REV 256. WORDS
1472  006112  000400                        256.                    ;STARTING AT ADDR RBUF0
1473  006114  013346                        RBUF0
1474  006116  104040                        DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
1475  006120  011276                        WBUF0                   ;WBUF0 AGAINST DATA STORED AT RBUF0+510.
1476  006122  014344                        RBUF0+510.                      ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
1477  006124  000400                        256.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
1478  006126  005767  000040                TST     RWFIND          ;SINGLE BLOCK ONLY?
1479  006132  001416                        BEQ     RWFBKE          ;BR IF YES.
1480  006134  004767  000272                JSR     PC,BINFL1       ;NO. DOUBLE. BIN FILL WBUF1.
1481  006140  005267  172714                INC     BLKRQ           ;
1482  006144  104027                        WDATAF                  ;CALL WDATAF SUB TO WRITE FWD 256. WORDS
1483  006146  000400                        256.                    ;STARTING AT ADDR WBUF1
1484  006150  012322                        WBUF1
1485  006152  104032                        RDATAR                  ;CALL RDATAR SUB TO READ REV 256. WORDS
1486  006154  000400                        256.                    ;STARTING AT ADDR RBUF1
1487  006156  014372                        RBUF1
1488  006160  104040                        DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
1489  006162  012322                        WBUF1                   ;WBUF1 AGAINST DATA STORED AT RBUF1+510.
1490  006164  015370                        RBUF1+510.                      ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
1491  006166  000400                        256.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
1492  006170  000207              RWFBKE:   RTS     PC
1493  006172  000000              RWFIND:   OPEN
1494                              ;SUBROUTINE TO SET UP WRITE BUFFER(S) TO MATCH DATA EXPECTED
1495                              ;AFTER RALL OPERATION.
1496  006174  005067  000166      SETWBF:   CLR     SETIND          ;SET FWD INDICATOR.
1497  006200  000403                        BR      SETWBA
1498  006202  012767  177777  000156  SETWBR:  MOV     #-1,SETIND      ;SET REV INDICATOR.
1499  006210  004567  177214      SETWBA:   JSR     R5,PARITY       ;COMPUTE PARITY FOR WBUF0.
1500  006214  011276                        WBUF0
1501  006216  015411                        EWBUF0
1502  006220  016767  172656  004050        MOV     LPB,FWCKS0      ;MOVE PARITY TO FWD CHECKSUM IN WBUF0.
1503  006226  116767  172652  007555        MOVB    ELPB,EWFCK0
1504  006234  004567  177170                JSR     R5,PARITY       ;COMPUTE PARITY FOR WBUF1.
1505  006240  012322                        WBUF1
1506  006242  016023                        EWBUF1
1507  006244  016767  172632  005050        MOV     LPB,FWCKS1      ;MOVE PARITY TO FWD CHECKSUM IN WBUF1.
1508  006252  116767  172626  010143        MOVB    ELPB,EWFCK1
1509  006260  016767  172574  003000        MOV     BLKRQ,WFBLK0    ;SET UP FORWARD AND REVERSE BLOCK NUMBERS
1510  006266  016767  172566  004016        MOV     BLKRQ,WFBLK1    ;IN WRITE BUFFERS.
1511  006274  016767  172560  004002        MOV     BLKRQ,WRBLK0    ;
1512  006302  016767  172552  005020        MOV     BLKRQ,WRBLK1
1513  006310  005267  003776                INC     WFBLK1
1514  006314  005267  005010                INC     WRBLK1
1515  006320  004567  177410                JSR     R5,OBVERS       ;
1516  006324  012304                        WRBLK0
1517  006326  016014                        EWRBK0
1518  006330  000001                        1
1519  006332  004567  177376                JSR     R5,OBVERS       ;
1520  006336  013330                        WRBLK1
1521  006340  016426                        EWRBK1
1522  006342  000001                        1
1523  006344  005767  000016                TST     SETIND          ;REVERSE SET UP?
1524  006350  001405                        BEQ     STWBE           ;BR IF NOT.
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1525  006352  004567  177356          JSR     R5,OBVERS       ;REVERSE SET UP. COMPLEMENT OBVERSE
1526  006356  011264                  AWBUF0                  ;ENTIRE WRITE BUFFER.
1527  006360  015404                  EAWBF0
1528  006362  001020                  528.
1529  006364  000207          STWBE:  RTS     PC              ;EXIT.
1530  006366  000000          SETIND: OPEN
1531                          ;SUBROUTINE TO CLEAR ENTIRE READ BUFFER.
1532  006370  104035          CLRRBF: CLEAR
1533  006372  013334                  ARBUF0
1534  006374  001024                  532.
1535  006376  104035                  CLEAR
1536  006400  016430                  EARBF0
1537  006402  000412                  266.
1538  006404  000207                  RTS     PC              ;EXIT.
1539  006406  104035          BINFL0: CLEAR                   ;CLEAR ENTIRE WBUF0.
1540  006410  011264                  AWBUF0
1541  006412  000412                  266.
1542  006414  104035                  CLEAR                   ;CLEAR EXTENDED WBUF0.
1543  006416  015404                  EAWBF0
1544  006420  000205                  133.
1545  006422  104036                  BINFIL                  ;FILL WRITE BUFFER 0 WITH BINARY COUNT.
1546  006424  011276                  WBUF0
1547  006426  000400                  256.
1548  006430  000207                  RTS     PC              ;EXIT.
1549  006432  104035          BINFL1: CLEAR                   ;CLEAR ENTIRE WBUF1.
1550  006434  012310                  AWBUF1
1551  006436  000412                  266.
1552  006440  104035                  CLEAR                   ;CLEAR EXTENDED WBUF1.
1553  006442  016016                  EAWBF1
1554  006444  000205                  133.
1555  006446  104036                  BINFIL                  ;FILL WRITE BUFFER 1 WITH BINARY COUNT.
1556  006450  012322                  WBUF1
1557  006452  000400                  256.
1558  006454  000207                  RTS     PC              ;EXIT.
1559                          ;SUBROUTINE TO REVERSE SEQUENCE OF 2 DATA STRINGS. 1ST STRING IS A WORD STRING,
1560                          ;2ND STRING IS A BYTE STRING. BOTH STRINGS MUST HAVE SAME NUMBER OF ELEMENTS.
1561                          ;CALL:  JSR     R5,REVERS       ;CALL REVERS SUB.
1562                          ;       ADR                     ;ADDR OF WORD STRING.
1563                          ;       BADR                    ;ADDR OF BYTE STRING.
1564                          ;       CNT                     ;NUMBER OF ELEMENTS TO REVERSE.
1565  006456  104002          REVERS: SAV03
1566  006460  012500                  MOV     (5)+,R0         ;WORD STRING ADDR TO R0.
1567  006462  012501                  MOV     (5)+,R1         ;BYTE STRING ADDR TO R1.
1568  006464  012502                  MOV     (5)+,R2         ;COUNT TO R2.
1569  006466  005302                  DEC     R2              ;DECREMENT R2 BY 1 TO FIGURE ADDR OF LAST
1570  006470  010203                  MOV     R2,R3           ;ELEMENT FOR BOTH STRINGS.
1571  006472  006302                  ASL     R2
1572  006474  060002                  ADD     R0,R2           ;ADDR OF END DATA WORD IN R2.
1573  006476  060103                  ADD     R1,R3           ;ADDR OF END DATA BYTE IN R3.
1574  006500  011067  000050  RVERSA: MOV     (0),RVRSA
1575  006504  011267  000046          MOV     (2),RVRSB
1576  006510  016712  000040          MOV     RVRSA,(2)
1577  006514  016720  000036          MOV     RVRSB,(0)+
1578  006520  111167  000030          MOVB    (1),BRVRSA
1579  006524  111367  000025          MOVB    (3),BRVRSB
1580  006530  116713  000020          MOVB    BRVRSA,(3)
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1581  006534  116721  000015                  MOVB    BRVRSB,(1)+
1582  006540  005742                          TST     -(2)            ;COMPLETE DATA ADDR UPDATE.
1583  006542  105743                          TSTB    -(3)
1584  006544  020200                          CMP     R2,R0           ;R2 LARGER THAN R0?
1585  006546  101354                          BHI     RVERSA          ;BR IF YES. REVERSAL NOT COMPLETE.
1586  006550  104003                          RST03                   ;YES. DONE.
1587  006552  000205                          RTS     R5              ;EXIT.
1588  006554                          RVRSA:
1589  006554     000                  BRVRSA: .BYTE   OPEN
1590  006555     000                  BRVRSB: .BYTE   OPEN
1591  006556  000000                  RVRSB:  OPEN
1592                                  ;EMT SUB TO SELECT SEQUENTIAL DECTAPE UNIT.
1593  006560  005267  000010          SQDRV:  INC     SQDRVA
1594  006564  042767  177770  000002          BIC     #177770,SQDRVA
1595  006572  104052                          SELDRV
1596  006574  000000                  SQDRVA: OPEN                    ;DESIRED UNIT NUMBER.
1597  006576  000770                          BR      SQDRV           ;UNIT NOT AVAILABLE RETURN.
1598  006600  000002                          RTI                     ;UNIT SELECTED. EXIT.
1599                                  ;EMT SUB TO SELECT DECTAPE UNIT SPECIFIED.
1600  006602  104006                  SELDRR: SAV05S
1601  006604  012500                          MOV     (5)+,R0         ;GET NUMBER OF UNIT TO BE SELECTED.
1602  006606  136C67  006634  172252          BITB    UNTAB(0),UNITS  ;SEE IF UNIT AVAILABLE FOR TESTING.
1603  006614  001405                          BEQ     SELDRA          ;BR IF UNIT NOT AVAILABLE.
1604  006616  010067  172242                  MOV     R0,UNITN        ;AVAI. SELECT UNIT.
1605  006622  110067  172235                  MOVB    R0,UNIT+1
1606  006626  005725                          TST     (5)+            ;SET UP SELECTED EXIT.
1607  006630  104007                  SELDRA: RST05S
1608  006632  000002                          RTI                     ;EXIT.
1609  006634     001     002     004  UNTAB:  .BYTE   BIT0,BIT1,BIT2,BIT3,BIT4,BIT5,BIT6,BIT7
1610  006637     010     020     040
1611  006642     100     200
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                                        ;*****************************************************************
006644  000000                          T0:     0                       ;ROUTINE NUMBER 0                       *
006646  006724                                  T1                      ;ADDRESS OF NEXT ROUTINE                *
006650  000012                                  10.                     ;TEST ITERATION COUNT                   *
006652  006654                                  CA                      ;SCOPE ENTRY POINT                      *
                                        ;*****************************************************************
                                        ;RALL FORWARD TEST. SINGLE BLOCK. BINARY COUNT.
                                        ;TEST SEQUENCE: 1. WDATA FWD 1 BLOCK.
                                        ;               2. RDATA REV 1 BLOCK. VERIFY DATA.
                                        ;               3. RALL FWD 258 WORDS. VERIFY DATA INCLUDING REVERSE
                                        ;                  AND FORWARD CHECKSUMS.
006654  004767  177174                  CA:     JSR     PC,RWFBK1       ;WRITE/READ SINGLE BLOCK.
006660  016767  172224  172172                  MOV     BLKNUM,BLKRQ
006666  004767  177302                          JSR     PC,SETWBF       ;SET UP WRITE BUFFER FWD.
006672  004767  177472                          JSR     PC,CLRRBF       ;CLEAR READ BUFFERS.
006676  104047                                  RALLF                   ;READ ALL FWD 258. WORDS INTO
006700  000402                                  258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS
006702  013344                                  RRCKS0                  ;ARE STORED IN CONSECUTIVE BYTES STARTING
006704  016434                                  ERRCK0                  ;AT ADDRESS ERRCK0 .
006706  104041                                  ADTCK                   ;CALL ADTCK SUB TO CHECK 18 BIT DATA STARTING
006710  011276                                  WBUF0                   ;AT ADDR WBUF0 AND EWBUF0 . AGAINST 18 BIT DATA
006712  013346                                  RBUF0                   ;STARTING AT ADDR RBUF0 AND ERBUF0 . FIFTH ARGUMENT
006714  015411                                  EWBUF0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO CHECK.
006716  016435                                  ERBUF0                  ;REPORT ERRORS.
006720  000400                                  256.
006722  104000                                  SCOPE                   ;SCOPE.
                                        ;*****************************************************************
006724  000001                          T1:     1                       ;ROUTINE NUMBER 1                       *
006726  007004                                  T2                      ;ADDRESS OF NEXT ROUTINE                *
006730  000012                                  10.                     ;TEST ITERATION COUNT                   *
006732  006734                                  DA                      ;SCOPE ENTRY POINT                      *
                                        ;*****************************************************************
                                        ;RALL REV TEST. SINGLE BLOCK. BINARY COUNT.
                                        ;TEST SEQUENCE: 1. WDATA FWD 1 BLOCK.
                                        ;               2. RDATA REV 1 BLOCK. VERIFY DATA.
                                        ;               3. COMPLEMENT OBVERSE WRITE BUFFER.
                                        ;               4. RALL REV 258 WORDS. VERIFY DATA.
006734  004567  177114                  DA:     JSR     R5,RWFBK1       ;WRITE/READ SINGLE BLOCK (SEQUENCE 1 AND 2).
006740  016767  172144  172112                  MOV     BLKNUM,BLKRQ
006746  004767  177230                          JSR     PC,SETWBR       ;SET UP WRITE BUFFER REV.
006752  004767  177412                          JSR     PC,CLRRBF       ;CLEAR READ BUFFERS.
006756  104050                                  RALLR                   ;READ ALL REV 258. WORDS INTO
006760  000402                                  258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS ARE
006762  013344                                  RRCKS0                  ;STORED IN CONSECUTIVE BYTES STARTING
006764  016434                                  ERRCK0                  ;AT ADDRESS ERRCK0 .
006766  104042                                  ADTCKI                  ;CALL ADTCKI SUB TO CHECK 18 BIT DATA STARTING
006770  011276                                  WBUF0                   ;AT ADDR WBUF0 AND EWBUF0 . AGAINST 18 BIT DATA
006772  014344                                  FRCKS0-2                        ;STARTING AT ADDR FRCKS0-2 AND ERFCK0-1 . ACTUAL
006774  015411                                  EWBUF0                  ;IS CHECKED IN DESCENDING ORDER. FIFTH ARGUMENT
006776  017034                                  ERFCK0-1                        ;REPRESENTS # OF 18 BIT ELEMENTS TO BE CHECKED.
007000  000400                                  256.                    ;REPORT ERRORS.
007002  104000                                  SCOPE
```

```
                                           ;*******************************************************************
007004  000002                             T2:     2                           ;ROUTINE NUMBER 2                  *
007006  007120                                     T3                          ;ADDRESS OF NEXT ROUTINE           *
007010  000012                                     10.                         ;TEST ITERATION COUNT              *
007012  007014                                     GA                          ;SCOPE ENTRY POINT                 *
                                           ;*******************************************************************
                                           ;WALL FORWARD TEST. SINGLE BLOCK. BINARY COUNT.
                                           ;TEST SEQUENCE: 1. BINARY FILL WRITE BUFFER 0.
                                           ;               2. FILL IN REV AND FWD CHECKSUMS.
                                           ;               3. WALL FWD 258 WORDS ONTO BLOCK 200.
                                           ;               4. RDATA FWD 256 WORDS. VERIFY DATA.
                                           ;               5. RALL REV 258 WORDS. VERIFY 258 WORDS INCLUDING EXTENDED BITS.
007014  004767  177366                     GA:     JSR     PC,BINFL0           ;BINFIL WBUF0.
007020  016767  172064  172032                     MOV     BLKNUM,BLKRQ
007026  004767  177142                             JSR     PC,SETWBF           ;SET UP WRITE BUFFER FWD.
007032  104045                                     WALLF                       ;WRITE ALL FWD 258. WORDS STARTING
007034  000402                                     258.                        ;FROM ADDR RWCKS0 . EXTENDED DATA BITS ARE
007036  011274                                     RWCKS0                      ;TAKEN FROM CONSECUTIVE BYTES STARTING
007040  015410                                     EWRCK0                      ;AT ADDRESS EWRCK0 .
007042  104031                                     RDATAF                      ;CALL RDATAF SUB TO READ FWD 256. WORDS
007044  000400                                     256.                        ;AND STORE AT ADDR STARTING AT RBUF0
007046  013346                                     RBUF0
007050  104037                                     DATCHK                      ;CALL DATCHK SUB TO CHECK DATA STORED AT
007052  011276                                     WBUF0                       ;WBUF0 AGAINST DATA STORED AT RBUF0
007054  013346                                     RBUF0                       ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
007056  000400                                     256.                        ;ERRORS.
007060  004567  176650                             JSR     R5,OBVERS           ;
007064  011264                                     AWBUF0
007066  015404                                     EAWBF0
007070  000412                                     266.
007072  104050                                     RALLR                       ;READ ALL REV 258. WORDS INTO
007074  000402                                     258.                        ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS ARE
007076  013344                                     RRCKS0                      ;STORED IN CONSECUTIVE BYTES STARTING
007100  016434                                     ERRCK0                      ;AT ADDRESS ERRCK0 .
007102  104042                                     ADTCKI                      ;CALL ADTCKI SUB TO CHECK 18 BIT DATA STARTING
007104  011274                                     RWCKS0                      ;AT ADDR RWCKS0 AND EWRCK0 , AGAINST 18 BIT DATA
007106  014346                                     FRCKS0                      ;STARTING AT ADDR FRCKS0 AND ERFCK0 . ACTUAL DATA
007110  015410                                     EWRCK0                      ;IS CHECKED IN DESCENDING ORDER. FIFTH ARGUMENT
007112  017035                                     ERFCK0                      ;REPRESENTS # OF 18 BIT ELEMENTS TO BE CHECKED.
007114  000402                                     258.                        ;REPORT ERRORS.
007116  104000                                     SCOPE
```

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 1705
 1706  007120  000003                ;*****************************************************************************
 1707  007122  007246                T3:     3                       ;ROUTINE NUMBER 3                            *
 1708  007124  000012                        T4                      ;ADDRESS OF NEXT ROUTINE                     *
 1709  007126  007130                        10.                     ;TEST ITERATION COUNT                        *
 1710                                        HA                      ;SCOPE ENTRY POINT                           *
 1711                                ;*****************************************************************************
 1712                                ;WALL REV TEST. SINGLE BLOCK. BINARY COUNT.
 1713                                ;TEST SEQUENCE: 1. BINARY FILL WRITE BUFFER 0.
 1714                                ;               2. FILL IN REV AND FWD CHECKSUMS.
 1715                                ;               3. OBVERSE 258 WORDS TO BE WRITTEN.
 1716                                ;               4. WALL REV 258 WORDS ONTO BLOCK 200.
 1717                                ;               5. RDATA REV 256 WORDS.
 1718                                ;               6. OBVERSE DATA READ IN STEP 5 AND VERIFY DATA.
 1719  007130  004767  177252        ;               7. RALL FWD 258 WORDS. VERIFY 258 WORDS INCLUDING EXTENDED BITS.
 1720  007134  016767  171750  171716 HA:     JSR     PC,BINFLO       ;BINFIL WBUF0.
 1721  007142  004767  177034        MOV     BLKNUM,BLKRQ
 1722  007146  004567  177304        JSR     PC,SETWBR       ;SET UP WRITE BUFFER REV.
 1723  007152  011274                JSR     R5,REVERS       ;REVERSE WRITE BUFFER DATA.
 1724  007154  015410                RWCKS0
 1725  007156  000402                EWRCK0
 1726  007160  104046                258.
 1727  007162  000402                WALLR                   ;WRITE ALL REV 258. WORDS STARTING
 1728  007164  011274                258.                    ;FROM ADDR RWCKS0 . EXTENDED DATA BITS ARE
 1729  007166  015410                RWCKS0                  ;TAKEN FROM CONSECUTIVE BYTES STARTING
 1730  007170  104032                EWRCK0                  ;AT ADDRESS EWRCK0 .
 1731  007172  000400                RDATAR                  ;CALL RDATAR SUB TO READ REV 256. WORDS
 1732  007174  013346                256.                    ;STARTING AT ADDR RBUF0
 1733  007176  004567  176532        RBUF0
 1734  007202  011274                JSR     R5,OBVERS       ;OBVERSE DATA READ.
 1735  007204  015410                RWCKS0
 1736  007206  000402                EWRCK0
 1737  007210  104037                258.
 1738  007212  011276                DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
 1739  007214  013346                WBUF0                   ;WBUF0 AGAINST DATA STORED AT RBUF0
 1740  007216  000400                RBUF0                   ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
 1741  007220  104047                256.                    ;ERRORS.
 1742  007222  000402                RALLF                   ;READ ALL FWD 258. WORDS INTO
 1743  007224  013344                258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS
 1744  007226  016434                RRCKS0                  ;ARE STORED IN CONSECUTIVE BYTES STARTING
 1745  007230  104042                ERRCK0                  ;AT ADDRESS ERRCK0 .
 1746  007232  011274                ADTCKI                  ;CALL ADTCKI SUB TO CHECK 18 BIT DATA STARTING
 1747  007234  014346                RWCKS0                  ;AT ADDR RWCKS0 AND EWRCK0 , AGAINST 18 BIT DATA
 1748  007236  015410                FRCKS0                  ;STARTING AT ADDR FRCKS0 AND ERFCK0 . ACTUAL DATA
 1749  007240  017035                EWRCK0                  ;IS CHECKED IN DESCENDING ORDER. FIFTH ARGUMENT
 1750  007242  000402                ERFCK0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO BE CHECKED.
 1751  007244  104000                258.                    ;REPORT ERRORS.
                                      SCOPE
```

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                                        ;*******************************************************
007246  000004                          T4:     4               ;ROUTINE NUMBER 4                     *
007250  007344                                  T5              ;ADDRESS OF NEXT ROUTINE              *
007252  000012                                  10.             ;TEST ITERATION COUNT                 *
007254  007256                                  IA              ;SCOPE ENTRY POINT                    *
                                        ;*******************************************************
                                        ;WALL FWD TEST. 2 BLOCKS. BINARY COUNT.
                                        ;TEST SEQUENCE: 1. BINARY FILL WBUF0 AND WBUF1.
                                        ;               2. FILL IN REV AND FWD CHECKSUMS.
                                        ;               3. WALL FWD 528 WORDS ONTO BLOCK 200 AND 201.
                                        ;               4. READ DATA FWD TO CHECK FOR PARITY ERRORS.
                                        ;               5. RALL FWD 528 WORDS. VERIFY DATA AND EXTENDED DATA.
007256  004767  177124                  IA:     JSR     PC,BINFL0       ;BINFIL WBUF0.
007262  004767  177144                          JSR     PC,BINFL1       ;BINFIL WBUF1.
007266  016767  171616  171564                  MOV     BLKNUM,BLKRQ
007274  004767  176674                          JSR     PC,SETWSF       ;SET UP WRITE BUFFER FWD.
007300  104045                                  WALLF                   ;WRITE ALL FWD 528. WORDS STARTING
007302  001020                                  528.                    ;FROM ADDR RWCKS0 . EXTENDED DATA BITS ARE
007304  011274                                  RWCKS0                  ;TAKEN FROM CONSECUTIVE BYTES STARTING
007306  015410                                  EWRCK0                  ;AT ADDRESS EWRCK0 .
007310  104031                                  RDATAF                  ;CALL RDATAF SUB TO READ FWD 512. WORDS
007312  001000                                  512.                    ;AND STORE AT ADDR STARTING AT RBUF0
007314  013346                                  RBUF0
007316  104047                                  RALLF                   ;READ ALL FWD 528. WORDS INTO
007320  001020                                  528.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS
007322  013344                                  RRCKS0                  ;ARE STORED IN CONSECUTIVE BYTES STARTING
007324  016434                                  ERRCK0                  ;AT ADDRESS ERRCK0 .
007326  104041                                  ADTCK                   ;CALL ADTCK SUB TO CHECK 18 BIT DATA STARTING
007330  011274                                  RWCKS0                  ;AT ADDR RWCKS0 AND EWRCK0 . AGAINST 18 BIT DATA
007332  013344                                  RRCKS0                  ;STARTING AT ADDR RRCKS0 AND ERRCK0 . FIFTH ARGUMENT
007334  015410                                  EWRCK0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO CHECK.
007336  016434                                  ERRCK0                  ;REPORT ERRORS.
007340  001020                                  528.
007342  104000                                  SCOPE
                                        ;*******************************************************
007344  000005                          T5:     5               ;ROUTINE NUMBER 5                     *
007346  007460                                  T6              ;ADDRESS OF NEXT ROUTINE              *
007350  000012                                  10.             ;TEST ITERATION COUNT                 *
007352  007354                                  JA              ;SCOPE ENTRY POINT                    *
                                        ;*******************************************************
                                        ;WALL REV TEST. 2 BLOCKS. BINARY COUNT.
                                        ;TEST SEQUENCE: 1. BINARY FILL WBUF0 AND WBUF1.
                                        ;               2. FILL IN REV AND FWD CHECKSUMS.
                                        ;               3. OBVERSE AND REVERSE 528 WORDS OF DATA TO BE WRITTEN.
                                        ;               4. WALL REV 528 WORDS ONTO BLOCK 201 AND 200.
                                        ;               5. READ DATA REV 512 WORDS TO CHECK FOR PARITY ERRORS.
                                        ;               6. RALL REV 528 WORDS. VERIFY DATA AND EXTENDED DATA.
007354  004767  177026                  JA:     JSR     PC,BINFL0       ;BINFIL WBUF0.
007360  004767  177046                          JSR     PC,BINFL1       ;BINFIL WBUF1.
007364  016767  171520  171466                  MOV     BLKNUM,BLKRQ
007372  004767  176604                          JSR     PC,SETWBR       ;SET UP WRITE BUFFER REVERSE.
007376  004567  177054                          JSR     R5,REVERS       ;REVERSE 528 WORDS OF WRITE DATA.
007402  011264                                  AWBUF0
007404  015404                                  EAWBF0
007406  001020                                  528.
007410  005267  171444                          INC     BLKRQ
```

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                                        WALLR                   ;WRITE ALL REV 528. WORDS STARTING
                                        528.                    ;FROM ADDR AWBUFO . EXTENDED DATA BITS ARE
                                        AWBUFO                  ;TAKEN FROM CONSECUTIVE BYTES STARTING
                                        EAWBFO                  ;AT ADDRESS EAWBFO .
                                        RDATAR                  ;CALL RDATAR SUB TO READ REV 512. WORDS
                                        512.                    ;STARTING AT ADDR RBUFO
                                        RBUFO
                                        RALLR                   ;READ ALL REV 528. WORDS INTO
                                        528.                    ;ADDR ARBUFO AND UP. EXTENDED DATA BITS ARE
                                        ARBUFO                  ;STORED IN CONSECUTIVE BYTES STARTING
                                        EARBFO                  ;AT ADDRESS EARBFO .
                                        ADTCK                   ;CALL ADTCK SUB TO CHECK 18 BIT DATA STARTING
                                        AWBUFO                  ;AT ADDR AWBUFO AND EAWBFO , AGAINST 18 BIT DATA
                                        ARBUFO                  ;STARTING AT ADDR ARBUFO AND EARBFO . FIFTH ARGUMENT
                                        EAWBFO                  ;REPRESENTS # OF 18 BIT ELEMENTS TO CHECK.
                                        EARBFO                  ;REPORT ERRORS.
                                        528.
                                        SCOPE
                                ;*******************************************************************
                                T6:     6                       ;ROUTINE NUMBER 6                  *
                                        T7                      ;ADDRESS OF NEXT ROUTINE           *
                                        10.                     ;TEST ITERATION COUNT              *
                                        KA                      ;SCOPE ENTRY POINT                 *
                                ;*******************************************************************
                                ;WALL-RALL TEST. ALL BLOCKS BINARY COUNT.
                                ;TEST SEQUENCE: 1. BINARY FILL WBUFO.
                                ;               2. FILL IN REV AND FORWARD CHECKSUMS.
                                ;               3. WALL FWD 260 WORDS IN EACH BLOCK, STARTING WITH 0.
                                ;               4. RDATA REV EVERY OTHER BLOCK. VERIFY DATA.
                                ;               5. RDATA FWD EVERY OTHER BLOCK. VERIFY DATA.
                                ;               6. OBVERSE WRITE DATA TO MATCH RALL REV DATA.
                                ;               7. RALL REV 258 WORDS EVERY OTHER BLOCK. VERIFY DATA.
                                ;               8. REOBVERSE WRITE DATA TO MATCH RALL FWD DATA.
                                ;               9. RALL FWD 260 WORDS EVERY OTHER BLOCK. VERIFY DATA.
007470  004767  176712          KA:     JSR     PC,BINFLO       ;BINFIL WBUFO.
007474  005067  171360                  CLR     BLKRQ
007500  004767  176470                  JSR     PC,SETWBF       ;SET UP WRITE BUFFER FWD.
007504  012700  001102                  MOV     #578.,R0        ;SET UP TO WALL 578 BLOCKS STARTING
007510  012767  177777  171342          MOV     #-1,BLKRQ       ;WITH BLOCK 0.
007516  005267  171336          KB:     INC     BLKRQ
007522  104045                          WALLF                   ;WRITE ALL FWD 259. WORDS STARTING
007524  000403                          259.                    ;FROM ADDR RWCKS0 . EXTENDED DATA BITS ARE
007526  011274                          RWCKS0                  ;TAKEN FROM CONSECUTIVE BYTES STARTING
007530  015410                          EWRCK0                  ;AT ADDRESS EWRCK0 .
007532  005300                          DEC     R0              ;DONE ALL BLOCKS?
007534  001370                          BNE     KB              ;BR IF NOT DONE.
007536  012700  000441                  MOV     #289.,R0        ;SET UP TO READ DATA REV EVERY OTHER BLOCK.
007542  012767  001103  171310          MOV     #579.,BLKRQ
007550  162767  000002  171302  KC:     SUB     #2,BLKRQ
007556  104032                          RDATAR                  ;CALL RDATAR SUB TO READ REV 256. WORDS
007560  000400                          256.                    ;STARTING AT ADDR RBUFO
007562  013346                          RBUFO
007564  104040                          DATCKI                  ;CALL DATCKI TO CHECK DATA STORED AT
007566  011276                          WBUFO                   ;WBUFO AGAINST DATA STORED AT RBUFO+510.
007570  014344                          RBUFO+510.                      ;CHECK # OF WORDS SPECIFIED. REPORT ERRORS.
007572  000400                          256.                    ;ACTUAL DATA IS CHECKED IN DESCENDING ORDER.
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1864  007574  005300                    DEC     R0              ;DONE?
1865  007576  001364                    BNE     KC              ;BR IF NOT DONE.
1866  007600  012700  000441            MOV     #289.,R0        ;SET UP TO READ DATA FWD EVERY OTHER BLOCK.
1867  007604  012767  177776  171246    MOV     #-2,BLKRQ
1868  007612  062767  000002  171240  KD:ADD     #2,BLKRQ
1869  007620  104031                    RDATAF                  ;CALL RDATAF SUB TO READ FWD 256. WORDS
1870  007622  000400                    256.                    ;AND STORE AT ADDR STARTING AT RBUF0
1871  007624  013346                    RBUF0
1872  007626  104037                    DATCHK                  ;CALL DATCHK SUB TO CHECK DATA STORED AT
1873  007630  011276                    WBUF0                   ;WBUF0 AGAINST DATA STORED AT RBUF0
1874  007632  013346                    RBUF0                   ;CHECK NUMBER OF WORDS SPECIFIED. REPORT
1875  007634  000400                    256.                    ;ERRORS.
1876  007636  005300                    DEC     R0              ;DONE?
1877  007640  001364                    BNE     KD              ;BR IF NOT DONE.
1878  007642  004567  176066            JSR     R5,OBVERS       ;OBVERSE WRITE DATA TO MATCH RALL REV DATA.
1879  007646  011264                    AWBUF0
1880  007650  015404                    EAWBF0
1881  007652  000412                    266.
1882  007654  012700  000441            MOV     #289.,R0        ;SET UP TO RALL REV EVERY OTHER BLOCK.
1883  007660  012767  001103  171172    MOV     #579.,BLKRQ
1884  007666  162767  000002  171164  KE:SUB     #2,BLKRQ
1885  007674  104050                    RALLR                   ;READ ALL REV 258. WORDS INTO
1886  007676  000402                    258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS ARE
1887  007700  013344                    RRCKS0                  ;STORED IN CONSECUTIVE BYTES STARTING
1888  007702  016434                    ERRCK0                  ;AT ADDRESS ERRCK0 .
1889  007704  104042                    ADTCKI                  ;CALL ADTCKI SUB TO CHECK 18 BIT DATA STARTING
1890  007706  011274                    RWCKS0                  ;AT ADDR RWCKS0 AND EWRCK0 , AGAINST 18 BIT DATA
1891  007710  014346                    FRCKS0                  ;STARTING AT ADDR FRCKS0 AND ERFCK0 . ACTUAL DATA
1892  007712  015410                    EWRCK0                  ;IS CHECKED IN DESCENDING ORDER. FIFTH ARGUMENT
1893  007714  017035                    ERFCK0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO BE CHECKED.
1894  007716  000400                    256.                    ;REPORT ERRORS.
1895  007720  005300                    DEC     R0              ;DONE?
1896  007722  001361                    BNE     KE              ;BR IF NOT DONE.
1897  007724  004567  176004            JSR     R5,OBVERS       ;REOBVERSE WRITE DATA TO MATCH RALL FWD DATA.
1898  007730  011264                    AWBUF0
1899  007732  015404                    EAWBF0
1900  007734  000412                    266.
1901  007736  012700  000441            MOV     #289.,R0        ;SET UP TO RALL FWD EVERY OTHER BLOCK.
1902  007742  012767  177776  171110    MOV     #-2,BLKRQ
1903  007750  062767  000002  171102  KF:ADD     #2,BLKRQ
1904  007756  104047                    RALLF                   ;READ ALL FWD 258. WORDS INTO
1905  007760  000402                    258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS
1906  007762  013344                    RRCKS0                  ;ARE STORED IN CONSECUTIVE BYTES STARTING
1907  007764  016434                    ERRCK0                  ;AT ADDRESS ERRCK0 .
1908  007766  104041                    ADTCK                   ;CALL ADTCK SUB TO CHECK 18 BIT DATA STARTING
1909  007770  011274                    RWCKS0                  ;AT ADDR RWCKS0 AND EWRCK0 , AGAINST 18 BIT DATA
1910  007772  013344                    RRCKS0                  ;STARTING AT ADDR RRCKS0 AND ERRCK0 . FIFTH ARGUMENT
1911  007774  015410                    EWRCK0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO CHECK.
1912  007776  016434                    ERRCK0                  ;REPORT ERRORS.
1913  010000  000402                    258.
1914  010002  005300                    DEC     R0              ;DONE?
1915  010004  001361                    BNE     KF              ;BR IF NOT DONE.
1916  010006  104000                    SCOPE
1917                          ;*************************************************************************
1918  010010  000007          T7:       7                       ;ROUTINE NUMBER 7                       *
1919  010012  177777                    TLAST                   ;ADDRESS OF NEXT ROUTINE                *
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                                        10.                     ;TEST ITERATION COUNT                   *
                                        LA                      ;SCOPE ENTRY POINT                      *
                                ;*******************************************************************
                                ;PARITY TEST.
                                ;TEST SEQUENCE: 1. BINARY FILL WBUF0.
                                ;               2. FILL IN REVERSE AND FORWARD CHECKSUMS. THE RESULTING
                                ;                  FORWARD CHECKSUM WILL BE 77.
                                ;               3. CLEAR ONE BIT OF FWD CHECKSUM.
                                ;               4. WALL FWD 258 WORDS. INCLUDES INCORRECT PARITY.
                                ;               5. RALL FWD 258 WORDS TO VERIFY DATA WRITTEN.
                                ;               6. RDATA FWD 256 WORDS. PARITY ERROR SHOULD OCCUR. IF NO
                                ;                  ERROR OCCURS, TYPE OUT THE CORRECT PARITY AND THE INCORRECT
                                ;                  PARITY WRITTEN, TO INDICATE THE BIT FAILING TO CAUSE ERROR.
                                ;               7. REPEAT STEPS 2 THROUGH 6 FOR EACH PARITY BIT.
010020  004767  176362          LA:     JSR     PC,BINFL0       ;BINARY FILL WBUF0.
010024  004567  000042                  JSR     R5,LSUBA        ;RUN TEST.
010030  000040                          BIT5
010032  004567  000034                  JSR     R5,LSUBA        ;RUN TEST.
010036  000020                          BIT4
010040  004567  000026                  JSR     R5,LSUBA        ;RUN TEST.
010044  000010                          BIT3
010046  004567  000020                  JSR     R5,LSUBA        ;RUN TEST.
010052  000004                          BIT2
010054  004567  000012                  JSR     R5,LSUBA        ;RUN TEST.
010060  000002                          BIT1
010062  004567  000004                  JSR     R5,LSUBA        ;RUN TEST.
010066  000001                          BIT0
010070  104000                          SCOPE                   ;SCOPE.
010072  016767  171012  170760  LSUBA:  MOV     BLKNUM,BLKRQ
010100  004567  175324                  JSR     R5,PARITY       ;COMPUTE PARITY FOR WBUF0.
010104  011276                          WBUF0
010106  015411                          EWBUF0
010110  042567  170764                  BIC     (5)+,LPBT       ;CLEAR SPECIFIED BIT FROM CALCULATED PARITY.
010114  016767  170760  170760          MOV     LPBT,LPB
010122  004567  175460                  JSR     R5,XPARTY
010126  016767  170750  002142          MOV     LPB,FWCKS0      ;MOVE BAD PARITY TO WBUF0.
010134  116767  170744  005647          MOVB    ELPB,EWFCK0
010142  104045                          WALLF                   ;WRITE ALL FWD 258. WORDS STARTING
010144  000402                          258.                    ;FROM ADDR RWCKS0 . EXTENDED DATA BITS ARE
010146  011274                          RWCKS0                  ;TAKEN FROM CONSECUTIVE BYTES STARTING
010150  015410                          EWRCK0                  ;AT ADDRESS EWRCK0 .
010152  104047                          RALLF                   ;READ ALL FWD 258. WORDS INTO
010154  000402                          258.                    ;ADDR RRCKS0 AND UP. EXTENDED DATA BITS
010156  013344                          RRCKS0                  ;ARE STORED IN CONSECUTIVE BYTES STARTING
010160  016434                          ERRCK0                  ;AT ADDRESS ERRCK0 .
010162  104041                          ADTCK                   ;CALL ADTCK SUB TO CHECK 18 BIT DATA STARTING
010164  011274                          RWCKS0                  ;AT ADDR RWCKS0 AND EWRCK0 , AGAINST 18 BIT DATA
010166  013344                          RRCKS0                  ;STARTING AT ADDR RRCKS0 AND ERRCK0 . FIFTH ARGUMENT
010170  015410                          EWRCK0                  ;REPRESENTS # OF 18 BIT ELEMENTS TO CHECK.
010172  016434                          ERRCK0                  ;REPORT ERRORS.
010174  000402                          258.
010176  104033                          RDATFS                  ;CALL RDATFS SUB TO READ DATA FWD 256. WORDS
010200  000400                          256.                    ;AND STORE AT ADDR STARTING AT RBUF0 .
010202  013346                          RBUF0                   ;ALLOW PARITY ERROR.
010204  032777  040000  170572          BIT     #BIT14,@TCST    ;PARITY ERROR?
010212  001013                          BNE     LSUBBA          ;BR IF PARITY ERROR SET.
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 1976  010214  104012                          OACNV                   ;NO. ERROR. CONVERT INCORRECT PARITY TO ASCII.
 1977  010216  001100                          LPBT
 1978  010220  011204                          ABPAR
 1979  010222  000002                          2
 1980  010224  104012                          OACNV                   ;CONVERT GOOD PARITY TO ASCII.
 1981  010226  001076                          LPBG
 1982  010230  011174                          AGPAR
 1983  010232  000002                          2
 1984  010234  104011                          ERRORN                  ;FAILURE TO DETECT PARITY ERROR.
 1985  010236  011153                          NPARE
 1986  010240  177777                          -1
 1987  010242  000205              LSUBBA:     RTS     R5              ;EXIT.
 1988
 1989  010244  022445  020124      EMO:        .ASCII  '%%T '
 1990  010250  020040  020040  050040 ATNUMB:  .ASCII  '     PC '
 1991  010256  020103
 1992  010260  020040  020040  020040 APC:     .ASCII  '        ICNT '
 1993  010266  020040  041511  052116
 1994  010274     040
 1995  010275     040  020040  020040 AICNT:   .ASCII  '     .'
 1996  010302     056
 1997  010303     040  052440  044516          .ASCII  '  UNIT '
 1998  010310  020124
 1999  010312  000040              AUNIT:      .ASCIZ  ' '
 2000  010314  022445  047111  040526 AINCRT:  .ASCIZ  '%%INVALID TEST'
 2001  010322  044514  020104  042524
 2002  010330  052123     000
 2003  010333     045  052045  032103 PGTIT:   .ASCIZ  '%%TC4 - TC11 TEST 4%%'
 2004  010340  026440  052040  030503
 2005  010346  020061  042524  052123
 2006  010354  032040  022445     000
 2007  010361     045  052123  047101 INST1:   .ASCII  '%STANDARD TAPES ON UNITS'
 2008  010366  040504  042122  052040
 2009  010374  050101  051505  047440
 2010  010402  020116  047125  052111
 2011  010410     123
 2012  010411     045  042522  047515          .ASCII  '%REMOTE, WRITE ENABLE'
 2013  010416  042524  020054  051127
 2014  010424  052111  020105  047105
 2015  010432  041101  042514
 2016  010436  053445  046101  051514          .ASCII  '%WALLSW: ON, WRTMSW: OFF'
 2017  010444  035127  047440  026116
 2018  010452  053440  052122  051515
 2019  010460  035127  047440  043106
 2020  010466  051445  046105  041505          .ASCII  '%SELECT UNITS WITH SR7 - SR0. '
 2021  010474  020124  047125  052111
 2022  010502  020123  044527  044124
 2023  010510  051440  033522  026440
 2024  010516  051440  030122  020056
 2025  010524  051120  051505  020123          .ASCIZ  'PRESS CONT.%'
 2026  010532  047503  052116  022456
 2027  010540     000
 2028  010541     045  042523  020124 ASETSR:  .ASCIZ  '%SET SR OPTIONS. NORMAL SR=0'
 2029  010546  051123  047440  052120
 2030  010554  047511  051516  020056
 2031  010562  047516  046522  046101
```

```
 2032  010570  051440  036522  000060
 2033  010576     007                    APGEND: .BYTE   007
 2034  010577     045  000052                    .ASCIZ  '%*'
 2035  010602  052040  053503  020103    CTCWC:  .ASCII  ' TCWC '
 2036  010610  020040  020040  020040    ATCWC:  .ASCIZ  '      '
 2037  010616     000
 2038  010617     040  041524  040502    CTCBA:  .ASCII  ' TCBA '
 2039  010624     040
 2040  010625     040  020040  020040    ATCBA:  .ASCIZ  '      '
 2041  010632  000040
 2042  010634  052040  041503  020115    STAT:   .ASCII  ' TCCM '
 2043  010642  020040  020040  020040    ATCCM:  .ASCII  '       TCST '
 2044  010650  052040  051503  020124
 2045  010656  020040  020040  020040    ATCST:  .ASCIZ  '      '
 2046  010664     000
 2047  010665     040  047516  042040    INTFAI: .ASCIZ  ' NO DT INTRPT '
 2048  010672  020124  047111  051124
 2049  010700  052120  000040
 2050
 2051  010704  042040  020124  051105    DTERR:  .ASCIZ  ' DT ERR '
 2052  010712  020122     000
 2053  010715     040  046102  051113    BLKSB:  .ASCII  ' BLKRQ '
 2054  010722  020121
 2055  010724  020040  020040  020040    ABLKRQ: .ASCIZ  '      '
 2056  010732     000
 2057  010733     124  053503  020103    WCNOTO: .ASCIZ  'TCWC NOT 0 '
 2058  010740  047516  020124  020060
 2059  010746     000
 2060  010747     124  041103  020101    INCTCB: .ASCIZ  'TCBA WRONG '
 2061  010754  051127  047117  020107
 2062  010762     000
 2063  010763     040  041524  040502    TCBASB: .ASCII  ' TCBA '
 2064  010770     040
 2065  010771     040  020040  020040    ATCBAS: .ASCIZ  '       '
 2066  010776  020040  000040
 2067  011002  042040  052101  020101    DATERR: .ASCII  ' DATA ERR  WORD '
 2068  011010  051105  020122  053440
 2069  011016  051117  020104
 2070  011022  020040  020040  020056    AWDCNT: .ASCII  '    .  S/B '
 2071  011030  051440  041057     040
 2072  011035     040  020040  020040    ADATSB: .ASCII  '       WAS '
 2073  011042  020040  053440  051501
 2074  011050     040
 2075  011051     040  020040  020040    ADATWS: .ASCIZ  '      '
 2076  011056  000040
 2077  011060  047045  020117  047125    NOUNIT: .ASCIZ  '%NO UNITS AVAILABLE.'
 2078  011066  052111  020123  053101
 2079  011074  044501  040514  046102
 2080  011102  027105     000
 2081  011105     122  054504  042457    STCMSG: .ASCIZ  'RDY/ERR NOT 0 AFTER DO'
 2082  011112  051122  047040  052117
 2083  011120  030040  040440  052106
 2084  011126  051105  042040  000117
 2085  011134  041040  045514  047040    SRCHER: .ASCIZ  ' BLK NOT FOUND'
 2086  011142  052117  043040  052517
 2087  011150  042116     000
```

```
 011153     045  047516  050040  NPARE:  .ASCII  '%NO PAR ERR GOOD '
 011160  051101  042440  051122
 011166  043440  047517  020104
 011174  020040  020040  040502  AGPAR:  .ASCII  '    BAD '
 011202  020104
 011204  020040     000          ABPAR:  .ASCIZ  '  '
 011207     040  043040  041520  FPCMSG: .ASCII  '  FPC '
 011214     040
 011215     040  020040  020040  AFPC:   .ASCIZ  '       %'
 011222  020040  000045
 011226  053445  046111  020114  GOOD:   .ASCIZ  '%WILL TEST UNITS: '
 011234  042524  052123  052440
 011242  044516  051524  020072
 011250     000
 011251     040  000054          GTAPES: .ASCIZ  ' ,'
 011254     060     061     062  GTAB:   .BYTE   '0,'1,'2,'3,'4,'5,'6,'7
 011257     063     064     065
 011262     066     067
                                         .EVEN

 011264  000000                  AWBUF0: OPEN                       ;WRITE BUFFER 0
 011266  000000                  WFBLK0: OPEN
 011270  000000                          OPEN
 011272  000000                          OPEN
 011274  000000                  RWCKS0: OPEN
 011276  000000                  WBUF0:  OPEN
         012276                          .=.+510.
 012276  000000                  FWCKS0: OPEN
 012300  000000                          OPEN
 012302  000000                          OPEN
 012304  000000                  WRBLK0: OPEN
 012306  000000                          OPEN
 012310  000000                  AWBUF1: OPEN                       ;WRITE BUFFER 1
 012312  000000                  WFBLK1: OPEN
 012314  000000                          OPEN
 012316  000000                          OPEN
 012320  000000                  RWCKS1: OPEN
 012322  000000                  WBUF1:  OPEN
         013322                          .=.+510.
 013322  000000                  FWCKS1: OPEN
 013324  000000                          OPEN
 013326  000000                          OPEN
 013330  000000                  WRBLK1: OPEN
 013332  000000                          OPEN
 013334  000000                  ARBUF0: OPEN                       ;READ BUFFER 0
 013336  000000                  RFBLK0: OPEN
 013340  000000                          OPEN
 013342  000000                          OPEN
 013344  000000                  RRCKS0: OPEN
 013346  000000                  RBUF0:  OPEN
         014346                          .=.+510.
 014346  000000                  FRCKS0: OPEN
 014350  000000                          OPEN
 014352  000000                          OPEN
 014354  000000                  RRBLK0: OPEN
 014356  000000                          OPEN
```

```
2144  014360  000000                  ARBUF1: OPEN                    ;READ BUFFER 1
2145  014362  000000                  RFBLK1: OPEN
2146  014364  000000                          OPEN
2147  014366  000000                          OPEN
2148  014370  000000                  RRCKS1: OPEN
2149  014372  000000                  RBUF1:  OPEN
2150          015372                          .=.+510.
2151  015372  000000                  FRCKS1: OPEN
2152  015374  000000                          OPEN
2153  015376  000000                          OPEN
2154  015400  000000                  RRBLK1: OPEN
2155  015402  000000                          OPEN
2156  015404     000                  EAWBF0: .BYTE   OPEN            ;EXTENDED WRITE BUFFER 0
2157  015405     000     000     000  EWFBK0: .BYTE   OPEN,OPEN,OPEN
2158  015410     000                  EWRCK0: .BYTE   OPEN
2159  015411     000                  EWBUF0: .BYTE   OPEN
2160          016011                          .=.+255.
2161  016011     000     000     000  EWFCK0: .BYTE   OPEN,OPEN,OPEN
2162  016014     000     000          EWRBK0: .BYTE   OPEN,OPEN
2163  016016     000                  EAWBF1: .BYTE   OPEN            ;EXTENDED WRITE BUFFER 1
2164  016017     000     000     000  EWFBK1: .BYTE   OPEN,OPEN,OPEN
2165  016022     000                  EWRCK1: .BYTE   OPEN
2166  016023     000                  EWBUF1: .BYTE   OPEN
2167          016423                          .=.+255.
2168  016423     000     000     000  EWFCK1: .BYTE   OPEN,OPEN,OPEN
2169  016426     000     000          EWRBK1: .BYTE   OPEN,OPEN
2170  016430     000     000     000  EARBF0: .BYTE   OPEN,OPEN,OPEN,OPEN     ;EXTENDED READ BUFFER 0
2171  016433     000
2172  016434     000                  ERRCK0: .BYTE   OPEN
2173  016435     000                  ERBUF0: .BYTE   OPEN
2174          017035                          .=.+255.
2175  017035     000     000     000  ERFCK0: .BYTE   OPEN,OPEN,OPEN,OPEN,OPEN
2176  017040     000     000
2177  017042     000     000     000  EARBF1: .BYTE   OPEN,OPEN,OPEN,OPEN     ;EXTENDED READ BUFFER 1
2178  017045     000
2179  017046     000                  ERRCK1: .BYTE   OPEN
2180  017047     000                  ERBUF1: .BYTE   OPEN
2181          017447                          .=.+255.
2182  017447     000     000     000  ERFCK1: .BYTE   OPEN,OPEN,OPEN,OPEN,OPEN
2183  017452     000     000
2184                                  ;
2185          000001                          .END
```

```
A       = 100000            448#
ABLKRQ    010724            825     2055#
ABPAR     011204           1978     2093#
ACTDAT    003602           1034#    1059*   1066    1077*   1079*   1093
ADATCI    003606            563     1037#
ADATCK    003616            562     1038    1039#
ADATSB    011035           1082     1086    2072#
ADATWS    011051           1090     1094    2075#
ADTCK   = 104041            563#    1631    1779    1819    1908    1965
ADTCKI= 104042              564#    1657    1698    1745    1889
AFPC      011215            802     2096#
AGPAR     011174           1982     2091#
AICNT     010275            817     1995#
AINCRT    010314            660     2000#
ALLPAR    001112            527#     647*   1001*   1005    1256*
APC       010260            809     1992#
APGEND    010576            685     2033#
ARBUF0    013334           1533     1817    1821    2132#
ARBUF1    014360           2144#
ASETSR    010541            639     2028#
ASR2      005654           1378     1408#
ASR6      005644           1382     1404#
ATCBA     010625            841     2040#
ATCBAS    010771           1157     2065#
ATCCM     010642            833     2043#
ATCST     010656            829     2045#
ATCWC     010610            837     2036#
ATNUMB    010250            813     1990#
AUNIT     010312            821     1999#
AWBUF0    011264           1526     1540    1691    1804    1810    1820    1879    1898    2108#
AWBUF1    012310           1550     2120#
AWDCNT    011022           1072     2070#
B       = 040000            449#
BACTDT    003600           1033#    1057*   1063*   1065*   1068    1078*   1089
BDCNV   = 104013            541#     815    1070
BDCNVA    003220            939#     949
BDCNVB    003222            940#     943
BDCNVC    003232            941      944#
BDCNVD    003256            953#     955
BDCNVV    003200            540      934#
BELL    = 000007            443#
BEXPDT    003574           1031#    1056*   1062*   1064*   1068    1075*   1081
BINFIL= 104036              560#    1545    1555
BINFLA    004224           1132#    1136
BINFLB    004226           1133#    1134
BINFLL    004216            559     1129#
BINFLO    006406           1466     1539#   1676    1719    1764    1799    1842    1934
BINFL1    006432           1480     1549#   1765    1800
BITCOM    005662           1380     1384    1387    1411#
BIT0    = 000001            421#     480     979    1609    1946
BIT1    = 000002            420#     473     475     477     479    1609    1944
BIT10   = 002000            411#     467     468     469     470     676
BIT11   = 004000            410#     461     483     613     672    1198    1204    1210    1218    1220    1222
BIT12   = 010000            409#     460     482     613
BIT13   = 020000            408#     450     459     844
BIT14   = 040000            407#     449     668    1007    1974
```

```
BIT15 = 100000          405     406*    448     601     977
BIT2  = 000004          419*    474     475     478     479     1609    1942
BIT3  = 000010          418*    476     477     478     479     1609    1940
BIT4  = 000020          417*    1609    1938
BIT5  = 000040          416*    1609    1936
BIT6  = 000100          415*    471     1609
BIT7  = 000200          414*    481     601     977     1609
BIT8  = 000400          413*    464     466     468     470
BIT9  = 001000          412*    465     466     469     470     651     680
BLKNUM  001110          526*    1467    1624    1650    1677    1720    1766    1801    1948
BLKRQ   001060          514*    824     1195    1201    1207    1467*   1481*   1509    1510    1511    1512    1624*   1650*
                        1677*   1720*   1766*   1801*   1807*   1843*   1846*   1847*   1855*   1856*   1867*   1868*   1883*
                        1884*   1902*   1903*   1948*
BLKSB   010715          1014    1098    1229    2053*
BMOVA   003166          928*    930
BMOVE = 104014          542*
BMOVV   003156          541     924*
BRVRSA  006554          1578*   1580    1589*
BRVRSB  006555          1579*   1581    1590*
C     = 020000          450*
CA      006654          1616    1623*
CHAINN  001674          529     663*
CHALT = 104015          543*    635     640     661
CHLT    002426          542     788*
CHNA    001732          669     672*
CHNAA   001750          673     676*
CHNAB   001724          670*    675
CHNAC   001714          666     668*
CHNB    001766          677     680*
CHNC    002012          612     686*    692
CKERRZ= 104023          549*    1192    1257    1305    1346
CKERZ   003454          548     995*
CKERZA  003466          999*    1004    1008
CKERZB  003470          1000*   1016
CKERZC  003500          997     1003*
CKERZD  003524          1006    1009*
CKINDA  003604          1035*   1037*   1039*   1042*   1044*   1104
CKINDB  003605          1036*   1040*   1045*   1049    1060    1106    1111
CKWCBA= 104034          558*    1260
CLEAR = 104035          559*    1532    1535    1539    1542    1549    1552
CLEARR  004176          558     1120*
CLRRBF  006370          1532*   1626    1652
COMND   001070          518*    973*    974*    975*    976     979
CPENA   001476          620*    623*    629*    631
CPENB   001520          624     629*
CRALL   005316          1326    1329*
CRALLA  005336          1325*   1328*   1335*
CRALLB  005350          1324*   1327*   1338*
CRALLC  005360          1336    1342*
CRALLD  005404          1345    1349*
CRALLE  005412          1350    1352*
CRALLF  005420          1353*
CTCBA   010617          1150    1163    2038*
CTCWC   010602          1149    1164    2035*
CTRA    001044          508*    621*    630*
CURTST  001042          507*    654     699*
```

DZTCDC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
CWALL   005142          1285    1288#
CWALLA  005162          1284*   1287*   1294#
CWALLB  005174          1283*   1286*   1297#
CWALLC  005204          1295    1301#
CWALLD  005230          1304    1308#
CWALLE  005236          1309    1311#
CWALLF  005254          1314#
CWCBA   004244           557    1141#
CWCBB   004300          1145    1153#
CWCBC   004340          1154    1167#
DA      006734          1642    1649#
DATCHK= 104037           561#   1686    1737    1872
DATCK   003642           560    1043    1044#
DATCKA  003672          1050    1053#
DATCKB  003712          1056#   1116
DATCKC  003764          1061    1066#
DATCKD  004004          1067    1070#
DATCKE  004124          1069    1103#
DATCKF  004152          1105    1111#
DATCKG  004164          1110    1115#
DATCKH  004172          1102    1117#
DATCKI= 104040           562#   1474    1488    1860
DATCKK  003652          1041    1046#
DATERR  011002          1099    2067#
DATKNT  003566          1028#   1054*   1071    1103*
DECVAL  003302           936     963#
DELAY = 104400           487#   1184    1249    1298    1339
DINH  = 010000           460#
DIRIND  004665          1171*   1173*   1212    1215    1235#
DLY     002756           396     877     879#
DLYA    002764           878     880#    884
DLYB    002772           881#    882
DLYRO = 002762           877#    883*
DLYR1 = 002770           878#    881*
DO    = 000001           480#    599     1181    1264    1266    1269    1271    1275    1283    1286    1324    1327
DTCKI   003632           561    1042#
DTERR   010704          1012    2051#
DTRMN   001304           584#    607
DTRMNA  001406           588     605#    614     617
DTRMNB  001430           591     595     600     604     613#
DTRMNC  001454           609     618#
EARBF0  016430          1536    1818    1823    2170#
EARBF1  017042          2177#
EAWBF0  015404          1527    1543    1692    1805    1811    1822    1880    1899    2156#
EAWBF1  016016          1553    2163#
EHALT = 104016           544#    851
EHLT    002440           543     794#
EHLTA   002450           795     797#
ELPB    001104           524#   1366*   1398*   1503    1508    1956
EMTINT  002110           394     704#
EMTTAB  001114           528#    708
EMTV    000030           394#
EMTX  = 000053           484#    530#    531#    532#    533#    534#    535#    536#    537#    538#    539#    540#    541#
                         542#    543#    544#    545#    546#    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#
```

```
EMO     010244          843    1989#
ERBUF0  016435         1635    2173#
ERBUF1  017047         2180#
ERFCK0  017035         1661    1702    1749    1893    2175#
ERFCK1  017447         2182#
ERRB    002634          805*    806*    808     843*    847#    848*    849
ERRCK0  016434         1630    1656    1697    1744    1778    1783    1888    1907    1912    1964    1969    2172#
ERRCK1  017046         2179#
ERRCTR  003570         1029#   1055*   1101*
ERRLIM  001106          525#   1055
ERRN    002452          538     798#
ERRNA   002622          844#    850
ERRNB   002636          845     848#
ERRNC   002652          851#
ERRND   002630          581*    641*    845#
ERRORN= 104011          539#    983     1010    1020    1096    1146    1159    1227    1984
EWBUF0  015411         1501    1634    1660    1951    2159#
EWBUF1  016023         1506    2166#
EWFBK0  015405         2157#
EWFBK1  016017         2164#
EWFCK0  016011         1503*   1956*   2161#
EWFCK1  016423         1508*   2168#
EWRBK0  016014         1517    2162#
EWRBK1  016426         1521    2169#
EWRCK0  015410         1682    1701    1724    1729    1735    1748    1771    1782    1851    1892    1911    1960    1968
                       2158#
EWRCK1  016022         2165#
EXPDAT  003576         1032#   1058*   1066    1074*   1076*   1085
FORWD   002042          650     694#
FORWDA  002066          699#
FPC     001074          520#    799*    801
FPCMSG  011207          984     1011    1021    1097    1147    1160    1228    2094#
FRCKS0  014346         1659    1700    1747    1891    2139#
FRCKS1  015372         2151#
FWCKS0  012276         1502*   1955*   2115#
FWCKS1  013322         1507*   2127#
FWD   = 000000          462#    599     1264    1266    1275    1283    1324
GA      007014         1668    1676#
GETBN1= 104044          566#    1132
GETRDY  001560          491     632     641#    662     681     693
GOOD    011226          619    2098#
GORUN   001636          653#    656
GTAB    011254          626    2103#
GTAPES  011251          626*    628    2102#
GTBIN1  003042          565     895#
GTRDYA  001622          650#    658
GTRDYB  001626          651#
GTRDYC  001644          652     655#
GTRDYD  001654          657#
GTRDYX  001574          643#    683
HA      007130         1709    1719#
HERE    002040          687     693#
I     = 000040          446#
IA      007256         1756    1764#
ICNT    001030          502#    665*    667*    700*    816
ICTR    001026          501#    674*    697*
```

```
IE     = 000100          471*   1181   1264   1266   1269   1271   1275   1283   1286   1311   1324   1327
ILO    = 010000          482*
INBIN  = 104043          565*    646
INBINN   003010          564     887*
INCTCB   010747         1161    2060*
INSTI    010361          634    2007*
INTFAI   010665         1022    2047*
IOTV     000020          390*
JA       007354         1790    1799*
KA       007470         1830    1842*
KB       007516         1847*   1853
KC       007550         1856*   1865
KD       007612         1868*   1877
KE       007666         1884*   1896
KF       007750         1903*   1915
KSTART   001032          503*    642
LA       010020         1921    1934*
LOGIC    002022          689*
LPB      001102          523*   1365*  1391*  1392*  1393   1394   1395*  1397*  1411   1412   1416*  1417*  1502
                        1507   1953*  1955
LPBG     001076          521*   1394*  1981
LPBT     001100          522*   1393*  1952*  1953   1977
LPBY     005730         1411*   1414*  1416   1419*
LPBZ     005732         1412*   1413*  1415*  1417   1420*
LSUBA    010072         1935    1937   1939   1941   1943   1945   1948*
LSUBBA   010242         1975    1987*
MACHER   000004          384*
MAINT  = 020000          459*
MANUAL = 100000          405*
NOINT  = 104024          550*   1185   1250   1299   1340
NOINTR   003544          549    1018*
NOP    = 000240          403*    690    716
NOUNIT   011060          611    2077*
NPARE    011153         1985    2088*
NXTST    001040          506*    642*   657    682    694    696*
OACNV  = 104012          540*    800    807    811    819    823    827    831    835    839   1080   1084   1088
                        1092   1155   1976   1980
OACNVA   003120          911*    920
OACNVV   003106          539     906*
OBVA     005746         1430*   1456
OBVB     005772         1438*   1464
OBVCNT   006050         1429*   1455*  1459*
OBVCTR   006052         1430*   1451*  1460*
OBVERS   005734         1426*   1515   1519   1525   1690   1733   1878   1897
OPEN   = 000000          404*    501    502    504    505    506    507    508    509    510    511    512    513
                         514    515    516    517    518    519    520    521    522    523    524    527    587
                         623    847    891    892    893   1028   1029   1030   1031   1032   1033   1034   1035
                        1036   1133   1234   1235   1245   1248   1261   1294   1297   1335   1338   1402   1403
                        1419   1420   1459   1460   1493   1530   1589   1590   1591   1596   2108   2109   2110
                        2111   2112   2113   2115   2116   2117   2118   2119   2120   2121   2122   2123   2124
                        2125   2127   2128   2129   2130   2131   2132   2133   2134   2135   2136   2137   2139
                        2140   2141   2142   2143   2144   2145   2146   2147   2148   2149   2151   2152   2153
                        2154   2155   2156   2157   2158   2159   2161   2162   2163   2164   2165   2166   2168
                        2169   2170   2172   2173   2175   2177   2179   2180   2182
PARCTR   005642         1369*   1388*  1396*  1399*  1403*
PARITY   005430         1364*   1499   1504   1949
```

```
PARTYA  005454          1370#  1389
PARTYB  005620          1397#  1400
PC    =%000007           430#   689*  1378*  1380*  1382*  1384*  1387*  1410*  1418*  1466*  1480*  1492*  1529*
                        1538*  1548*  1558*  1623*  1625*  1626*  1651*  1652*  1676*  1678*  1719*  1721*  1764*
                        1765*  1767*  1799*  1800*  1802*  1842*  1844*  1934*
PGTIT   010333           577   2003#
POPSP = 005726           433#
POPSP2= 022626           434#    735    746    766   1189   1252   1253   1314   1315   1353   1354
PRTY0 = 000000           397     442#
PRTY1 = 000040           441#
PRTY2 = 000100           440#
PRTY3 = 000140           439#
PRTY4 = 000200           438#
PRTY5 = 000240           437#
PRTY6 = 000300           436#    498
PRTY7 = 000340           389     391    395    435#   643
PSW   = 177776           401#    643*
PT0     003036           888*    892#   895    900*
PT1     003040           889*    893#   895*   896*   899*   900    902
PUSH  = 005746           431#
PUSH2 = 024646           432#    728    760
PWORD   005640          1370*   1371   1381   1385   1402#
RALL  = 000006           475#   1324   1327
RALLF = 104047           569#   1627   1741   1775   1904   1961
RALLFF  005264           568    1324#
RALLR = 104050           570#   1653   1694   1815   1885
RALLRR  005302           569    1327#
RBUF0   013346          1473    1476   1633   1685   1688   1732   1739   1774   1814   1859   1862   1871   1874
                        1973    2137#
RBUF1   014372          1487    1490   2149#
RDATA = 000004           474#   1266   1271   1275
RDATAF= 104031           555#   1683   1772   1869
RDATAR= 104032           556#   1471   1485   1730   1812   1857
RDATF   005020           554    1265   1266#
RDATFS= 104033           557#   1971
RDATR   005046           555    1270   1271#
RDTFSS  005064           556    1274#
REV   = 004000           461#    590   1176   1177   1179   1269   1271   1286   1327
REVCNT  004664          1175*   1223*  1234#
REVERS  006456          1565#   1722   1803
RFBLK0  013336          2133#
RFBLK1  014362          2145#
RIND    003034           887*    888    889    891#   897*
RNUM  = 000002           473#    590   1181   1352
RRBLK0  014354          2142#
RRBLK1  015400          2154#
RRCKS0  013344          1629    1655   1696   1743   1777   1781   1887   1906   1910   1963   1967   2136#
RRCKS1  014370          2148#
RST03 = 104003           533#   1390   1457   1586
RST05 = 104005           535#
RST05S= 104007           537#    777    791    861    921    931    956   1117   1126   1137   1316   1355   1607
RST5S = 000004           486#    852    903   1000   1025   1167   1262
RS03    002230           532     735#
RS05    002260           534     746#
RS05S   002254           536     744#
RS5S    002340           390     765#
```

DZTCDC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
RTNNO   001036          505#    575*    655     678     695*    701     812
RVERSA  006500         1574#   1585
RVRSA   006554         1574*   1576    1588#
RVRSB   006556         1575*   1577    1591#
RWCKS0  011274         1681    1699    1723    1728    1734    1746    1770    1780    1850    1890    1909    1959    1966
                       2112#
RWCKS1  012320         2124#
RWFBKA  006070         1463    1466#
RWFBKE  006170         1479    1492#
RWFBK1  006054         1462#   1623    1649
RWFBK2  006062         1465#
RWFIND  006172         1462*   1465*   1478    1493#
R0      =%000000        422#    583*    606*    625*    678*    686*    704     705*    706*    707*    708*    709*    727
                        736*    747*    780     781*    782*    783     785*    789*    856*    907*    911     915*    916*
                        917*    918*    936*   1047*   1121*   1130*   1291*   1308*   1332*   1349*   1367*   1427*   1566*
                       1572    1584    1601*   1604    1605    1845*   1852*   1854*   1864*   1866*   1876*   1882*   1895*
                       1901*   1914*
R1      =%000001        423#    615*    726     737*    748*    774*    857*    859*    863     867     871*    873*    908*
                        910*    925*    935*    940*    944*    950*    952*   1048*   1122*   1124*   1131*   1135*   1292*
                       1333*   1371*   1374*   1376*   1377*   1379*   1381*   1383*   1385*   1386*   1404*   1405*   1406*
                       1407*   1408*   1409*   1414    1415    1428*   1454*   1567*   1573
R2      =%000002        424#    725     738*    749*    909*    910     919*    926*    937*    951*    952     954*   1051*
                       1293*   1334*   1368*   1431*   1433*   1438*   1440*   1442*   1568*   1569*   1570    1571*   1572*
                       1584
R3      =%000003        425#    724     739*    750*    911*    912*    913*    914     927*    929*    938*    948*   1052*
                       1372*   1373*   1375*   1432*   1434*   1437*   1439*   1441*   1445*   1448*   1570*   1573*
R4      =%000004        426#    723     731*    751*    759     762*    767*    789     799     939*    942*    945*    946
R5      =%000005        427#    694*    699     722     730*    731     744     752*    758     761*    762     765     768*
                        805    1401*   1458*   1499*   1504*   1515*   1519*   1525*   1587*   1649*   1690*   1722*   1733*
                       1803*   1878*   1897*   1935*   1937*   1939*   1941*   1943*   1945*   1949*   1954*   1987*
R6      =%000006        428#    574*    644*    664*
R7      =%000007        429#    650*    702*    860*    865*    870*    872*    874*
SAT     = 000000        472#
SAV03 = 104002          532#   1364    1426    1565
SAV05 = 104004          534#
SAV05S= 104006          536#    773     788     855     906     924     934    1046    1120    1129    1288    1329    1600
SAV5S = 000003          485#    804     901     981     995    1018    1141    1226    1238
SCOPE = 104000          530#    988    1152    1166    1186    1193    1233    1251    1258    1300    1306    1341    1347
                       1637    1663    1704    1751    1785    1825    1916    1947
SCOPTR  001034          504#    671     698*
SELDRA  006630         1603    1607#
SELDRR  006602          571    1600#
SELDRV= 104052          572#    586     622     1595
SELE    = 004000        483#
SEQDRV= 104051          571#    653     670
SETCOM= 104020          546#    589     598    1180    1247    1296    1337
SETIND  006366         1496*   1498*   1523    1530#
SETWBA  006210         1497    1499#
SETWBF  006174         1496#   1625    1678    1767    1844
SETWBR  006202         1498#   1651    1721    1802
SPBOT = 001000          402#    574     644     664
SQDRV   006560          570    1593#   1597
SQDRVA  006574         1593*   1594*   1596#
SQDRV1  001320          584*    585*    587#    615
SR      = 177570        400#    636     651     655     668     672     676     680     701*    794     844
SRCCON  004426         1183#   1199    1203    1205    1209    1213    1216    1224
```

DZTCDC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
SRCF    004556          1196    1210#
SRCHA   004360          1172    1174#
SRCHAA  004420          1178    1180#
SRCHB   004432          1182    1184#
SRCHC   004440          1174    1187#
SRCHD   004446          1187    1189#
SRCHDA  004464          1191    1195#
SRCHE   004526          1197    1204#
SRCHER  011134          1230    2085#
SRCHF =  104025           551#  1267    1276    1284    1325
SRCHFF  004344           550    1171#
SRCHG   004576          1211    1215#
SRCHM   004422          1176*   1179*   1181#
SRCHR =  104026           552#  1272    1287    1328
SRCHRR  004352           551    1173#
SRCREV  004606          1194    1218#
SRCRVA  004616          1202    1220#
SRCRVB  004626          1208    1219    1222#
SRCRVC  004634          1221    1223#
SRESET=  104001           531#   645
SRSETT  002404           530     780#    783*
SST    =  000010          476#
START   001242           489     574#
STAT    010634           986    1013    1023    1231    2042#
STATS   003310           546     966#
STATUS=  104021           547#    982    1009    1019    1143    1225
STCMSG  011105           985    2081#
STCOM   003350           545     973#
STCOMB  003436           978     980     989#
STOPDT=  104022           548#    605     663     798
STPDT   003444           547     992#
STRTA   001534           579     633#    637
STTCV   002364           544     773#
STWBE   006364          1524    1529#
SVECTR=  104017           545#    648
SV03    002130           531     711#
SV05    002160           533     719#
SV05A   002166           717     720#
SV05B   002202           714     724#
SV05C   002214           713*    716*    719*    729#
SV05S   002150           535     716#
SV5S    002310           388     756#
TCBA    001012           495#    596*    970    1153    1243*   1244    1290*   1331*
TCBASB  010763          1162    2063#
TCBAT   001056           513#    840     970*
TCCM    001006           493#    592     601     603     967     976*    977     992*    996    1177    1183*   1190    1198
                        1204    1210    1218    1220*   1222*   1254    1303    1311*   1344    1352*
TCCMT   001046           509#    832     967*
TCDT    001014           496#    969    1195    1200*   1201    1206*   1207    1302*   1343
TCDTT   001052           511#    969*
TCLVL   001020           498#    776
TCST    001004           492#    594     613     966     1003    1007    1301*   1312    1342    1974
TCSTT   001050           510#    828     966*
TCVTR   001016           497#    774    1174*   1246*   1295*   1336*
TCWC    001010           494#    597*    968    1144    1239*   1240    1242*   1289*   1330*
TCWCT   001054           512#    836     968*
```

```
TEMP    001072          519#   1142*   1153    1156
TENPWR  003270          937     958#
TLAST = 177777          444#   1919
TPB     001024          500#    867*
TPS     001022          499#    868
TRC   = 000003          445#
TRCV    000014          388#
TRPV    000034          396#
TYP     002660          537     855#
TYPA    002664          857#    866     875
TYPC    002704          858     863#
TYPD    002720          860     865     867#    872     874
TYPE  = 104010          538#    576     610     618     627     633     638     659     684     846
TYPF    002734          864     871#
TYPG    002744          873#
TO      006644          503    1613#
T1      006724         1614    1639#
T2      007004         1640    1665#
T3      007120         1666    1706#
T4      007246         1707    1753#
T5      007344         1754    1787#
T6      007460         1788    1827#
T7      010010         1828    1918#
UNIT    001062          515#    974    1605*
UNITN   001064          516#    625     820    1604*
UNITS   001066          517#    582*    608     616*    636*    691    1602
UNTAB   006634          616    1602    1609#
UPS   = 000200          481#
U0    = 000000          463#
U1    = 000400          464#
U2    = 001000          465#
U3    = 001400          466#
U4    = 002000          467#
U5    = 002400          468#
U6    = 003000          469#
U7    = 003400          470#
V0    = 000000          451#
V1    = 000004          452#
V2    = 000010          453#
V3    = 000014          454#
V4    = 000020          455#
V5    = 000024          456#
V6    = 000030          457#
V7    = 000034          458#
WALL  = 000016          479#   1283    1286
WALLF = 104045          567#   1679    1768    1848    1957
WALLFF  005110          566    1283#
WALLR = 104046          568#   1726    1808
WALLRR  005126          567    1286#
WBUF0   011276          596    1470    1475    1500    1546    1632    1658    1687    1738    1861    1873    1950    2113#
WBUF1   012322         1484    1489    1505    1556    2125#
WCNOTO  010733         1148    2057#
WDATA = 000014          478#    599    1264    1269
WDATAF= 104027          553#   1468    1482
WDATAR= 104030          554#
WDATF   005010          552    1264#
```

DZTCDC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
WDATR   005036           553    1269#
WFBLKO  011266          1509*   2109#
WFBLK1  012312          1510*   1513*   2121#
WRBLKO  012304          1511*   1516    2118#
WRBLK1  013330          1512*   1514*   1520    2130#
WRDCNT  003572          1030#   1053*   1115*
WRDFR   004666          1237#   1268    1273
WRDFRA  004732          1245#   1267*   1272*   1276*
WRDFRB  004744          1248#   1264*   1266*   1269*   1271*   1275*
WRDFRC  004754          1246    1252#
WRDFRD  004756          1253#
WRDFRE  005004          1262#
WRDFRF  005000          1255    1260#
WRDFRG  005002          1240*   1241*   1244*   1261#
WRDFRN  004674          1238#   1277
WRDFRZ  004766          1237*   1256#   1274*
WRTM    = 000012         477#
X       = 000007         447#   1612    1617#   1638    1643#   1664    1669#   1705    1710#   1752    1757#   1786    1791#
                        1826    1831#   1917    1922#
XPARTY  005606          1395#   1954
.       = 017454         381#    382     384     386     392     399     488#    490#    593     602     869     898     1107
                        1112    1125    2114#   2126#   2138#   2150#   2160#   2167#   2174#   2181#
```

```
ACKDT     381#  1631  1779  1819  1908  1965
ACKDTI    381#  1657  1698  1745  1889
CKDT      381#  1686  1737  1872
CKDTI     381#  1474  1488  1860
EMTDEF    381#   529   530   531   532   533   534   535   536   537   538   539   540   541   542
          543    544   545   546   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
RALF      381#  1627  1741  1775  1904  1961
RALR      381#  1653  1694  1815  1885
RDTF      381#  1683  1772  1869
RDTFS     381#  1971
RDTR      381#  1471  1485  1730  1812  1857
TSTA      381#  1612  1638  1664  1705  1752  1786  1826
TSTAA     381#  1612  1638  1664  1705  1752  1786  1826  1917
WALF      381#  1679  1768  1848  1957
WALR      381#  1726  1808
WDTF      381#  1458  1482
WDTR      381#
```

ADD	910	913	944	945	952	989	1200	1244	1572	1573	1868	1903			
ASL	707	1241	1397	1571											
ASR	1404	1405	1406	1407	1408	1409									
BCS	941														
BEQ	579	602	614	637	656	669	677	687	692	864	978	980	1006	1050	1061
	1069	1102	1105	1107	1112	1145	1154	1196	1199	1216	1219	1309	1313	1350	1479
	1524	1603													
BGT	1197														
BHI	1585														
BIC	585	912	915	992	1064	1065	1179	1220	1311	1379	1383	1386	1392	1414	1415
	1416	1594	1952												
BICB	616														
BIS	975	1176	1222	1417											
BIT	601	613	651	668	672	676	680	844	977	979	1007	1177	1198	1204	1210
	1218	1312	1974												
BITB	1602														
BLE	1208														
BLOS	1202														
BMI	604	997	1004												
BNE	607	609	631	652	658	666	673	675	681	683	845	850	858	882	884
	898	920	930	949	955	1008	1067	1116	1125	1136	1178	1205	1211	1213	1224
	1389	1400	1452	1456	1853	1865	1877	1896	1915	1975					
BPL	593	595	795	869	1191	1255	1304	1345							
BR	588	591	600	612	617	624	632	662	693	714	717	866	875	943	1016
	1038	1041	1043	1110	1172	1182	1194	1203	1209	1221	1265	1268	1270	1273	1277
	1285	1326	1463	1497	1597										
CLR	575	647	939	973	1001	1056	1057	1123	1256	1289	1290	1330	1331	1365	1366
	1435	1462	1496	1843											
CLRB	1039	1044	1045	1171	1436										
CMP	657	682	849	1066	1068	1109	1114	1153	1195	1201	1207	1584			
CMPB	655	863	1108	1113											
COM	667	782	896	897	1391	1413	1433	1434							
DEC	606	630	674	881	883	919	929	948	954	1101	1115	1124	1135	1308	1349
	1388	1399	1451	1455	1569	1852	1864	1876	1895	1914					
DECB	1223														
EMT	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544
	545	546	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		
HALT	383	385	387	393	399	679	790	796							
INC	584	629	665	899	942	1103	1183	1454	1481	1513	1514	1593	1807	1847	
JMP	489	491	654	671											
JSR	650	689	860	865	872	874	1378	1380	1382	1384	1387	1466	1480	1499	1504
	1515	1519	1525	1623	1625	1626	1649	1651	1652	1676	1678	1690	1719	1721	1722
	1733	1764	1765	1767	1799	1800	1802	1803	1842	1844	1878	1897	1934	1935	1937
	1939	1941	1943	1945	1949	1954									
MOV	574	581	583	596	597	615	620	621	625	641	642	643	644	664	678
	686	694	695	696	697	698	699	700	701	704	705	706	708	711	712
	713	716	719	720	721	722	723	724	725	726	727	730	731	736	737
	738	739	740	741	744	747	748	749	750	751	752	753	754	756	757
	758	759	761	762	765	767	768	769	770	774	775	776	780	781	783
	785	789	799	805	843	848	856	879	880	887	888	889	895	900	902
	907	908	909	911	925	926	927	935	936	937	938	950	951	966	967
	968	969	970	974	976	1047	1048	1051	1052	1053	1054	1055	1058	1059	1121
	1122	1130	1131	1134	1142	1174	1187	1237	1239	1240	1243	1246	1264	1266	1267
	1269	1271	1272	1274	1275	1276	1283	1284	1286	1287	1291	1292	1293	1295	1302
	1324	1325	1327	1328	1332	1333	1334	1336	1343	1367	1368	1369	1370	1371	1381

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            1385  1393  1394  1396  1411  1412  1427  1428  1429  1430  1431  1465  1467  1498  1502
            1507  1509  1510  1511  1512  1566  1567  1568  1570  1574  1575  1576  1577  1601  1604
            1624  1650  1677  1720  1766  1801  1845  1846  1854  1855  1866  1867  1882  1883  1901
            1902  1948  1953  1955
MOVB         582   626   636   857   859   867   871   873   914   928   946   953  1037  1040  1042
            1062  1063  1173  1175  1301  1342  1352  1372  1432  1503  1508  1578  1579  1580  1581
            1605  1956
NEG         1242
NOP         1259  1307  1348
RESET        688   784
ROL         1074  1075  1077  1078  1398  1443  1445  1446  1448  1449
ROLB        1444  1447  1450
ROR          916   917   918  1076  1079  1373  1374  1375  1376  1437  1438  1439  1440  1441  1442
RTI          713   719   729   733   742   755   764   771   778   786   792   797   853   862   885
             890   904   922   932   957   971   990   993  1002  1026  1118  1127  1138  1168  1188
            1214  1217  1263  1310  1317  1351  1356  1598  1608
RTS          702   709   870  1401  1410  1418  1458  1492  1529  1538  1548  1558  1587  1987
SUB          806   940  1206  1856  1884
SWAB        1377  1395
TRAP         487
TST          578   592   594   603   732   763   794   947   996   998   999  1003  1005  1144  1190
            1254  1303  1344  1453  1478  1523  1582  1606
TSTB         608   691   868  1049  1060  1104  1106  1111  1212  1215  1583
.ABS         379
.ASCII      1989  1990  1992  1995  1997  2007  2012  2016  2020  2035  2038  2042  2043  2053  2063
            2067  2070  2072  2088  2091  2094
.ASCIZ      1999  2000  2003  2025  2028  2034  2036  2040  2045  2047  2051  2055  2057  2060  2065
            2075  2077  2081  2085  2093  2096  2098  2102
.BYTE        963  1035  1036  1234  1235  1589  1590  1609  2033  2103  2156  2157  2158  2159  2161
            2162  2163  2164  2165  2166  2168  2169  2170  2172  2173  2175  2177  2179  2180  2182
.END        2185
.EVEN       2106
.LIST          1   377   399   530   531   532   533   534   535   536   537   538   539   540   541
             542   543   544   545   546   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  1617  1643  1669  1710  1757  1791  1831  1922
.MACR        381
.NLIST         1   378   399   530   531   532   533   534   535   536   537   538   539   540   541
             542   543   544   545   546   547   548   549   550   551   552   553   554   555   556
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             572  1617  1643  1669  1710  1757  1791  1831  1922
.PAGE       1318  1612  1664  1705  1752
.REM           1
.REPT        399
.TITLE         1
.WORD        529   530   531   532   533   534   535   536   537   538   539   540   541   542   543
             544   545   546   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   690


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*DZTCDC,DZTCDC.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZTCDC.P11
```

RUN-TIME: 8 15 4 SECONDS
RUN-TIME RATIO: 78/28=2.7
CORE USED: 10K (20 PAGES)

G05

Spooler runtime 9 Seconds, 39 KCS, 235 disk reads, 4 disk writes, 57 pages