RS03-L* RH11-RS03/RS04 BFT AH-9315H-MC FEB 1981
RS04-A*,RH11 CZRSBHO FICHE 1 OF 1 COPYRIGHT@ 73-80
MADE IN USA

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                                .REM    @

                                                IDENTIFICATION
                                                --------------

                                        PRODUCT CODE:           AC-9314H-MC

                                        PRODUCT NAME:           CZRSBH0 RH11-RS03/RS04 BFT

                                        PRODUCT DATE:           OCT 1980

                                        MAINTAINER:             DIAGNOSTIC ENGINEERING


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CONTENTS

1. ABSTRACT

THIS DIAGNOSTIC WAS DESIGNED TO TEST RS03,RS03/LA AND RS04 DRIVES.

THIS IS A BASIC FUNCTION DIAGNOSTIC WHICH IS USED TO VERIFY THAT THE (RH11) CONTROLLER AND THE (RS03,RS03/LA OR RS04) DISKS ARE OPERATING CORRECTLY. THIS IS NOT A RELIABILITY DIAGNOSTIC AND THEREFORE SHOULD NOT BE USED AS ONE. THIS PROGRAM CAN TEST UP TO 8 DRIVES. THE DRIVES CAN BE INTERMIXED AND IN ANY ORDER.

IF THE OPERATOR WOULD LIKE TO CHECK THE DISK REGISTERS PRIOR TO ENTERING THIS DIAGNOSTIC, THERE ARE SOME ROUTINES IN THE BACK OF THE DIAGNOSTIC WHICH CAN BE USED. THESE ROUTINES WILL ALLOW THE OPERATOR TO LOAD THE REGISTERS THROUGH THE SWITCHES. PLEASE REFERENCE THE STARTING ADDRESSES THAT WILL TEST THE REGISTERS YOU DESIRE.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP11 STANDARD COMPUTER WITH A MINIMUM OK 8K OF MEMORY, AND AN RH11 CONTROLLER WITH A RS03, RS03/LA OR RS04 DISK.

2.3 PRELIMINARY PROGRAMS

NONE

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR ABS TAPES.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5.1.1 (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

1. STARTING ADDRESS 200.

   A. SET SWITCHES (SEE SEC 5.1.1) ALL DOWN FOR WORST CASE. IF SWITCHLESS CPU, SIMPLY
   B. PRESS START.
   C. THE PROGRAM WILL LOOP AND BELL WILL RING ONCE EVERY PASS
   D. THE DISPLAY ON THE 11/45 WILL SHOW THE ITERATION COUNT IN THE LEFT BYTE AND TEST NUMBER IN THE RIGHT. TO USE, SET THE DATA DISPLAY SWITCH TO THE DISPLAY POSITION.
   E. THE PROGRAM WILL TEST ALL RS03, RS03/LA AND RS04 DISKS.

2. STARTING ADDRESSES FOR TESTING THE RH11-RS03/LA/04 REGISTERS USING THE SWITCH REGISTER. ON SWITCH-LESS MACHINES THESE ROUTINES ARE USEFULL FOR SCOPING. SIMPLY STRIKE ^G ANYTIME AFTER PRESSING START TO ENTER OR CHANGE VALUE DESIRED.

   A. 250 WORD COUNT REGISTER TEST
   B. 254 BUS ADDRESS REG. TEST
   C. 260 DISK ADDRESS REG. TEST
   D. 264 DRIVE STATUS REG. TEST
   E. 270 ERROR REG. TEST
   F. 274 LOOK AHEAD REG. TEST
   G. 300 RSCS2 REG. TEST
   H. 304 ATTENTION SUMMARY REG. TEST
   I. 310 MAINTENANCE REG. TEST
   J. 314 RSCS1 REG TEST

5. OPERATIONAL SWITCH SETTINGS

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC.176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(I.E.) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> IF NO CHANGES ARE TO BE MADE.

2. 6 DIGITS 0-7 TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE; LAST DIGIT FOLLOWED BY <CR>.

3. ^U TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ^G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

SWITCH SETTINGS ARE:

```
SW<15> = 1 ..... HALT ON ERROR
SW<14> = 1 ..... LOOP ON TEST
SW<13> = 1 ..... INHIBIT TYPEOUTS
SW<12> = 1 ..... INHIBIT OBUFSV FROM CHANGING WHEN LOOKING
                 FOR MEMORY ON -B- PORT
SW<11> = 1 ..... INHIBIT ITERATIONS OF SUBTEST
SW<10> = 1 ..... BELL ON ERROR
           0 ..... BELL ON PASS COMPLETE
SW<09> - 1 ..... LOOP ON ERROR
SW<08> = 1 ..... LOOP ON TEST IN SW<7:0>
```

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED IN LOCATION 'LAD''. IF A SCOPE LOOP IS REQUESTED, THE CURRENT SUBTEST WILL BE LOOPED UPON. SW<11> ON A 1 INHIBITS ITERATION OF SUBTESTS. THE CONTENTS OF LAD MAY BE USED TO DETERMINE THE LAST SUBTEST SUCCESSFULLY COMPLETED.

5.2.2 HLT

THIS ROUTINE PRINTS OUT AN ERROR MESSAGE (SEE 6.1). TO INHIBIT TYPEOUTS, PUT SW<13> ON A 1.

5.2.3 TRAPCATCHER

A ''.+2'' - 'HALT'' SEQUENCE IS REPEATED FROM 0 - 776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERUPTS WILL HALT AT THE VECTOR + 2.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

```
ADR   CS1 = ----- CS2 = ----- ER = -----
GOOD      = ----- BAD = -----

WHERE:

 CS1,CS2,ER ETC.        = RS11 DISK REGISTERS.
 GOOD                   = EXPECTED DATA.
 BAD                    = DATA RECEIVED.
```

TO FIND THE FAILING TEST, LOOK AT THE LISTING ABOVE THE ADDRESS TYPED.

6.2 ERROR RECOVERY

RESTART AT 200

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

A BELL WILL RING WITHIN 1 MINUTE WITH ALL SWITCHES DOWN.

8.2 STACK POINTER

STACK IS INITALLY SET TO 500

9. WRITE LOCK TEST

THE WRITE LOCK TEST REQUIRES OPERATOR INTERVENTION. THE STARTING ADDRESS FOR THIS TEST IS 220. THE PROGRAM WILL TELL THE OPERATOR WHICH SWITCHES HAVE TO BE SET.

10. TEST DESCRIPTION

1. TEST RSCS2

   CLEAR ALL READ/WRITE BITS AND CHECK. SET ALL R/W BITS AND CHECK. NOW CLEAR AND RECHECK.

2. TEST FOR ONLINE DRIVES

   SET ERROR BITS IN RSER. THIS CAUSES ATTENTION SUMMARY BITS TO SET IN RSAS. DO FOR ALL DRIVES. RSAS HAS NOT YET BEEN TESTED. SO IN THE CASE OF NO BITS IN RSAS SETTING, DRIVE 0 IS TESTED.

3. RESET TEST FOR REGISTERS

   SET ALL R/W BITS IN RSCS1, RSCS2, RSBA, RSDA, RSER, RSWC, RSDB, AND RSMR. DO A RESET AND TEST ALL R/W BITS TO BE CLEARED.

4. SET AND CLEAR ALL REGISTERS

   SET ALL R/W BITS IN RSCS1, RSCS2, RSBA, RSDA, RSER, RSWC, RSDB AND RSMR AND TEST. SET ALTERNATE BITS AND CHECK TO MAKE SURE BITS ARE NOT TIED TOGETHER. NOW SET ALL BITS AND CLEAR THEM TO MAKE SURE ALL CAN BE CLEARED ONCE SET.

5. RANDOM NUMBER TEST FOR RSWC AND RSDA

   THIS TEST GENERATES RANDOM NUMBERS AND LOADS THEM INTO RSWC, RSDA AND RSBA.

6. TEST "CLEAR BIT" IN RSCS2

   SET ALL R/W BITS IN RSCS1, RSCS2, RSBA, RSDA, RSER, RSWC RSDB, AND RSMR. SET CLEAR BIT IN RSCS2. NOW TEST ALL R/W BITS FOR 0 IN ALL THE ABOVE REGISTERS.

7. TEST DLT AND TRE BITS

   DO A READ FROM THE SILO. THIS SHOULD CAUSE A DLT AND A TRE ERROR BECAUSE THE SILO IS EMPTY.

8. CLEAR DLT AND TRE

   CLEAR BY SETTING TRE IN RSCS1 AND TEST.

9. LOAD RSDB WITH ALL ONES AND ALL ZEROS

   LOAD RSDB WITH A WORD OF ZEROS AND A WORD OF ONES. WAIT FOR "OR" TO SET AND THEN CHECK OUTPUT OF SILO. IF OR DID NOT SET ERROR MESSAGE APPEARS.

10. TEST FOR 66 LOCATIONS IN SILO

    THIS IS DONE BY PUTTING A BINARY COUNT IN EVERY LOCATION AND

```
                                        CHECKING THE OUTPUT FOR 66 WORDS.

                                    11. TEST DLT ERROR

                                        THIS IS DONE BY LOADING THE SILO WITH 67 WORDS WITHOUT
                                        READING ANY OUT.  THIS SHOULD CAUSE DLT TO SET.

                                    12. FLOAT A "1" AND A "0" THROUGH THE SILO

                                        LOAD THE SILO WITH A WORD OF ZEROS AND FLOAT A "1" THROUGH
                                        THE WORD.  THEN LOAD THE SILO WITH A WORD OF ALL ONES AND
                                        FLOAT A "0" THROUGH THE WORD.  CHECK THE OUTPUT OF THE SILO
                                        FOR THE CORRECT ANSWER.

                                    13. TEST NO-OP FUNCTION

                                        THE NO-OP FUNCTION IS TESTED WITH AND WITHOUT ERROR BITS SET.
                                        ALL THE REGISTERS ARE CHECKED AFTER BOTH CASES.

                                    14. TEST DRIVE CLEAR FUNCTION

                                        FIRST SET ALL R/W BITS IN RSDA, RSWC, RSER, AND RSMR.  DO A
                                        DRIVE CLEAR FUNCTION.  NOW TEST ALL REGISTERS FOR CORRECT
                                        DATA.

                                    15. EXECUTE A ONE WORD WRITE FUNCTION

                                        SET RSWC TO -1.  MOV -1 INTO OUTBUF.  LOAD RSBA WITH OUTBUF.
                                        DO A WRITE TEST RDY BIT FOR 0 THEN WAIT FOR IT TO SET.  TIME
                                        OUT TO ERROR IF RDY BIT DOESN'T SET AND CHECK FOR ERROR
                                        CONDITIONS.  TEST RSDA FOR CORRECT ADDRESS.  TEST WORD COUNT
                                        FOR 0.  THIS IS TESTED ON -A- AND -B- PORT.

                                    16. EXECUTE A ONE WORD WRITE CHECK

                                        SET UP RSDA, RSBA, RSWC AND OUTBUF AS IN THE WRITE FUNCTION
                                        TEST.  DO A WRITE CHECK FUNCTION.  TEST RDY AS DONE IN THE
                                        WRITE TEST.  CHECK FOR WRITE CHECK ERROR.  THEN TEST RSDA,
                                        RSWC AND RSBA FOR CORRECT DATA.  THIS IS TESTED ON -A- AND
                                        -B- PORT.

                                    17. TEST READ FUNCTION

                                        SETUP RSDA, RSBA, RSWC AND OUTBUF AS IN THE WRITE FUNCTION DO
                                        A READ FUNCTION.  TEST RDY BIT AS DONE IN THE WRITE FUNCTION.
                                        TEST FOR ERRORS.  ALSO TEST RSDA, RSWC AND RSBA FOR CORRECT
                                        DATA.  THIS IS TESTED ON -A- AND -B- PORT.

                                    18. TEST BLOCK SEARCH FUNCTION, PIP AND DRY BITS AND ADDR. CONF.
                                        BIT

                                        DO A BLOCK SEARCH FOR SECTOR 32, LOOP ON ADDR. CONF. BIT IN
                                        RSMR.  IF IT DOESN'T SET, TIMEOUT.  WHEN YOU GET THERE DO A
                                        BLOCK SEARCH FOR SECTOR 0.  NOW WE KNOW THAT WE HAVE TIME TO
```

TEST FOR DRY AND PIP BITS BEFORE FINDING SECTOR 0. FOR PIP SHOULD SET AND DRY SHOULD CLEAR BEFORE FINDING SECTOR 0. ONCE SECTOR 0 IS FOUND PIP SHOULD CLEAR AND DRY SHOULD SET. IF DRY DOES NOT SET A TIME OUT ERROR WILL OCCUR INDICATING SECTOR 0 WAS NOT FOUND. SC IN RSCS1 SHOULD ALSO SET. RSBA AND RSWC SHOULD NOT MOVE, THIS IS ALSO TESTED.

19. ILLEGAL FUNCTION CODE TEST

IN THIS TEST RSBA, RSWC AND RSDA ARE SET UP AS IF TO DO A LEGAL FUNCTION. AN ILLEGAL FUNCTION IS THEN EXECUTED. THE PROGRAM TEST FOR ILF AND ERR BITS TO SET. RSBA, RSWC AND RSDA ARE ALSO TESTED FOR CORRECT DATA. THIS IS DONE FOR ALL THE ILLEGAL FUNCTIONS.

FOR AN AID IN TROUBLE SHOOTING THE ILLEGAL FUNCTION CODE CAN BE LOADED INTO LOCATION ILLTAB OR ILFTB2, DEPENDING ON WHICH ILLEGAL FUNCTION TEST YOU WISH TO LOOP ON. IN THE NEXT LOCATION, FOLLOWING THE ILLEGAL FUNCTION, A 0 MUST BE LOADED. NOW BY SETTING SWITCH 14 (LOOP ON TEST), YOU WILL LOOP ON THE ILLEGAL FUNCTION.

20. TEST PAR IN RSER

SET PAR IN RSER AND CHECK. ALSO TEST ERR IN RSDS TO SET BECAUSE OF THE PAR SETTING.

21. TEST DPR AND MOL IN RSDS

BOTH THESE BITS SHOULD BE SET IN RSDS IF THE DRIVE IS ON LINE AND UP TO SPEED.

22. LOOK AHEAD TEST

FIRST CHECK TO SEE IF SECTOR FRACTION BITS ARE MOVING. NOW SET RSDA TO 0 AND INCREMENT IT EVERY TIME THE ADDR.CONF BIT SETS. IF THE ADDR.CONF BIT DOES NOT SET IN A CERTAIN LENGTH OF TIME, A TIME OUT ERROR OCCURS.

23. PARITY TEST

THIS WILL TEST THE PARITY LOGIC ONLY IF THERE IS PARITY MEMORY ON THE SYSTEM IN LESS THAN 28K. IT WILL WRITE BAD PARITY IN A MEMORY LOCATION THEN TRY TO DO A WRITE TO THE DRIVE FROM THAT LOCATION. THIS SHOULD CAUSE A PARITY ERROR.

24. TEST WRITE CHECK ERROR

IN THIS TEST THE PROGRAM WRITES A -1 ON TO THE DISK. A 0 IS NOW FLOATED THROUGH THE WORD IN THE BUS ADDRESS LOCATION, AND A WRITE CHECK FUNCTION IS DONE. THE WCE BIT IN RSCS2 SHOULD SET AND SHOULD CAUSE THE TRE BIT IN RSCS1 TO SET. THESE BITS ARE THEN CLEARED. A WORD OF 0 IS NOW WRITTEN ON THE DISK AND A 1 IS FLOATED THROUGH THE WORD IN THE BUS ADDRESS AND THE

WRITE CHECK FUNCTION TEST IS REPEATED.

25. TEST PROGRAM ERROR BIT IN RSCS2

HERE THE PROGRAM ATTEMPTS TO INITIATE A DATA TRANSFER OPERATION WHILE THE CONTROL IS CURRENTLY PERFORMING ONE. THIS SHOULD CAUSE PGE TO SET WHICH SHOULD CAUSE TRE TO SET. THESE BITS ARE THEN CLEARED. RSWC IS ALSO TESTED FOR IT SHOULD NOT BE 0 FOR THE CURRENT OPERATION SHOULD HAVE BEEN ABORTED DUE TO THE PGE ERROR.

26. TEST RMR IN RSER

HERE A WRITE COMMAND IS GIVEN AND DURING ITS EXECUTION THE PROGRAM TRYS TO MODIFY THE RSDA REG. THIS SHOULD CAUSE THE RMR BIT TO SET WHICH CAUSES THE ERR BIT TO SET. THESE BITS ARE THEN CLEARED.

27. TEST DCK IN RSER

HERE A WRITE COMMAND IS GIVEN THEN DURING THIS FUNCTION A DRIVE CLEAR COMMAND IS GIVEN. THIS SHOULD CAUSE THE DCK BIT TO SET WHICH SHOULD CAUSE THE ERR BIT TO SET. THESE BITS ARE THEN CLEARED.

28. TEST DISK ADDRESS REGISTER

LOAD THE LAST DISK ADDRESS (7777) INTO RSDA. DO A ONE WORD WRITE AND CHECK THAT RSDA INCREMENTED TO 10000.

29. TEST IAE ERROR

DO A ONE WORD WRITE BUT FIRST SET RSDA TO AN INVALID ADDRESS SUCH AS 10000. THIS SHOULD CAUSE A IAE ERROR WHICH WILL CAUSE ERR, ATA AND SC BITS TO SET. THESE BITS ARE THEN CLEARED BY LOADING A 1 INTO ATA IN RSAS.

30. TEST FOR NON-EXISTENT DISK ERROR

FIRST FIND A DRIVE THAT IS NOT ON THE SYSTEM OR OFF LINE. NOW TRY TO DO A ONE WORD WRITE TO THAT DRIVE. NED IN RSCS2 SHOULD SET WHICH SHOULD CAUSE TRE TO SET. THESE BITS ARE THEN CLEARED BY MOVING A 1 INTO TRE.

31. TEST DAO IN RSER AND LBT IN RSDS

SET RSDA TO ITS LAST ADDRESS. NOW WRITE ONE SECTOR PLUS ONE WORD. DAO SHOULD SET AND LBT SHOULD SET. THESE SHOULD CAUSE ERR, ATA, TRE AND SC TO SET. THESE ARE CLEARED BY DOING A CLEAR.

32. TEST BAI IN RSCS2

SET BAI IN RSCS2. DO A ONE WORD WRITE AND CHECK RSBA TO SEE

```
520
521
522                                   IF IT INCREMENTED.
523
524                                33.  TEST NON-EXISTENT MEMORY ERROR BIT IN RSCS2
525
526                                     SET BITS A16 AND A17 IN RSCS1 FOR AN  18  BIT  ADDRESS.   MOV
527                                     173000  INTO  RSBA.   MOV  -1000  INTO  RSWC  AND  DO A WRITE
528                                     FUNCTION.  THE NEM BIT SHOULD SET AND  SHOULD  CAUSE  TRE  TO
529                                     SET.  CLEAR THESE BITS BY LOADING A 1 INTO TRE.
530
531                                34.  TEST FOR ZERO'S IN A PARTIALLY FILLED SECTOR
532
533                                     FIRST WRITE A COMPLETE SECTOR WITH ALL ONES.  THEN DO  A  ONE
534                                     WORD  WRITE.   THE  REMAINING  63  WORDS SHOULD BE WRITTEN AS
535                                     ZERO'S.  NOW DO A WRITE CHECK TO COMPARE FOR THESE ZERO'S.
536
537                                35.  PRIORITY INTERRUPT TEST
538
539                                     HERE THE PROGRAM ENABLES THE INTERRUPT AND DOES  A  ONE  WORD
540                                     WRITE  FUNCTION.   THE  PROGRAM  SHOULD  NOT  TRAP  UNTIL THE
541                                     PROCESSOR IS DROPPED TO PRIORITY 4.
542
543                                36.  DYNAMIC FUNCTION TEST
544
545                                     WHILE ONE DRIVE IS READING, THE UNIT # IN RSCS2 IS  MODIFIED.
546                                     IF  THERE  IS  ANOTHER DRIVE ON THE SYSTEM, A DRIVE SEARCH IS
547                                     PERFORMED ON IT.  THIS IS ALL DONE WHILE THE FIRST  DRIVE  IS
548                                     STILL READING.
549                                                    ECO SECTION
550                                CHGH0 - A CHANGE TO TEST 67 (PARITY ERROR TEST) WAS MADE TO MAKE
551                                        THE TEST DO THE INIENDED FUNCTION.  IT HAD BEEN SKIPPING
552                                        THE TEST DUE TO INCORRECT SETUP PROCEDURE.
553                                @
554
555                                .TITLE  CZRSBH0 RH11-RS03/04 BFT
556                                ;COPYRIGHT 1973,1980 DIGITAL EQUIPMENT CORP.,MAYNARD,MASS.
557                                ;PROGRAM BY STANLEY HARACKIEWICZ
558
559
560                                ;          SWITCH                    USE
561                                ;          ------                    ------------------
562          100000                        SW15=    100000           ;HALT ON ERROR
563          040000                        SW14=    40000            ;LOOP ON TEST
564          020000                        SW13=    20000            ;INHIBIT ERROR TYPEOUTS
565          010000                        SW12=    10000            ;INHIBIT OBUFSV FROM CHANGING FOR -B- PORT ONLY
566          004000                        SW11=    4000             ;INHIBIT ITERATIONS
567          002000                        SW10=    2000             ;0 - BELL ON PASS COMPLETE
568                                                                   ;1 - BELL ON ERROR
569          001000                        SW9=     1000             ;LOOP ON ERROR
570          000400                        SW8=     400              ;LOOP ON TEST IN SW<7:0>
571          000000                .=       0                        ;TRAP CATCHER FROM 0 - 776
572          000046                .=       46                       ;HOOKS FOR ACT 11
573  000046  022172                $ENDAD
574          000052                .=       52
575  000052  040000                BIT14
```

```
                        000174                  .=      174                     ;SOFTWARE SWITCK REGISTER LOCATION
000174  000000                                DISPREG:0
000176  000000                                SWREG:  0

                        000200                  .=      200
000200  000137  000230                          JMP     @#STRT

                        000220                  .=      220
000220  000137  024520                          JMP     @#WRTLCK        ;WRITE LOCK TEST

                        000230                  .=      230
000230  042737  004000  001160          STRT:   BIC     #BIT11,ONCEE    ;CLEAR TKSEL TEST FLAG
000236  000137  001204                          JMP     @#BEGIN         ;STARTING ADDRESS IS BEGIN

                                        ;STARTING ADDRESSES  FOR SWITCH REGISTER TESTING OF RH-RS REGISTERS

                        000250                  .=      250
000250  000137  023632                          JMP     @#SRSWC         ;WORD COUNT REG
000254  000137  023656                          JMP     @#SRSBA         ;BUS ADDR REG
000260  000137  023702                          JMP     @#SRSDA         ;DISK ADDR REG
000264  000137  023726                          JMP     @#SRSDS         ;DRIVE STATUS REG
000270  000137  023752                          JMP     @#SRSER         ;ERROR REG
000274  000137  023776                          JMP     @#SRSLA         ;LOOK AHEAD REG
000300  000137  024006                          JMP     @#SRCS2         ;CS2 REG
000304  000137  024032                          JMP     @#SRAS          ;ATTENTION SUMMARY REG
000310  000137  024056                          JMP     @#RSMRR         ;MAINTENANCE REG
000314  000137  024102                          JMP     @#SRSCS1        ;CS1 REG

                        000320                  .=      320
000320  052737  004000  001160                  BIS     #BIT11,ONCEE    ;SET TKSEL TEST FLAG
000326  000137  001204                          JMP     @#BEGIN         ;ENABLES OPERATOR TO DO A
                                                                        ;WRITE OR READ TO A DESIRED ADDR
                                                                        ;OPTIONAL WC, DA, AND UNIT #
```

```
        000001                  N=      1               ;INITALIZE FOR NEWTST
        104000                  HLT=    EMT             ;SET HLT TO EMT FOR ERROR TYPEOUTS
        177776                  PS=     177776          ;PROCESSOR STATUS
        177776                  PSW=    PS              ;PROCESSOR STATUS WORD
        000007                  BELL=   7               ;BELL
        000000                  R0=     %0              ;R0 - DEFINE REGISTERS
        000001                  R1=     %1              ;R1
        000002                  R2=     %2              ;R2
        000003                  R3=     %3              ;R3
        000004                  R4=     %4              ;R4
        000005                  R5=     %5              ;R5
        000006                  SP=     %6              ;R6 - STACK POINTER
        000007                  PC=     %7              ;R7 - PROGRAM COUNTER
        000001                  BIT0=   1               ;BIT EQUATES
        000002                  BIT1=   2
        000004                  BIT2=   4
        000010                  BIT3=   10
        000020                  BIT4=   20
        000040                  BIT5=   40
        000100                  BIT6=   100
        000200                  BIT7=   200
        000400                  BIT8=   400
        001000                  BIT9=   1000
        002000                  BIT10=  2000
        004000                  BIT11=  4000
        010000                  BIT12=  10000
        020000                  BIT13=  20000
        040000                  BIT14=  40000
        100000                  BIT15=  100000
        000001          GOOD=   %1                      ;FOR GOOD DATA
        000000          BAD=    %0                      ;FOR BAD DATA
```

```
                    001000                  .=      1000
                                            
001000  000000              ICNT:   0               ;LH = ITERATION COUNT  ;RH = TEST NO.
001002  000000              ERRORS: 0               ;ERROR COUNT
001004  000000  000000      PCNT:   0,0             ;2 WORD PASS COUNT
001010  000000              LAD:    0               ;LOOP ADDRESS FOR SCOPE
001012  000000              HLTADR: 0               ;ADDRESS OF LAST HLT INSTRUCTION  EXECUTED
001014  001000              FILCHR: 1000            ;FILCHR=0 (CHAR)  ;FILCHR+1=2 (COUNT)
001016  177564              TPS:    177564          ;OUTPUT STATUS REGISTER
001020  177560              TKS:    177560
001022  177562              TKB:    177562
001024  177566              TPB:    177566          ;OUTPUT BUFFER
001026  177570              SWR:    177570          ;SWITCH REGISTER
001030  177570              DISPLAY:177570          ;DISPLAY REGISTER
                                            
                    001100          .=      1100
001100  000000              SAVBAD: 0               ;LOC FOR ILLEGAL FUNCTION CODE
001102  000000              OBUFSV: 0               ;LOC OF OUTBUF
                                            
                                            ;DISK I/O REGISTERS
                                            
001104  172040              RSCS1:  172040          ;DISK CONTROL + STATUS REGISTER
001106  172050              RSCS2:  172050          ;DISK CONTROL + STATUS REGISTER
001110  172042              RSWC:   172042          ;WORD COUNT REGISTER
001112  172044              RSBA:   172044          ;BUS ADDRESS
001114  172046              RSDA:   172046          ;DISK ADDRESS (DESIRED ADDRESS)
001116  172052              RSDS:   172052          ;DRIVE STATUS
001120  172054              RSER:   172054          ;ERROR REG.
001122  172056              RSAS:   172056          ;ATTENTION SUMMARY
001124  172060              RSLA:   172060          ;LOOK AHEAD
001126  172062              RSDB:   172062          ;DATA BUFFER REGISTER
001130  172064              RSMR:   172064          ;MAINTENANCE REGISTER
001132  172066              RSDT:   172066          ;DRIVE TYPE REGISTER
001134  000204              RSVEC:  204             ;INTERUPT VECTOR
001136  000206              RSVCPS: 206             ;INTERRUPT PRIO. VECTOR
001140  172041              RSCS1B: 172041          ;ODD BYTE ADD FOR CS1
001142  172051              RSCS2B: 172051          ;ODD BYTE ADD FOR CS2
001144  172043              RSWCB:  172043          ;ODD BYTE ADD FOR CW
001146  172045              RSBAB:  172045          ;ODD BYTE ADD FOR BA
                                            
                                            ;MEMORY MANAGEMENT REGISTER ASSIGNMENTS
                                            
                    177572          SR0=177572
                    172340          KIPAR0=172340
                    172342          KIPAR1=172342
                    172344          KIPAR2=172344
                    172356          KIPAR7=172356
                    172300          KIPDR0=172300
                    172302          KIPDR1=172302
                    172304          KIPDR2=172304
                    172316          KIPDR7=172316
                    000006          RW=6
                    000000          UP=00
                                            
```

```
                        ;BIT ASSIGNMENTS FOR ERROR TYPEOUTS
                        ;THE RS REGISTERS ARE DIVIDED INTO 3 GROUPS.
                        ;CS1,CS2 AND ER ARE IN THE FIRST GROUP.THIS GROUP IS ALWAYS
                        ;TYPED WITH EITHER OF THE OTHER GROUPS. AS,BA,DA, WC AND DS
                        ;ARE IN THE SECOND GROUP. DT,DB,MR, AND LA ARE IN THE 3RD
                        ;GROUP.YOU CAN NOT INTERMIX GROUP 2 OR 3. THEY HAVE
                        ;TO BE TYPED SEPERATELY.
                        ;EXAMPLE:   HLT !CS1,AS,BA
                        ;           HLT !CS1!DT!DB

000001                      CS1=1           ;CONTROL AND STATUS 1
000002                      ER=2            ;CONTROL AND STATUS 2
000004                      DA=4            ;DESIRED ADD
000010                      WC=10           ;WORD COUNT
000020                      BA=20           ;BUS ADDRESS
000040                      DS=40           ;DRIVE STATUS
000100                      AS=100          ;ATTENTION SUMMARY
000200                      CS2=200         ;CONTROL AND STATUS REG
000204                      LA=204          ;LOOK AHEAD
000210                      DB=210          ;DATA BUFFER
000220                      MR=220          ;MAINTENANCE
000240                      DT=240          ;DRIVE TYPE

                        ;BIT ASSIGNMENTS FOR THE REGISTER BITS

040000                      TRE=40000       ;TRANSFER ERROR CS1
100000                      SC=100000       ;SPECIAL CONDITIONS CS1
000100                      IR=100          ;INPUT READY CS2
000200                      OR=200          ;OUTPUT READY CS2
002000                      PGE=2000        ;PROGRAM ERROR-CS2
010000                      NED=10000       ;NON-EXISTENT DRIVE CS2
040000                      WCE=40000       ;WRITE CHECK ERROR-CS2
100000                      DLT=100000      ;DATA LATE ERROR CS2
000200                      DRY=200         ;DRIVE READY DS
020000                      PIP=20000       ;POSITIONING IN PROGRESS DS
002000                      LBT=2000        ;LAST BLOCK TRANSFER-DS
040000                      ERR=40000       ;ERROR DS
100000                      ATA=100000      ;ATTENTION ACTIVE-DS
001000                      DAO=1000        ;DISK OVERFLOW ERROR-ER
100000                      DCK=100000      ;DATA CHECK ERROR-ER
000010                      BAI=10          ;BUS ADDR INCREMENT INHIBIT
000100                      IE=100          ;INTERRUPT INABLE CS1
```

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                                ;WORKING LOCATIONS
                                
001150  146723                  RANNU:  146723                  ;RANDOM NUMBER PRIME
001152  000000                  UNNUM:  0                       ;UNIT CURRENTLY BEING TESTED
001154  000000                  UNITSV: 0                       ;SET BIT=UNIT ON BUS
001156  000000                  UNCMP:  0                       ;FOR COMPARING FOR # OF DEVICE
001160  000000                  ONCEE:  0                       ;DID WE TEST ANY DRIVES
001162  000000                  RS04DT: 0                       ;CLR IF RS03 SET IF RS04
001164  000000                  TIMSV:  0                       ;SAVE LOC FOR TIME
001166  000000                  AOB1:   0                       ;PORT SWITCH
        000004                  WWP=4                           ;WRITE WRONG PARITY
        172100                  MPR0=172100                     ;PARITY REG
001170  000000                  BPORTT: 0                       ;BUFFER ADDR FOR -B- PORT
001172  000000                  SAVEE:  0                       ;WORK LOC
001174  177746                  CACHE:  177746                  ;CACHE REG

                                ;DISCRIPTION OF ONCEE BITS
                                ;BIT0 MEANS FOUND DRIVE
                                ;BIT11 DO TKSEL TEST
                                ;BIT12 TYPE COULD NOT FIND NED ONLY ONCE
                                ;BIT13 TYPE NO MEM ON B PORT ONLY ONCE
                                ;BIT14 0- DO WCE WITH 0 -1 DO WCE WITH 1
                                ;BIT15 MEANS ERROR FOUND

                                :RH11 WORK REGISTERS
                                ;(CAN BE CHANGED IN ANY ROUTINE)
001176  000000                  WORK:   0
001200  000000                  WORK1:  0
001202  000000                  WORK2:  0

001204  012706  000500          BEGIN:  MOV     #500,SP         ;SET STACK TO  *** 500 ***
001210  012737  023134  000024          MOV     #.POWER,@#24    ;SET UP PF VECTOR
001216  012737  000340  000026          MOV     #340,@#26       ;LOCK OUT THE WORLD
001224  012737  022562  000030          MOV     #.HLT,@#30      ;SET EMT VECTOR
001232  012737  000340  000032          MOV     #340,@#32       ;LOCK UP
001240  012737  023566  000034          MOV     #.TRAP,@#34     ;SET TRAP VECTOR
001246  012737  000340  000036          MOV     #340,@#36       ;LOCK UP
001254  005037  001000                  CLR     ICNT            ;INIT ICNT
001260  005037  001010                  CLR     LAD             ;INIT LAD
001264  042737  143777  001160          BIC     #143777,ONCEE   ;CLEAR ONCEE
001272  012737  027530  001102          MOV     #OUTBUF,OBUFSV  ;SAVE LOC OF OUTBUFFER
001300  032737  004000  001160          BIT     #BIT11,ONCEE    ;DO TKSEL TEST?
001306  001402                  BEQ     .+6             ;NO
001310  000137  024160          JMP     @#TKSEL         ;YES
001314  104420                  SUSWR                   ;SIZE FOR HDWR SWR
001316  005227  177777          INC #-1                 ; SO TITLE PRINTOUT 1ST PASS ONLY
001322  001025                  BNE AROUND              ; THRU FOR PASSES >1
                                ;*************************************************************************
                                ; ROUTINE TO PRINT  DIAGNOSTICS TITLE
                                ;*************************************************************************
001324  104402  001330          TYPE    ,.+2            ;.ASCIZ "CZRSBH0 RH11-RS03/04 BFT DIAGNOSTIC"<15><12>
001376  000240          AROUND: NOP                     ;FALL THUR

```

```
                                        ;NOW TEST FOR DRIVES
                                        ;*************************************************************************
                                        ;TEST 1         TEST FOR DRIVES
                                        ;*************************************************************************
001400  104400                  TST1:   SCOPE

001402  012701  000010          MULTII: MOV     #8.,R1          ;PUT 8 INTO R1 FOR COUNT
001406  005077  177474                  CLR     @RSCS2          ;SET DEVICE TO ZERO
001412  012777  000007  177500  TRY:    MOV     #7,@RSER        ;CAUSE AN ERROR +SETS BIT IN RSAS REG
001420  005301                          DEC     R1              ;DO A MAXIMUM OF 8 TIMES
001422  001403                          BEQ     DVNUM           ;TESTED FOR ALL DRIVES GET OUT
001424  005277  177456                  INC     @RSCS2          ;INCREMENT DRIVE UNIT
001430  000770                          BR      TRY             ;REPEAT FOR NEXT DRIVE
001432  017737  177464  001154  DVNUM:  MOV     @RSAS,UNITSV    ;SAVE
001440  012737  000401  001156          MOV     #401,UNCMP      ;SETUP TO CMP WITH UNITSV
001446  012737  000000  001152          MOV     #0,UNNUM        ;PUT 0 INTO UNIT NO.
001454  032777  020000  177344          BIT     #BIT13,@SWR     ;INHIBIT TYPE OUT?
001462  001015                          BNE     STTEST          ;YES
001464  104402  001470                  TYPE    ,.+2            ;.ASCIZ <15><12>''TESTING UNIT ''
001510  042737  100000  001160          BIC     #BIT15,ONCEE    ;CLEAR ERROR FLAG
001516  033737  001156  001154  STTEST: BIT     UNCMP,UNITSV    ;IS THIS DRIVE ON THE SYSTEM
001524  001475                          BEQ     TRYNX           ;NO
001526  013777  001152  177352          MOV     UNNUM,@RSCS2    ;YES PUT UNIT # INTO CS2
001534  022777  000004  177370          CMP     #4,@RSDT        ;IS THIS A RS03LA?
001542  001004                          BNE     7$              ;NO
001544  012737  000004  001162          MOV     #4,RS04DT       ;SETUP DRIVE TYPE FOR A LA DISK
001552  000435                          BR      1$              ;GET OUT
001554  022777  000000  177350  7$:     CMP     #0,@RSDT        ;IS THIS A RS03?
001562  001003                          BNE     2$              ;NO
001564  005037  001162                  CLR     RS04DT          ;YES
001570  000426                          BR      1$              ;GET OUT
001572  022777  000001  177332  2$:     CMP     #1,@RSDT        ;IS THIS A RS03 4US?
001600  001003                          BNE     3$              ;NO
001602  005037  001162                  CLR     RS04DT          ;RS03
001606  000417                          BR      1$              ;GET OUT
001610  022777  000002  177314  3$:     CMP     #2,@RSDT        ;IS THIS A RS04?
001616  001410                          BEQ     6$              ;YES
001620  022777  000003  177304          CMP     #3,@RSDT        ;IS IT A RS04?
001626  001404                          BEQ     6$              ;YES
001630  043737  001156  001154          BIC     UNCMP,UNITSV    ;CLEAR UNWANTED ATA BIT
001636  000430                          BR      TRYNX           ;GET A NEW NUMBER
001640  052737  177777  001162  6$:     BIS     #-1,RS04DT      ;YES RS04
001646  032777  020000  177152  1$:     BIT     #BIT13,@SWR     ;INHIBIT TYPE OUT?
001654  001020                          BNE     4$              ;YES
001656  032737  100000  001160          BIT     #BIT15,ONCEE    ;ANY ERRORS?
001664  001404                          BEQ     5$              ;NO
001666  104402  001672                  TYPE    ,.+2            ;.ASCIZ <15><12><12>
                                        ;*************************************************************************4
001676                          5$:
001676  013746  001152                  MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
001702  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
                                        ;*********************************************************
001704  104402  000040                  TYPE    ,40             ;TYPE SPACE
001710  042737  100000  001160          BIC     #BIT15,ONCEE    ;CLEAR ERROR FLAG
001716  000473                  4$:     BR      NOWGO           ;NOW TEST
```

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                                TRYNX:  ASL     UNCMP           ;CHECK NEXT BIT FOR DRIVE
                                        BCS     CHCKDV          ;DID WE TEST ANY REG?
                                        INC     UNNUM           ;INC UNIT #
                                        BR      STTEST          ;CHECK FOR NEXT DRIVE

                                CHCKDV: BIT     #BIT0,ONCEE     ;DID WE TEST ANY DRIVES?
                                        BNE     DONEE           ;YES WE DID TEST A DRIVE
                                        MOV     #100000,UNCMP   ;NO DRIVES TESTED, COULD NOT SET
                                        CLR     UNNUM           ;ANY AS BITS, THUS DEFAULTS TO
                                        BIT     #BIT13,@SWR     ;INHIBIT TYPE OUT?
                                        BNE     4$              ;YES
                                        MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
                                        TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
                                        TYPE    ,40             ;TYPE SPACE
                                        TYPE    ,..+2           ;.ASCIZ <15><12>''COULD NOT FIND DRIVE WILL TEST DRIVE 0
                                        HALT                    ;WAIT
                                4$:     BR      NOWGO           ;TEST DRIVE 0
                                DONEE:  JMP     DONE            ;GET OUT

                                ;THIS TEST IS DESIGNED TO TEST THE ABILITY OF RESET
                                ;TO CLEAR ALL THE RH AND RS REGISTERS

                                NOWGO:  MOV     #OUTBUF,OBUFSV  ;SAVE LOC OF OUTBUFFER
                                        BIS     #BIT0,ONCEE     ;SET FOUND DRIVE FLAG
                                        MOV     TIMES,TIMSV     ;SAVE TIME
                                        MOV     #1,TIMES        ;ONLY TEST ONCE
                                ;*****************************************************************************
                                ;TEST 2         RESET TEST FOR REGISTERS
                                ;*****************************************************************************
                                TST2:   SCOPE
                                        MOV     #340,@#PS       ;LOCK OUT INTERUPTS
                                        MOV     UNNUM,@RSCS2    ;GET UNIT #
                                        MOV     #177776,@RSCS1  ;SET ALL
                                        MOV     #177777,@RSBA   ;POSSIBLE R/W
                                        MOV     #177777,@RSDA   ;BITS IN THESE REGISTERS
                                        MOV     #177777,@RSER
                                        MOV     #177777,@RSMR
                                        MOV     #177777,@RSWC
                                        MOV     #177737,@RSCS2
                                        RESET                   ;CLEAR ALL BITS IN ALL REG.

                                ;TEST RSCS2 FOR CLEARED BITS

                                        CMP     #100,@RSCS2     ;DID THESE BITS GET CLEARED?
                                        BEQ     .+4             ;YES
                                        HLT     !CS2            ;(417) SHOULD BE CLEARED IN CS2
                                        MOV     UNNUM,@RSCS2    ;PUT # OF UNIT IN TEST IN CS2
                                        CMP     #10600,@RSDS    ;IS DPR AND MOL SET?
                                        BEQ     .+4             ;YES
                                        HLT     !DS             ;NO WHY NOT?
                                ;TEST CONTROL AND STATUS REG 1
                                        CMP     #4200,@RSCS1    ;DID THE READY BIT SET?
                                        BEQ     .+4             ;YES
                                        HLT     !CS1            ;READY SHOULD BE SET
```

```
                                ;TEST BUS ADDRESS REGISTER
                                
002274  005777  176612                TST     @RSBA           ;IS BA REG. CLEARED
002300  001401                        BEQ     .+4             ;YES
002302  104020                        HLT     !BA             ;SHOULD BE 0
                                
                                ;TEST DISK ADDRESS REGISTER
                                
002304  005777  176604                TST     @RSDA           ;IS DA CLEARED
002310  001401                        BEQ     .+4             ;YES
002312  104004                        HLT     !DA             ;SHOULD BE 0
                                
                                ;TEST ERROR REG RSER
                                
002314  005777  176600                TST     @RSER           ;DID RSER CLEAR?
002320  001401                        BEQ     .+4             ;YES
002322  104002                        HLT     !ER             ;BITS(157015) SHOULD BE CLEARED
                                
                                ;TEST RS MAINTENANCE REGISTER
                                
002324  032777  000077  176576        BIT     #77,@RSMR       ;DID THESE BITS GET CLEARED
002332  001401                        BEQ     .+4             ;YES
002334  104220                        HLT     !MR             ;BITS(77) SHOULD BE 0
                                
                                ;TEST WC REG IT SHOULD NOT CHANGE
                                
002336  022777  177777  176544        CMP     #177777,@RSWC   ;DID IT CHANGE?
002344  001401                        BEQ     .+4             ;NO
002346  104010                        HLT     !WC             ;RESET SHOULD NOT MODIFY RSWC
                                
                                ;TEST RSAS
                                
002350  005777  176546                TST     @RSAS           ;IS REG CLEAR
002354  001401                        BEQ     .+4             ;YES
002356  104100                        HLT     !AS             ;NO
```

```
                        ;*****************************************************************************
                        ;TEST 3          TEST CLEAR BIT IN CS2 ON ALL THE R/W BITS
                        ;*****************************************************************************
002360  104400          TST3:   SCOPE

002362  012737  000340  177776  TTAGG:  MOV     #340,@#PS       ;LOCK OUT INTERRUPTS
002370  013777  001152  176510          MOV     UNNUM,@RSCS2    ;GET UNIT #
002376  012777  043576  176500          MOV     #43576,@RSCS1   ;SET ALL
002404  012777  177777  176500          MOV     #177777,@RSBA   ;POSSIBLE
002412  012777  177777  176474          MOV     #177777,@RSDA   ;REGISTERS
002420  012777  177777  176472          MOV     #177777,@RSER
002426  012777  177777  176472          MOV     #177777,@RSDB
002434  012777  177777  176446          MOV     #177777,@RSWC
002442  012777  020417  176436          MOV     #20417,@RSCS2
002450  012777  000071  176452          MOV     #71,@RSMR
002456  012777  000040  176422          MOV     #40,@RSCS2      ;CLEAR ALL BITS
002464  022777  000100  176414          CMP     #100,@RSCS2     ;DID THE RIGHT BITS CLEAR?
002472  001401                        BEQ     .+4             ;YES
002474  104200                        HLT     !CS2            ;(417) SHOULD BE CLEARED IN CS2
002476  013777  001152  176402          MOV     UNNUM,@RSCS2    ;GET DRIVE NUMBER
002504  032777  173577  176372          BIT     #173577,@RSCS1  ;DID ALL BITS GET CLEARED
002512  001401                        BEQ     .+4             ;YES
002514  104001                        HLT     !CS1            ;NO, ALL BITS SHOULD BE 0
                        ;TEST BUS ADDRESS REGISTER

002516  005777  176370                TST     @RSBA           ;IS BA REG. CLEARED
002522  001401                        BEQ     .+4             ;YES
002524  104020                        HLT     !BA             ;SHOULD BE 0

                        ;TEST DISK ADDRESS REGISTER

002526  005777  176362                TST     @RSDA           ;IS DA CLEARED
002532  001401                        BEQ     .+4             ;YES
002534  104020                        HLT     !BA             ;SHOULD BE 0

                        ;TEST ERROR REG RSER

002536  005777  176356                TST     @RSER           ;DID THESE BITS GET CLEARED
002542  001401                        BEQ     .+4             ;YES
002544  104002                        HLT     !ER             ;BITS(157015) SHOULD BE CLEARED

                        ;TEST RS MAINTENANCE REGISTER
002546  032777  000077  176354          BIT     #77,@RSMR       ;DID THESE BITS GET CLEARED
002554  001401                        BEQ     .+4             ;YES
002556  104220                        HLT     !MR             ;BITS(77) SHOULD BE 0

                        ;TEST WC REG. IT SHOULD NOT CHANGE
002560  022777  177777  176322          CMP     #177777,@RSWC   ;DID WC CHANGE
002566  001401                        BEQ     .+4             ;NO
002570  104010                        HLT     !WC             ;WHY DID IT CHANGE?
```

```
                                ;*****************************************************************************
                                ;TEST 4          SET AND CLEAR ALL REGISTERS
                                ;*****************************************************************************
002572  104400                  TST4:   SCOPE
                                ;CAN WE SET THE FUNCTION BITS IN THE RSCS1 REG.
                                ;BITS 7,6,5,4,3,2&1

002574  104414                          CLRDK                   ;CLEAR ALL RS REG
002576  013737  001164  022560          MOV     TIMSV,TIMES     ;GET TIME
002604  012777  003576  176272          MOV     #3576,@RSCS1    ;SET DISK FUNCTION BITS
002612  022777  007776  176264          CMP     #7776,@RSCS1    ;ARE THESE BITS SET?
002620  001401                          BEQ     .+4             ;NO
002622  104001                          HLT     !CS1            ;SHOULD = 7776
002624  012777  002524  176252          MOV     #2524,@RSCS1    ;SET THESE BITS
002632  022777  006724  176244          CMP     #6724,@RSCS1    ;DID THEY SET
002640  001401                          BEQ     .+4             ;YES
002642  104001                          HLT     !CS1            ;SHOULD BE 6724
002644  012777  001052  176232          MOV     #1052,@RSCS1    ;SET THESE BITS
002652  022777  005252  176224          CMP     #5252,@RSCS1    ;ARE THEY =?
002660  001401                          BEQ     .+4             ;YES
002662  104001                          HLT     !CS1            ;SHOULD = 5252
002664  104400                  TST5:   SCOPE
                                ;CLEAR THE FUNCTION BITS

002666  012777  043576  176210          MOV     #43576,@RSCS1   ;SET DISK FUNCTION BITS
002674  005077  176204                  CLR     @RSCS1
002700  022777  004200  176176          CMP     #4200,@RSCS1    ;IS THE READY BIT SET
002706  001401                          BEQ     .+4             ;YES
002710  104001                          HLT     !CS1            ;RSCS1 SHOULD = 4200

                                ;*****************************************************************************
                                ;TEST 6          TEST RSCS2
                                ;*****************************************************************************
002712  104400                  TST6:   SCOPE

002714  000005                          RESET                   ;CLEAR WORLD
002716  022777  000100  176162          CMP     #100,@RSCS2     ;DID THEY CLEAR?
002724  001401                          BEQ     .+4             ;YES
002726  104200                          HLT     !CS2            ;NO
002730  012777  021037  176150          MOV     #21037,@RSCS2   ;SET BITS 21017
002736  022777  021137  176142          CMP     #21137,@RSCS2   ;DID THESE BITS GET SET
002744  001405                          BEQ     1$              ;YES
002746  017700  176134                  MOV     @RSCS2,BAD
002752  012701  021137                  MOV     #21137,GOOD     ;WHAT CS2 SHOULD =
002756  104000                          HLT                     ;CS2 = BAD GOOD = CORRECT ANS
```

```
1032  002760  012777  020025  176120  1$:     MOV     #20025,@RSCS2   ;SET THESE BITS
1033  002766  022777  020125  176112          CMP     #20125,@RSCS2   ;DID THESE BITS GET SET
1034  002774  001401                          BEQ     .+4             ;YES
1035  002776  104200                          HLT     !CS2            ;NO,CS2 SHOULD = 20125
1036  003000  012777  000012  176100          MOV     #12,@RSCS2      ;LOAD THESE BITS
1037  003006  022777  000112  176072          CMP     #112,@RSCS2     ;DID THESE BITS GET SET IN CS2
1038  003014  001401                          BEQ     .+4             ;YES
1039  003016  104200                          HLT     !CS2            ;BAD = CS2 GOOD = CORRECT ANS
1040  003020  012777  177777  176060          MOV     #-1,@RSCS2      ;SET BITS
1041  003026  005077  176054                  CLR     @RSCS2          ;CLEAR THEM
1042  003032  022777  000100  176046          CMP     #100,@RSCS2     ;DID CLEAR WORK
1043  003040  001401                          BEQ     .+4             ;YES
1044  003042  104200                          HLT     !CS2            ;R/W BITS DID NOT CLEAR
1045  003044  013777  001152  176034          MOV     UNNUM,@RSCS2    ;GET UNIT #
1046  003052  104400                  TST7:   SCOPE
1047                                  ;CAN WE SET ALL THE RSBA BITS
1048
1049  003054  012777  177777  176030          MOV     #177777,@RSBA   ;SET THE BITS
1050  003062  022777  177776  176022          CMP     #177776,@RSBA   ;DID THEY SET
1051  003070  001401                          BEQ     .+4             ;YES
1052  003072  104020                          HLT     !BA             ;BITS 17776 SHOULD BE SET
1053  003074  012777  125252  176010          MOV     #125252,@RSBA   ;SET THESE BITS
1054  003102  022777  125252  176002          CMP     #125252,@RSBA   ;ARE THEY =
1055  003110  001401                          BEQ     .+4             ;YES
1056  003112  104020                          HLT     !BA             ;SHOULD BE 125252
1057  003114  012777  052524  175770          MOV     #52524,@RSBA    ;SET THESE BITS
1058  003122  022777  052524  175762          CMP     #52524,@RSBA    ;ARE THEY =
1059  003130  001401                          BEQ     .+4             ;YES
1060  003132  104020                          HLT     !BA             ;SHOULD BE 52524
1061
1062  003134  104400                  TST10:  SCOPE
1063                                  ;FLOAT A 1 THROUGH RSBA
1064
1065  003136  012701  000002          FLOTBA: MOV     #2,GOOD         ;GET A 2
1066  003142  000241                          CLC                     ;CLEAR CARRY
1067  003144  010177  175742          1$:     MOV     GOOD,@RSBA      ;FLOAT NUMBER
1068  003150  017700  175736                  MOV     @RSBA,BAD       ;GET BA
1069  003154  020100                          CMP     GOOD,BAD        ;COMPARE BA
1070  003156  001401                          BEQ     .+4             ;BA CORRECT
1071  003160  104000                          HLT                     ;BAD=BA GOOD=CORRECT ANS
1072  003162  006101                          ROL     GOOD            ;ROTATE NUMBER
1073  003164  103367                          BCC     1$              ;LOOP TILL DONE
```

```
1074  003166  104400                  TST11:  SCOPE
1075
1076                                  ;CLEAR THE RSBA REGISTER
1077
1078  003170  012777  177777  175714          MOV     #177777,@RSBA   ;SET RSBA EQUAL TO ALL ONES
1079  003176  005077  175710                  CLR     @RSBA
1080  003202  005777  175704                  TST     @RSBA           ;TEST FOR BIT0 SET IN RSBA (READ ONLY BIT)
1081  003206  001401                          BEQ     .+4             ;YES
1082  003210  104020                          HLT     !BA             ;NO
1083  003212  104400                  TST12:  SCOPE
1084
1085                                  ;CAN WE SET ALL BITS IN RSWC REGISTER
1086
1087  003214  012777  177777  175666          MOV     #177777,@RSWC   ;SET WC BITS
1088  003222  022777  177777  175660          CMP     #177777,@RSWC   ;ARE ALL BITS SET
1089  003230  001401                          BEQ     .+4             ;YES
1090  003232  104010                          HLT     !WC             ;NO
1091  003234  012777  125252  175646          MOV     #125252,@RSWC   ;SET THESE BITS
1092  003242  022777  125252  175640          CMP     #125252,@RSWC   ;ARE THEY =
1093  003250  001401                          BEQ     .+4             ;YES
1094  003252  104010                          HLT     !WC             ;SHOULD BE 125252
1095  003254  012777  052525  175626          MOV     #52525,@RSWC    ;SET THESE BITS
1096  003262  022777  052525  175620          CMP     #52525,@RSWC    ;ARE THEY =
1097  003270  001401                          BEQ     .+4             ;YES
1098  003272  104010                          HLT     !WC             ;SHOULD BE 152525
1099  003274  104400                  TST13:  SCOPE
1100
1101                                  ;FLOAT A 1 THROUGH RSWC
1102
1103  003276  012701  000001          FLOTWC: MOV     #1,GOOD         ;GET A 1
1104  003302  000241                          CLC                     ;CLEAR CARRY
1105  003304  010177  175600          1$:     MOV     GOOD,@RSWC      ;FLOAT NUMBER
1106  003310  017700  175574                  MOV     @RSWC,BAD       ;GET WC
1107  003314  020100                          CMP     GOOD,BAD        ;COMPARE WC
1108  003316  001401                          BEQ     .+4             ;WC CORRECT
1109  003320  104000                          HLT                     ;BAD=WC GOOD=CORRECT ANS
1110  003322  006101                          ROL     GOOD            ;ROTATE NUMBER
1111  003324  103367                          BCC     1$              ;LOOP TILL DONE
```

```
1112                                    ;CLEAR THE WORD COUNT REGISTER
1113  003326  104400                    TST14:  SCOPE
1114
1115  003330  012777  177777  175552            MOV     #177777,@RSWC   ;SET RSWC REGISTER EQUAL TO ALL ONES
1116  003336  005077  175546                    CLR     @RSWC
1117  003342  005777  175542                    TST     @RSWC           ;DID ALL BITS GET CLEARED
1118  003346  001401                            BEQ     .+4             ;YES
1119  003350  104010                            HLT     !WC             ;NO
1120  003352  104400                    TST15:  SCOPE
1121
1122                                    ;CAN WE SET ALL THE BITS IN THE RSDA REGISTER.
1123
1124  003354  012777  177777  175532            MOV     #177777,@RSDA   ;SET ALL BITS
1125  003362  022777  177777  175524            CMP     #177777,@RSDA   ;ARE THE BITS SET
1126  003370  001401                            BEQ     .+4             ;YES
1127  003372  104004                            HLT     !DA             ;NO
1128  003374  012777  125252  175512            MOV     #125252,@RSDA   ;SET THESE BITS
1129  003402  022777  125252  175504            CMP     #125252,@RSDA   ;ARE THEY =
1130  003410  001401                            BEQ     .+4             ;YES
1131  003412  104004                            HLT     !DA             ;SHOULD BE 125252
1132  003414  012777  052525  175472            MOV     #52525,@RSDA    ;SET THESE BITS
1133  003422  022777  052525  175464            CMP     #52525,@RSDA    ;ARE THEY =
1134  003430  001401                            BEQ     .+4             ;YES
1135  003432  104004                            HLT     !DA             ;SHOULD BE 52525
1136  003434  104400                    TST16:  SCOPE
1137
1138                                    ;FLOAT A 1 THROUGH RSDA
1139
1140  003436  012701  000001            FLOTDA: MOV     #1,GOOD         ;GET A 1
1141  003442  000241                            CLC                     ;CLEAR CARRY
1142  003444  010177  175444            1$:     MOV     GOOD,@RSDA      ;FLOAT NUMBER
1143  003450  017700  175440                    MOV     @RSDA,BAD       ;GET DA
1144  003454  020100                            CMP     GOOD,BAD        ;COMPARE DA
1145  003456  001401                            BEQ     .+4             ;DA CORRECT
1146  003460  104000                            HLT                     ;BAD=DA GOOD=CORRECT ANS
1147  003462  006101                            ROL     GOOD            ;ROTATE NUMBER
1148  003464  103367                            BCC     1$              ;LOOP TILL DONE
```

```
1149                                        ;CAN WE CLEAR THE RSDA REG.
1150  003466  104400                TST17:  SCOPE
1151
1152  003470  012777  177777  175416        MOV     #177777,@RSDA   ;SET RSDA TO ALL ONES
1153  003476  005077  175412                CLR     @RSDA
1154  003502  005777  175406                TST     @RSDA           ;TEST FOR ZERO RSDA
1155  003506  001401                        BEQ     .+4             ;YES
1156  003510  104004                        HLT     !DA             ;ANS SHOULD BE 0
1157  003512  104400                TST20:  SCOPE
1158
1159                                        ;SET AND CLEAR THE RSER REG.
1160
1161  003514  012777  177777  175376        MOV     #177777,@RSER   ;SET THESE BITS
1162  003522  022777  177017  175370        CMP     #177017,@RSER   ;DID THEY SET
1163  003530  001401                        BEQ     .+4             ;YES
1164  003532  104002                        HLT     !ER             ;RSER SHOULD = 157017
1165  003534  112777  000001  175356        MOVB    #1,@RSER        ;A MOVB INST
1166  003542  022777  000001  175350        CMP     #1,@RSER        ;SHOULD MODIFY COMPLETE WD
1167  003550  001401                        BEQ     .+4             ;OK
1168  003552  104002                        HLT     !ER
1169
1170  003554  104400                TST21:  SCOPE
1171
1172  003556  012777  052005  175334        MOV     #52005,@RSER    ;SET THESE BITS
1173  003564  022777  052005  175326        CMP     #52005,@RSER    ;DID THEY SET
1174  003572  001401                        BEQ     .+4             ;YES
1175  003574  104002                        HLT     !ER             ;ER SHOULD = 52005
1176  003576  104400                TST22:  SCOPE
1177
1178  003600  012777  125012  175312        MOV     #125012,@RSER   ;SET THESE BITS
1179  003606  022777  125012  175304        CMP     #125012,@RSER   ;DID THEY SET
1180  003614  001401                        BEQ     .+4             ;YES
1181  003616  104002                        HLT     !ER             ;ER SHOULD = 105012
```

```
1182  003620  104400                TST23:  SCOPE
1183
1184  003622  012777  177017  175270        MOV     #177017,@RSER   ;SET THESE BITS
1185  003630  005077  175264              CLR     @RSER           ;CLEAR THEM
1186  003634  005777  175260              TST     @RSER           ;DID THEY CLEAR
1187  003640  001401                      BEQ     .+4             ;YES
1188  003642  104002                      HLT     !ER             ;SHOULD = 0
1189  003644  104400                TST24:  SCOPE
1190
1191                                ;SET AND CLEAR RSMR
1192
1193  003646  012777  000070  175254        MOV     #70,@RSMR       ;SET THESE BITS
1194  003654  017737  175250  001176        MOV     @RSMR,WORK      ;PUT INTO WORKABLE REG
1195  003662  042737  177700  001176        BIC     #177700,WORK    ;CLEAR JUNK
1196  003670  022737  000070  001176        CMP     #70,WORK        ;DID THEY SET
1197  003676  001401                      BEQ     .+4             ;YES
1198  003700  104220                      HLT     !MR             ;SHOULD = 70
1199  003702  104400                TST25:  SCOPE
1200
1201  003704  012777  000070  175216        MOV     #70,@RSMR       ;SET BITS
1202  003712  005077  175212              CLR     @RSMR           ;CLEAR THEM
1203  003716  032777  000077  175204        BIT     #77,@RSMR       ;DID THEY CLEAR
1204  003724  001401                      BEQ     .+4             ;YES
1205  003726  104220                      HLT     !MR             ;BITS (77) SHOULD = 0
1206  003730  104400                TST26:  SCOPE
1207
1208  003732  012777  000050  175170        MOV     #50,@RSMR       ;SET BITS
1209  003740  017737  175164  001176        MOV     @RSMR,WORK      ;PUT IN WORKABLE REG
1210  003746  042737  177700  001176        BIC     #177700,WORK    ;CLEAR JUNK
1211  003754  022737  000050  001176        CMP     #50,WORK        ;DID THESE BITS SET
1212  003762  001401                      BEQ     .+4             ;YES
1213  003764  104220                      HLT     !MR             ;BITS (50) SHOULD BE SET
1214  003766  104400                TST27:  SCOPE
1215
1216  003770  012777  000020  175132        MOV     #20,@RSMR       ;SET BITS
1217  003776  017737  175126  001176        MOV     @RSMR,WORK      ;PUT INTO WORKABLE REG
1218  004004  042737  177700  001176        BIC     #177700,WORK    ;CLEAR JUNK
1219  004012  022737  000020  001176        CMP     #20,WORK        ;DID THEY SET
1220  004020  001401                      BEQ     .+4             ;YES
1221  004022  104220                      HLT     !MR             ;MR SHOULD AT LEAST HAVE A (21)
```

```
                                ;*****************************************************************************
                                ;TEST 30                    LOAD RANDOM NUMBERS INTO RSWC, RSDA AND RSBA
                                ;*****************************************************************************
004024  104400                  TST30:  SCOPE

004026  012737  001000  001176  RANTS:  MOV     #1000,WORK      ;MAKE TABLE 1000 WDS LONG
004034  012701  027530                   MOV     #OUTBUF,R1      ;GET SRARTING LOC OF TABLE
004040  004537  027000                   JSR     R5,RANDOM       ;GENERATE #
004044  012704  027530                   MOV     #OUTBUF,R4      ;SETUP FOR COMPARE
004050  012737  004056  001010          MOV     #LOP1,LAD       ;SETUP LOOP ADDR
004056  012703  001000          LOP1:   MOV     #1000,R3        ;LOAD TEST COUNTER
004062  005303                  4$:     DEC     R3              ;DONE WITH COMPARE?
004064  001413                          BEQ     1$              ;YES
004066  013705  001110                   MOV     RSWC,R5         ;GET WC ADDRESS
004072  011415                          MOV     (R4),(R5)       ;LOAD WC
004074  021524                          CMP     (R5),(R4)+      ;IS IT CORRECT?
004076  001771                          BEQ     4$              ;YES
004100  017700  175004                   MOV     @RSWC,BAD       ;GET BAD WC
004104  014401                          MOV     -(R4),GOOD      ;GET GOOD ANS
004106  104000                          HLT                     ;TYPE THEM OUT
004110  005724                          TST     (R4)+           ;UPDATE RANDOM NUMBER
004112  000763                          BR      4$              ;CONT
004114  012704  027530          1$:     MOV     #OUTBUF,R4      ;GET STARTING LOC OF TABLE
004120  012737  004126  001010          MOV     #LOP2,LAD       ;SETUP LOOP ADDR
004126  012703  001000          LOP2:   MOV     #1000,R3        ;SETUP TEST COUNTER
004132  005303                  3$:     DEC     R3              ;DONE YET?
004134  001413                          BEQ     1$              ;YES
004136  013705  001114                   MOV     RSDA,R5         ;LOAD DA ADDRESS INTO R5
004142  011415                          MOV     (R4),(R5)       ;LOAD DA
004144  021524                          CMP     (R5),(R4)+      ;IS IT CORRECT?
004146  001771                          BEQ     3$              ;YES
004150  017700  174740                   MOV     @RSDA,BAD       ;GET BAD DATA
004154  014401                          MOV     -(R4),GOOD      ;GET GOOD DATA
004156  104000                          HLT                     ;TYPE IT OUT
004160  005724                          TST     (R4)+           ;UPDATE RANDOM NUMBER
004162  000763                          BR      3$              ;CONTINUE
004164  012704  027530          1$:     MOV     #OUTBUF,R4      ;GET STARTING LOC OF TABLE
004170  012737  004176  001010          MOV     #LOP3,LAD       ;SETUP LOOP ADDR
004176  012703  001000          LOP3:   MOV     #1000,R3        ;SETUP TEST COUNTER
004202  005303                  3$:     DEC     R3              ;DONE YET?
004204  001416                          BEQ     2$              ;YES
004206  013705  001112                   MOV     RSBA,R5         ;LOAD ADDRESS OF BA INTO R5
004212  011415                          MOV     (R4),(R5)       ;LOAD BA
004214  042714  000001                   BIC     #BIT0,(R4)      ;CLEAR BIT 0
004220  021514                          CMP     (R5),(R4)       ;IS IT CORRECT?
004222  001767                          BEQ     3$              ;YES
004224  017700  174662                   MOV     @RSBA,BAD       ;GET BAD DATA
004230  011401                          MOV     (R4),GOOD       ;GET GOOD DATA
004232  104000                          HLT                     ;TYPE IT OUT
004234  000400                          BR      1$              ;GET OUT
004236  005724                  1$:     TST     (R4)+           ;GET NEW NUMBER
004240  000760                          BR      3$              ;CONTINUE
004242  000240                  2$:     NOP
```

```
                        ;*****************************************************************************
                        ;TEST 31                TEST ODD BYTE INSTRUCTIONS ON CS1, CS2, WC AND BA
                        ;*****************************************************************************
004244  104400          TST31:  SCOPE

004246  104414          BITST:  CLRDK                           ;CLEAR ALL RS REG
004250  012777  003566  174626          MOV     #3566,@RSCS1    ;LOAD CS1
004256  112777  000005  174654          MOVB    #5,@RSCS1B      ;LOAD BIT
004264  022777  006766  174612          CMP     #6766,@RSCS1    ;DID IT LOAD?
004272  001401                          BEQ     .+4             ;YES
004274  104001                          HLT     !CS1
004276  112777  000032  174600          MOVB    #32,@RSCS1
004304  022777  006632  174572          CMP     #6632,@RSCS1
004312  001401                          BEQ     .+4
004314  104001                          HLT     !CS1            ;CS1 SHOULD = 6632

004316  104400          TST32:  SCOPE

004320  013777  001152  174560  BITCS2: MOV     UNNUM,@RSCS2    ;LOAD UNIT NUMBER
004326  052777  177400  174552          BIS     #177400,@RSCS2  ;LOAD ALL BITS
004334  105077  174602                  CLRB    @RSCS2B         ;CLR UPPER BYTE
004340  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT NO.
004344  052701  000100                  BIS     #100,GOOD       ;SET OR BIT
004350  017700  174532                  MOV     @RSCS2,BAD      ;GET CS2
004354  020001                          CMP     BAD,GOOD        ;IS CS2 CORRECT?
004356  001401                          BEQ     .+4             ;YES
004360  104000                          HLT                     ;LOAD BYTE DID NOT WORK

004362  104400          TST33:  SCOPE

004364  012777  025252  174516  BITWC:  MOV     #25252,@RSWC    ;LOAD WC
004372  112777  000377  174544          MOVB    #377,@RSWCB     ;LOAD BIT
004400  022777  177652  174502          CMP     #177652,@RSWC   ;DID IT LOAD?
004406  001401                          BEQ     .+4             ;YES
004410  104010                          HLT     !WC             ;NO WC SHOULD =177652
004412  112777  000123  174470          MOVB    #123,@RSWC
004420  022777  177523  174462          CMP     #177523,@RSWC
004426  001401                          BEQ     .+4
004430  104010                          HLT     !WC             ;WC SHOULD = 177523

004432  104400          TST34:  SCOPE

004434  012777  025252  174450  BITBA:  MOV     #25252,@RSBA    ;LOAB DA
004442  112777  000377  174476          MOVB    #377,@RSBAB     ;LOAD BIT
004450  022777  177652  174434          CMP     #177652,@RSBA   ;DID IT LOAD?
004456  001401                          BEQ     .+4             ;YES
004460  104020                          HLT     !BA             ;DA SHOULD =177652
004462  112777  000125  174422          MOVB    #125,@RSBA
004470  022777  177524  174414          CMP     #177524,@RSBA
004476  001401                          BEQ     .+4
004500  104020                          HLT     !BA             ;BA SHOULD = 177525
004502  104414                          CLRDK                   ;CLEAR ALL RS REG
```

```
                                ;*****************************************************************************
                                ;TEST 35                 TEST DATA LATE IN CS2
                                ;*****************************************************************************
004504  104400                  TST35:  SCOPE

                                ;DO A READ FROM SILO: SHOULD GET DLT + TRE ERROR BECAUSE SILO IS EMPTY

004506  104414                  SILOB:  CLRDK                   ;CLEAR ALL RS REG
004510  017700  174412                  MOV     @RSDB,BAD       ;READ FROM EMPTY SILO
004514  017700  174366                  MOV     @RSCS2,BAD      ;GET CS2
004520  012701  100100                  MOV     #100100,GOOD    ;GET CORRECT ANS
004524  053701  001152                  BIS     UNNUM,GOOD      ;FOR CS2
004530  020001                          CMP     BAD,GOOD        ;IS CS2 CORRECT?
004532  001401                          BEQ     .+4             ;YES
004534  104200                          HLT     !CS2            ;SHOULD HAVE DLT ERROR
004536  022777  144200  174340          CMP     #144200,@RSCS1  ;DID SC AND TRE SET?
004544  001401                          BEQ     .+4             ;YES
004546  104001                          HLT     !CS1            ;SC AND TRE SHOULD BE SET
004550  012777  040000  174326          MOV     #TRE,@RSCS1     ;CLEARS ERROR BIT
004556  032777  140000  174320          BIT     #140000,@RSCS1  ;DID SC + TRE CLEAR
004564  001401                          BEQ     .+4             ;YES
004566  104001                          HLT     !CS1            ;TRE AND SC SHOULD BE 0
004570  017700  174312                  MOV     @RSCS2,BAD      ;GET CS2
004574  042701  100000                  BIC     #BIT15,GOOD     ;GET CORRECT ANS
004600  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
004602  001401                          BEQ     .+4             ;YES
004604  104200                          HLT     !CS2            ;DLT SHOULD BE 0
                                ;*****************************************************************************
                                ;TEST 36                 LOAD RSDB WITH ALL ONES AND ALL ZEROS
                                ;*****************************************************************************
004606  104400                  TST36:  SCOPE

004610  104414                  ZERONE: CLRDK                   ;CLEAR ALL RS REG
004612  005077  174310                  CLR     @RSDB           ;LOAD DB WITH ALL 0
004616  012777  177777  174302          MOV     #177777,@RSDB   ;LOAD DB WITH ALL ONES
004624  012737  002000  001176          MOV     #2000,WORK      ;TIME OUT ROUTINE
004632  012701  000300                  MOV     #300,GOOD       ;GET CORRECT FOR CS2
004636  053701  001152                  BIS     UNNUM,GOOD
004642  017700  174240          2$:     MOV     @RSCS2,BAD      ;GET CS2
004646  020100                          CMP     GOOD,BAD        ;IS IT CORRECT?
004650  001404                          BEQ     3$              ;YES
004652  005337  001176                  DEC     WORK            ;TO WAIT FOR OR
004656  001371                          BNE     2$              ;TO SET
004660  104200                          HLT     !CS2            ;OR SHOULD BE SET
004662  005001                  3$:     CLR     GOOD
004664  017700  174236                  MOV     @RSDB,BAD       ;LOAD BAD WITH DB
004670  020100                          CMP     GOOD,BAD        ;IS BAD CORRECT
004672  001401                          BEQ     .+4             ;YES
004674  104000                          HLT                     ;COULD NOT FLOAT 0 THROUGH DB
004676  012701  177777                  MOV     #-1,GOOD        ;LOAD GOOD WITH ANS
004702  017700  174220                  MOV     @RSDB,BAD       ;GET DATA FROM DB
004706  020100                          CMP     GOOD,BAD        ;IS DB CORRECT
004710  001401                          BEQ     .+4             ;YES
004712  104000                          HLT                     ;BAD SHOULD = 1777777
```

```
1381  004714  104400                  TST37:  SCOPE
1382                                  ;TEST FOR 66 LOCATIONS IN SILO PUT COUNT IN EVERY LOCATION
1383
1384  004716  104414                  SILO:   CLRDK                   ;CLEAR ALL RS REG
1385  004720  005001                          CLR     R1              ;CLEAR COUNTER
1386  004722  005201                  1$:     INC     R1              ;INCREMENT COUNTER
1387  004724  010177  174176                  MOV     R1,@RSDB        ;LOAD SILO
1388  004730  022701  000102                  CMP     #66.,R1         ;LAST LOC. YET?
1389  004734  001372                          BNE     1$              ;NO LOOP AGAIN
1390  004736  012701  000200                  MOV     #200,GOOD       ;GET CORRECT ANS FOR CS2
1391  004742  053701  001152                  BIS     UNNUM,GOOD
1392  004746  017700  174134                  MOV     @RSCS2,BAD      ;GET CS2
1393  004752  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
1394  004754  001401                          BEQ     .+4             ;YES
1395  004756  104200                          HLT     !CS2            ;OR SHOULD BE 1
1396  004760  005001                          CLR     GOOD            ;CLEAR LOCATION COUNTER
1397  004762  005201                  2$:     INC     GOOD            ;ADD 1 TO IT
1398  004764  022701  000103                  CMP     #67.,GOOD       ;LAST LOC YET?
1399  004770  001405                          BEQ     3$              ;YES
1400  004772  017700  174130                  MOV     @RSDB,BAD       ;GET LOC FROM DB
1401  004776  020100                          CMP     GOOD,BAD        ;DO LOCATIONS MATCH?
1402  005000  001770                          BEQ     2$              ;YES
1403  005002  104000                          HLT                     ;CAN NOT MATCH 66 LOCATIONS
1404  005004  032777  000200  174074  3$:     BIT     #OR,@RSCS2      ;IS OR 0
1405  005012  001401                          BEQ     .+4             ;YES
1406  005014  104200                          HLT     !CS2            ;OR SHOULD BE 0
1407
1408                                  ;NOW PUT 67 WORDS INTO SILO AND CHECK FOR DLT ERROR
1409
1410  005016  005001                          CLR     R1              ;CLEAR COUNTER
1411  005020  005201                  4$:     INC     R1              ;ADD 1 TO COUNT
1412  005022  010177  174100                  MOV     R1,@RSDB        ;PUT INTO COUNTER
1413  005026  022701  000103                  CMP     #67.,R1         ;DONE YET?
1414  005032  001401                          BEQ     .+4             ;YES
1415  005034  000771                          BR      4$              ;NO DO AGAIN
1416  005036  032777  100000  174042        BIT     #DLT,@RSCS2     ;DID DATA LATE SET?
1417  005044  001001                          BNE     .+4             ;YES
1418  005046  104200                          HLT     !CS2            ;DLT DID NOT SET
1419
1420                                  ;DOES SILO CHANGE WITH 67TH WORD: IT SHOULD NOT
1421
1422  005050  017700  174052                  MOV     @RSDB,BAD       ;GET 1ST WD FORM SILO
1423  005054  012701  000001                  MOV     #1,GOOD         ;CORRECT ANS OF SILO
1424  005060  020100                          CMP     GOOD,BAD        ;IS SILO GOOD
1425  005062  001401                          BEQ     .+4             ;YES
1426  005064  104000                          HLT                     ;SILO SHOULD NOT HAVE MOVED
1427  005066  104400                  TST40:  SCOPE
```

```
                                        ;FLOAT A 1 AND A 0 THROUGH THE SILO
                                        
005070  104414          SILOFL: CLRDK                   ;CLEAR ALL RS REG
005072  000241                  CLC                     ;CLEAR CARRY TO FLOAT A 0
005074  012701  000001          MOV     #1,GOOD         ;GET UP DATA FOR INPUT TO SILO
005100  010177  174022  1$:     MOV     GOOD,@RSDB      ;LOAD DB
005104  006101                  ROL     GOOD            ;SHIFT BIT
005106  103401                  BCS     .+4             ;DONE YET SHIFTING?
005110  000773                  BR      1$              ;NO
005112  012701  177776          MOV     #-2,GOOD        ;SET ALL ONES
005116  000261                  SEC                     ;SET CARRY TO ROL
005120  010177  174002  3$:     MOV     GOOD,@RSDB      ;LOAD SILO
005124  006101                  ROL     GOOD            ;SHILT 0
005126  103774                  BCS     3$              ;LOOP TILL DONE
                                        
                                        ;NOW TEST OUTPUT
                                        
005130  000241                  CLC                     ;CLEAR CARRY
005132  012701  000001          MOV     #1,GOOD         ;CORRECT ANS
005136  017700  173764  2$:     MOV     @RSDB,BAD       ;GET DATA FROM DB
005142  020100                  CMP     GOOD,BAD        ;IS DB DATA GOOD?
005144  001401                  BEQ     .+4             ;YES
005146  104000                  HLT                     ;DB COULD NOT BUBBLE CORRECTLY
005150  006101                  ROL     GOOD            ;SETUP FOR NEXT ANS
005152  103401                  BCS     .+4             ;DONE YET?
005154  000770                  BR      2$              ;NO
005156  012701  177776          MOV     #-2,GOOD        ;SETUP FOR ANS
005162  017700  173740  4$:     MOV     @RSDB,BAD       ;GET DATA FROM DB
005166  020100                  CMP     GOOD,BAD        ;IS IT CORRECT?
005170  001401                  BEQ     .+4             ;YES
005172  104000                  HLT                     ;DB WRONG
005174  000261                  SEC                     ;SET CARRY TO ROL
005176  006101                  ROL     GOOD            ;SETUP FOR NEXT ANS
005200  103770                  BCS     4$              ;LOOP TILL DONE
```

```
                        ;*****************************************************************************
                        ;TEST 41                    TEST NO-OP FUNCTION
                        ;*****************************************************************************
005202  104400          TST41:  SCOPE

005204  104414          NOOP:   CLRDK                           ;CLEAR ALL RS REG
005206  012737  177777  027530          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
005214  013777  001102  173670          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
005222  012777  177777  173660          MOV     #-1,@RSWC       ;LOAD WC WITH -1
005230  012777  000001  173646          MOV     #1,@RSCS1       ;DO NO-OP FUNCTION
005236  032777  000001  173640          BIT     #1,@RSCS1       ;DID GO BIT CLEAR
005244  001401                          BEQ     .+4             ;YES
005246  104001                          HLT     !CS1            ;GO BIT SHOULD BE CLEARED
005250  005777  173644                  TST     @RSER           ;DID ANY ERRORS OCCURR?
005254  001401                          BEQ     .+4             ;NO
005256  104002                          HLT     !ER             ;ALL ERROR BITS SHOULD BE 0
005260  022777  177777  173622          CMP     #-1,@RSWC       ;DID WC MOVE?
005266  001401                          BEQ     .+4             ;NO
005270  104010                          HLT     !WC             ;WC SHOULD = 1777777
005272  005777  173616                  TST     @RSDA           ;DID DA MOV
005276  001401                          BEQ     .+4             ;NO
005300  104004                          HLT     !DA             ;DA SHOULD =0
005302  023777  001102  173602          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
005310  001401                          BEQ     .+4             ;NO
005312  104020                          HLT     !BA             ;BA MOVED
005314  033777  001156  173600          BIT     UNCMP,@RSAS     ;AS SHOULD NOT SET ON
005322  001401                          BEQ     .+4             ;A NO-OP FUNCTION
005324  104100                          HLT     !AS             ;AS SET WHY?
```

```
                        ;*****************************************************************************
                        ;TEST 42                    TEST NO-OP FUNCTION WITH ERROR BITS SET
                        ;*****************************************************************************
005326  104400          TST42:  SCOPE

005330  104414          NNOOP:  CLRDK                           ;CLEAR ALL RS REG
005332  012777  000007  173560          MOV     #7,@RSER        ;LOAD ER
005340  033777  001156  173554          BIT     UNCMP,@RSAS     ;IS ATA BIT SET?
005346  001001                          BNE     .+4             ;YES
005350  104100                          HLT     !AS             ;AS BIT SHOULD BE SET
005352  012737  177777  027530          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
005360  013777  001102  173524          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
005366  012777  177777  173514          MOV     #-1,@RSWC       ;LOAD WC WITH -1
005374  012777  000001  173502          MOV     #1,@RSCS1       ;DO NO-OP FUNCTION
005402  032777  000001  173474          BIT     #1,@RSCS1       ;DID GO BIT CLEAR
005410  001401                          BEQ     .+4             ;YES
005412  104001                          HLT     !CS1            ;GO BIT SHOULD BE CLEARED
005414  022777  150600  173474          CMP     #150600,@RSDS   ;DID ERR BITS SET?
005422  001401                          BEQ     .+4             ;NO
005424  104040                          HLT     !DS             ;ERR BIT SHOULD BE 0
005426  022777  177777  173454          CMP     #-1,@RSWC       ;DID WC MOVE?
005434  001401                          BEQ     .+4             ;NO
005436  104010                          HLT     !WC             ;WC SHOULD = 1777777
005440  005777  173450                  TST     @RSDA           ;DID DA MOV
005444  001401                          BEQ     .+4             ;NO
005446  104004                          HLT     !DA             ;DA SHOULD =0
005450  023777  001102  173434          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
005456  001401                          BEQ     .+4             ;NO
005460  104020                          HLT     !BA             ;BA MOVED
005462  033777  001156  173432          BIT     UNCMP,@RSAS     ;AS SHOULD BE SET
005470  001001                          BNE     .+4             ;IS IT?
005472  104100                          HLT     !AS             ;NO
005474  022777  000007  173416          CMP     #7,@RSER        ;DID ER CHANGE?
005502  001401                          BEQ     .+4             ;NO
005504  104002                          HLT     !ER             ;ER SHOULD NOT CHANGE
```

```
                        ;*****************************************************************************
                        ;TEST 43                    TEST NO-OP FUNCTION CODE 21
                        ;*****************************************************************************
005506  104400          TST43:  SCOPE

005510  104414          NOOP21: CLRDK                           ;CLEAR ALL RS REG
005512  012737  177777  027530          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
005520  013777  001102  173364          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
005526  012777  177777  173354          MOV     #-1,@RSWC       ;LOAD WC WITH -1
005534  012777  000021  173342          MOV     #21,@RSCS1      ;DO NO-OP FUNCTION
005542  032777  000001  173334          BIT     #1,@RSCS1       ;DID GO BIT CLEAR
005550  001401                          BEQ     .+4             ;YES
005552  104001                          HLT     !CS1            ;GO BIT SHOULD BE CLEARED
005554  005777  173340                  TST     @RSER           ;DID ANY EPRORS OCCURR?
005560  001401                          BEQ     .+4             ;NO
005562  104002                          HLT     !ER             ;ALL ERROR BITS SHOULD BE 0
005564  022777  177777  173316          CMP     #-1,@RSWC       ;DID WC MOVE?
005572  001401                          BEQ     .+4             ;NO
005574  104010                          HLT     !WC             ;WC SHOULD = 1777777
005576  005777  173312                  TST     @RSDA           ;DID DA MOV
005602  001401                          BEQ     .+4             ;NO
005604  104004                          HLT     !DA             ;DA SHOULD =0
005606  023777  001102  173276          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
005614  001401                          BEQ     .+4             ;NO
005616  104020                          HLT     !BA             ;BA MOVED
005620  033777  001156  173274          BIT     UNCMP,@RSAS     ;AS SHOULD NOT SET ON
005626  001401                          BEQ     .+4             ;A NO-OP FUNCTION
005630  104100                          HLT     !AS             ;AS SET WHY?
005632  022777  004220  173244          CMP     #4220,@RSCS1    ;IS CS1 CORRECT?
005640  001401                          BEQ     .+4             ;YES
005642  104040                          HLT     !DS             ;CS1 SHOULD = 4220
```

```
                        ;*****************************************************************************
                        ;TEST 44                    TEST NO-OP FUNCTION CODE 21 WITH ERROR BITS SET
                        ;*****************************************************************************
005644  104400          TST44:  SCOPE

005646  104414          NNOP21: CLRDK                           ;CLEAR ALL RS REG
005650  012777  000007  173242          MOV     #7,@RSER        ;LOAD ER
005656  033777  001156  173236          BIT     UNCMP,@RSAS     ;IS ATA BIT SET?
005664  001001                        BNE     .+4             ;YES
005666  104100                        HLT     !AS             ;AS BIT SHOULD BE SET
005670  012737  177777  027530          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
005676  013777  001102  173206          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
005704  012777  177777  173176          MOV     #-1,@RSWC       ;LOAD WC WITH -1
005712  012777  000021  173164          MOV     #21,@RSCS1      ;DO NO-OP FUNCTION
005720  032777  000001  173156          BIT     #1,@RSCS1       ;DID GO BIT CLEAR
005726  001401                        BEQ     .+4             ;YES
005730  104001                        HLT     !CS1            ;GO BIT SHOULD BE CLEARED
005732  022777  150600  173156          CMP     #150600,@RSDS   ;DID ERR BITS SET?
005740  001401                        BEQ     .+4             ;NO
005742  104040                        HLT     !DS             ;ERR BIT SHOULD BE 0
005744  022777  177777  173136          CMP     #-1,@RSWC       ;DID WC MOVE?
005752  001401                        BEQ     .+4             ;NO
005754  104010                        HLT     !WC             ;WC SHOULD = 1777777
005756  005777  173132                TST     @RSDA           ;DID DA MOV
005762  001401                        BEQ     .+4             ;NO
005764  104004                        HLT     !DA             ;DA SHOULD =0
005766  023777  001102  173116          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
005774  001401                        BEQ     .+4             ;NO
005776  104020                        HLT     !BA             ;BA MOVED
006000  033777  001156  173114          BIT     UNCMP,@RSAS     ;AS SHOULD BE SET
006006  001001                        BNE     .+4             ;IS IT?
006010  104100                        HLT     !AS             ;NO
006012  022777  000007  173100          CMP     #7,@RSER        ;DID ER CHANGE?
006020  001401                        BEQ     .+4             ;NO
006022  104002                        HLT     !ER             ;ER SHOULD NOT CHANGE
006024  022777  104220  173052          CMP     #104220,@RSCS1  ;IS CS1 CORRECT?
006032  001401                        BEQ     .+4             ;YES
006034  104040                        HLT     !DS             ;CS1 SHOULD = 104220
```

```
                        ;*****************************************************************************
                        ;TEST 45                    TEST DRIVE CLEAR FUNCTION WITH ERRORS SET
                        ;*****************************************************************************
006036  104400          TST45:  SCOPE
                        ;FIRST SET ALL R/W BITS IN DISK REG
                        ;DO DRIVE CLEAR-ALL R/W BITS SHOULD BE CLEARED

006040  104414          DRCLR:  CLRDK                           ;CLEAR ALL RS REG
006042  012777  177777  173040          MOV     #177777,@RSWC   ;LOAD RSWC
006050  012777  177777  173036          MOV     #177777,@RSDA   ;SET ALL POSSIBLE
006056  012777  177017  173034          MOV     #177017,@RSER   ;BITS IN DISK REG
006064  012777  000070  173036          MOV     #70,@RSMR       ;SET THESE BITS
006072  012777  000011  173004          MOV     #11,@RSCS1      ;SET DRIVE CLEAR
006100  017700  173002                  MOV     @RSCS2,BAD      ;GET CS2 DATA
006104  042700  177640                  BIC     #177640,BAD     ;CLEAR JUNK
006110  013701  001152                  MOV     UNNUM,GOOD      ;GET DRIVE UNIT
006114  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
006120  020100                          CMP     GOOD,BAD        ;IS UNIT # THE SAME
006122  001401                          BEQ     .+4             ;YES
006124  104000                          HLT                     ;UNIT # IN CS2 GOT MODIFIED
006126  005777  172762                  TST     @RSDA           ;DID DA CLEAR
006132  001401                          BEQ     .+4             ;YES
006134  104004                          HLT     !DA             ;DA SHOULD BE 0
006136  005777  172756                  TST     @RSER           ;DID ER CLEAR
006142  001401                          BEQ     .+4             ;YES
006144  104002                          HLT     !ER             ;ER SHOULD BE CLEARED
006146  017737  172756  001176          MOV     @RSMR,WORK      ;GET MR REG
006154  042737  177707  001176          BIC     #177707,WORK    ;CLEAR JUNK
006162  022737  000070  001176          CMP     #70,WORK        ;IS 70 STILL SET IN MR?
006170  001401                          BEQ     .+4             ;YES
006172  104220                          HLT     !MR             ;BITS 70 SHOULD NOT CLEAR
006174  022777  004210  172702          CMP     #4210,@RSCS1    ;DID THESE BITS CLEAR?
006202  001401                          BEQ     .+4             ;YES
006204  104001                          HLT     !CS1            ;CS1 SHOULD =4210
006206  033777  001156  172706          BIT     UNCMP,@RSAS     ;AS SHOULD NOT SET
006214  001401                          BEQ     .+4             ;ON A DRIVE CLEAR FUN
006216  104100                          HLT     !AS             ;WHY DID AS SET?
006220  022777  177777  172662          CMP     #177777,@RSWC   ;DID RSWC CHANGE?
006226  001401                          BEQ     .+4             ;NO
006230  104010                          HLT     !WC
```

```
                                        ;DO ONE WORD WRITE
                                        ;*************************************************************************
                                        ;TEST 46                    EXECUTE THE ONE WORD WRITE
                                        ;*************************************************************************
006232  104400                          TST46:  SCOPE

006234  104414                          WRTST:  CLRDK                   ;CLEAR ALL RS REG
006236  012737  177777  027530                  MOV     #177777,OUTBUF  ;DATA TO BE X-FERED
006244  013777  001102  172640                  MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
006252  012777  177777  172630                  MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
006260  012777  000060  172616          1$:     MOV     #60,@RSCS1      ;SET FUNCTION WITH NO GO BIT
006266  022777  177777  172614                  CMP     #-1,@RSWC       ;DID WC MOVE?
006274  001401                                  BEQ     .+4             ;NO
006276  104010                                  HLT     !WC             ;WC MOVED
006300  023777  001102  172604                  CMP     @#OBUFSV,@RSBA  ;DID RSBA MOVE?
006306  001401                                  BEQ     .+4             ;NO
006310  104020                                  HLT     !BA             ;BA MOVED
006312  052777  000001  172564                  BIS     #BIT0,@RSCS1    ;SET GO BIT
006320  105777  172560                  2$:     TSTB    @RSCS1          ;TEST FOR RDY=0
006324  100001                                  BPL     .+4             ;RDY=0
006326  104001                                  HLT     !CS1            ;RDY SHOULD = 0
006330  004737  026744                          JSR     PC,WAITRY       ;WAIT FOR READY
006334  104001                                  HLT     !CS1            ;SHOULD = 260 RDY NEVER CAME UP
006336  022777  000001  172550                  CMP     #1,@RSDA        ;IS RSDA CORRECT
006344  001401                                  BEQ     .+4             ;RSDA OK
006346  104004                                  HLT     !DA             ;SHOULD = 1 SHOULD INCREMENT
006350  022777  004260  172526          3$:     CMP     #4260,@RSCS1    ;IS ERROR FLAG SET?
006356  001401                                  BEQ     .+4             ;NO! X-FER OK
006360  104047                                  HLT     !CS1!ER!DS!DA   ;ERROR DURING X-FER
006362  005777  172522                  4$:     TST     @RSWC           ;FETCH WORD COUNT
006366  001401                                  BEQ     .+4             ;WORD COUNT DID OVERFLOW
006370  104010                                  HLT     !WC             ;SHOULD = 0 FAILED TO INCREMENT
006372  022777  010600  172516                  CMP     #10600,@RSDS    ;IS RSDS OK?
006400  001401                                  BEQ     .+4             ;YES
006402  104044                                  HLT     !DS!DA          ;NO
006404  013701  001152                          MOV     UNNUM,GOOD      ;GET UNIT #
006410  052701  000100                          BIS     #100,GOOD       ;SET IR BIT
006414  017700  172466                          MOV     @RSCS2,BAD      ;GET CS2
006420  020100                                  CMP     GOOD,BAD        ;IS CS2 CORRECT?
006422  001401                                  BEQ     .+4             ;YES
006424  104000                                  HLT                     ;BAD = CS2 GOOD IS CORRECT ANS
006426  017700  172460                          MOV     @RSBA,BAD       ;GET BA DATA
006432  013701  001102                          MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
006436  062701  000002                          ADD     #2,GOOD         ;UPDATE OUTBUFFER
006442  020100                                  CMP     GOOD,BAD        ;IS RSBA CORRECT
006444  001401                                  BEQ     .+4             ;YES
006446  104000                                  HLT                     ;BA FAILED TO INCREMENT
006450  005777  172444                          TST     @RSER           ;DID ANY ERRORS SET?
006454  001401                                  BEQ     .+4             ;NO
006456  104040                                  HLT     !DS
```

```
                                        ;TEST READ FUNCTION
                                        ;*************************************************************************
                                        ;TEST 47                EXECUTE THE ONE WORD READ
                                        ;*************************************************************************
006460  104400                  TST47:  SCOPE

006462  104414                  RDTST:  CLRDK                           ;CLEAR ALL RS REG
006464  005037  027530                  CLR     OUTBUF                  ;CLR TO READ INTO
006470  013777  001102  172414          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
006476  012777  177777  172404          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
006504  012777  000071  172372  1$:     MOV     #71,@RSCS1              ;GO READ
006512  105777  172366          2$:     TSTB    @RSCS1                  ;TEST FOR BUSY=1
006516  100001                          BPL     .+4                     ;BUSY SET
006520  104001                          HLT     !CS1                    ;BUSY NOT SET
006522  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
006526  104001                          HLT     !CS1                    ;TIMEOUT RDY DID NOT SET
006530  022777  000001  172356          CMP     #BIT0,@RSDA             ;WAS RSDA INCREMENTED BY 1
006536  001401                          BEQ     .+4                     ;RSDA OK
006540  104046                          HLT     !DA!ER!DS               ;RSDA SHOULD CONTAIN A 1
006542  022777  004270  172334  3$:     CMP     #4270,@RSCS1            ;IS ERROR FLAG SET?
006550  001401                          BEQ     .+4                     ;NO! X-FER OK
006552  104043                          HLT     !CS1!ER!DS              ;RSCS1 SHOULD = 270
006554  005777  172330          4$:     TST     @RSWC                   ;TEST WC
006560  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
006562  104010                          HLT     !WC                     ;SHOULD = 0
006564  013701  001152                  MOV     UNNUM,GOOD              ;GET CORRECT
006570  052701  000100                  BIS     #100,GOOD               ;ANS OF CS2
006574  017700  172306                  MOV     @RSCS2,BAD              ;GET CS2
006600  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
006602  001401                          BEQ     .+4                     ;YES
006604  104000                          HLT                             ;GOOD = CORRECT ANS FOR CS2
006606  017700  172300                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
006612  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
006616  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
006622  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
006624  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
006626  104000                          HLT                             ;RSBA FAILED TO INCREMENT
006630  013700  027530                  MOV     OUTBUF,BAD              ;GET DATA READ FROM DISK
006634  012701  177777                  MOV     #-1,GOOD                ;GET CORRECT ANS
006640  020100                          CMP     GOOD,BAD                ;IS OUTBUF CORRECT
006642  001401                          BEQ     .+4                     ;YES
006644  104000                          HLT                             ;GOOD=CORRECT ANS BAD=DATA READ FROM DISK
```

```
                                ;*******************************************************************************
                                ;TEST 50                    TEST WRITE CHECK
                                ;*******************************************************************************
006646  104400                  TST50:  SCOPE
                                ;DO A ONE WORD WRITE CHECK

                                ;* * *EXECUTE THE ONE WORD WRITE CHECK* * *

006650  104414                  WRCKT:  CLRDK                           ;CLEAR ALL RS REG
006652  012737  177777  027530          MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
006660  013777  001102  172224          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
006666  012777  177777  172214          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
006674  012777  000051  172202  1$:     MOV     #51,@RSCS1              ;GO WRITE CHECK
006702  105777  172176          2$:     TSTB    @RSCS1                  ;TEST FOR READY
006706  100001                          BPL     .+4                     ;NOT READY
006710  104001                          HLT     !CS1                    ;BUSY FAILED TO SET
006712  004737  026744          RSWCWT: JSR     PC,WAITRY               ;WAIT FOR READY
006716  104001                          HLT     !CS1                    ;BUSY FAILED TO CLEAR
006720  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
006724  052701  000100                  BIS     #100,GOOD               ;SET BIT IR
006730  017700  172152                  MOV     @RSCS2,BAD              ;GET CS2
006734  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
006736  001401                          BEQ     .+4                     ;YES
006740  104000                          HLT                             ;GOOD = CORRECT ANS FOR CS2
006742  022777  004250  172134  2$:     CMP     #4250,@RSCS1            ;ANY ERRORS?
006750  001401                          BEQ     .+4                     ;X-FER OK
006752  104046                          HLT     !DA!ER!DS               ;ERROR DUR X-FER
006754  022777  000001  172132  3$:     CMP     #BIT0,@RSDA             ;WAS DAR INCREMENTED BY 1
006762  001401                          BEQ     .+4                     ;RSDA OK
006764  104004                          HLT     !DA                     ;DAR SHOULD = 1
006766  005777  172116                  TST     @RSWC                   ;TEST FOR OVERFLOW
006772  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
006774  104010                          HLT     !WC                     ;SHOULD = 0
006776  017700  172110                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
007002  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
007006  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
007012  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
007014  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
007016  104000                          HLT                             ;RSBA FAILED TO INCREMENT
```

```
                                        ;DO ONE WORD WRITE ON -B- PORT
                                        ;IF A 1 WD TRANSFER KEEPS SETTING NEM PROGAM WILL GO AND UPDATE
                                        ;ADDRESS (OBUFSV) ON -B- PORT BY 4K AND TRY TRANSFER AGAIN UNTILL IT
                                        ;REACHES 28K. IF NO TRANSFER IT THEN SKIPS WRITE,
                                        ;READ AND WRITE CHECK ON -B- PORT
                                        ;TO INHIBIT OBUFSV FROM CHANGING SET BIT 12

                                        ;*************************************************************************
                                        ;TEST 51                EXECUTE THE ONE WORD WRITE ON -B- PORT
                                        ;*************************************************************************
007020  104400                  TST51:  SCOPF

007022  104414                  WRTSTB: CLRDK                   ;CLEAR ALL RS REG
007024  013737  001102  001176          MOV     @#OBUFSV,WORK   ;GET LOC OF PSBA TO LOAD
007032  012777  177777  172136          MOV     #177777,@WORK   ;DATA TO BE X-FERED
007040  013777  001102  172044          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
007046  012777  177777  172034          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
007054  012777  002061  172022          MOV     #2061,@RSCS1    ;TEST B PORT
007062  105777  172016          2$:     TSTB    @RSCS1          ;TEST FOR RDY=0
007066  100001                          BPL     .+4             ;RDY=0
007070  104001                          HLT     !CS1            ;RDY SHOULD = 0
007072  004737  026744                  JSR     PC,WAITRY       ;WAIT FOR READY
007076  104001                          HLT     !CS1            ;SHOULD = 260 RDY NEVER CAME UP
007100  032777  010000  171720          BIT     #BIT12,@SWR     ;INHIBIT ADDRESS?
007106  001006                          BNE     3$              ;YES
007110  032777  004000  171770          BIT     #BIT11,@RSCS2   ;DID NEM SET?
007116  001402                          BEQ     3$              ;NO
007120  000137  025776                  JMP     FINDM           ;GO FIND MEMORY ON PORT B
007124  022777  000001  171762  3$:     CMP     #1,@RSDA        ;IS RSDA CORRECT
007132  001401                          BEQ     .+4             ;RSDA OK
007134  104004                          HLT     !DA             ;SHOULD = 1 SHOULD INCREMENT
007136  022777  006260  171740          CMP     #6260,@RSCS1    ;IS CS1 CORRECT?
007144  001401                          BEQ     4$              ;YES
007146  104001                          HLT     !CS1
007150  005777  171734          4$:     TST     @RSWC           ;FETCH WORD COUNT
007154  001401                          BEQ     .+4             ;WORD COUNT DID OVERFLOW
007156  104010                          HLT     !WC             ;SHOULD = 0 FAILED TO INCREMENT
007160  022777  010600  171730          CMP     #10600,@RSDS    ;IS RSDS OK?
007166  001401                          BEQ     .+4             ;YES
007170  104044                          HLT     !DS!DA          ;NO
007172  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
007176  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
007202  017700  171700                  MOV     @RSCS2,BAD      ;GET CS2
007206  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
007210  001401                          BEQ     .+4             ;YES
007212  104000                          HLT                     ;BAD = CS2 GOOD IS CORRECT ANS
007214  017700  171672                  MOV     @RSBA,BAD       ;GET BA DATA
007220  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
007224  062701  000002                  ADD     #2,GOOD         ;UPDATE OUTBUFFER
007230  020100                          CMP     GOOD,BAD        ;IS RSBA CORRECT
007232  001401                          BEQ     .+4             ;YES
007234  104000                          HLT                     ;BA FAILED TO INCREMENT
```

```
                                ;*****************************************************************************
                                ;TEST 52                EXECUTE THE ONE WORD READ ON -B- PORT
                                ;*****************************************************************************
007236  104400                  TST52:  SCOPE

007240  104414                  RDTSTB: CLRDK                           ;CLEAR ALL RS REG
007242  005037  001176                  CLR     WORK                    ;CLR TO READ INTO
007246  013777  001102  171636          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
007254  012777  177777  171626          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
007262  012777  002071  171614          MOV     #2071,@RSCS1            ;B PORT
007270  105777  171610          2$:     TSTB    @RSCS1                  ;TEST FOR BUSY=1
007274  100001                          BPL     .+4                     ;BUSY SET
007276  104001                          HLT     !CS1                    ;BUSY NOT SET
007300  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
007304  104001                          HLT     !CS1                    ;TIMEOUT RDY DID NOT SET
007306  022777  000001  171600          CMP     #BIT0,@RSDA             ;WAS RSDA INCREMENTED BY 1
007314  001401                          BEQ     .+4                     ;RSDA OK
007316  104046                          HLT     !DA!ER!DS               ;RSDA SHOULD CONTAIN A 1
007320  022777  006270  171556          CMP     #6270,@RSCS1            ;TST B PORT
007326  001401                          BEQ     4$                      ;OK
007330  104001                          HLT     !CS1                    ;CS1 SHOULD = 6270
007332  005777  171552          4$:     TST     @RSWC                   ;TEST WC
007336  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
007340  104010                          HLT     !WC                     ;SHOULD = 0
007342  013701  001152                  MOV     UNNUM,GOOD              ;GET CORRECT
007346  052701  000100                  BIS     #100,GOOD               ;ANS OF CS2
007352  017700  171530                  MOV     @RSCS2,BAD              ;GET CS2
007356  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
007360  001401                          BEQ     .+4                     ;YES
007362  104000                          HLT                             ;GOOD = CORRECT ANS FOR CS2
007364  017700  171522                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
007370  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
007374  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
007400  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
007402  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
007404  104000                          HLT                             ;RSBA FAILED TO INCREMENT
007406  013737  001102  001176          MOV     @#OBUFSV,WORK           ;GET DATA READ FROM DISK
007414  017700  171556                  MOV     @WORK,BAD
007420  012701  177777                  MOV     #-1,GOOD                ;GET CORRECT ANS
007424  020100                          CMP     GOOD,BAD                ;IS OUTBUF CORRECT
007426  001401                          BEQ     .+4                     ;YES
007430  104000                          HLT                             ;GOOD=CORRECT ANS BAD=DATA READ FROM DISK
```

```
                        ;*****************************************************************************
                        ;TEST 53                    TEST WRITE CHECK ON -B- PORT
                        ;*****************************************************************************
007432  104400          TST53:  SCOPE

007434  104414          WRCKTB: CLRDK                           ;CLEAR ALL RS REG
007436  013737  001102  001176          MOV     @#OBUFSV,WORK   ;GET LOC FOR
007444  012777  177777  171524          MOV     #177777,@WORK   ;DATA TO BE X-FERED
007452  013777  001102  171432          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
007460  012777  177777  171422          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
007466  012777  002051  171410          MOV     #2051,@RSCS1    ;B PORT
007474  105777  171404          2$:     TSTB    @RSCS1          ;TEST FOR READY
007500  100001                          BPL     .+4             ;NOT READY
007502  104001                          HLT     !CS1            ;BUSY FAILED TO SET
007504  004737  026744                  JSR     PC,WAITRY       ;WAIT FOR READY
007510  104001                          HLT     !CS1            ;BUSY FAILED TO CLEAR
007512  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
007516  052701  000100                  BIS     #100,GOOD       ;SET BIT IR
007522  017700  171360                  MOV     @RSCS2,BAD      ;GET CS2
007526  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
007530  001401                          BEQ     .+4             ;YES
007532  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
007534  022777  006250  171342          CMP     #6250,@RSCS1    ;IS CS1 CORRECT?
007542  001401                          BEQ     3$              ;YES
007544  104001                          HLT     !CS1            ;CS1 SHOULD = 6250
007546  022777  000001  171340  3$:     CMP     #BIT0,@RSDA     ;WAS DAR INCREMENTED BY 1
007554  001401                          BEQ     .+4             ;RSDA OK
007556  104004                          HLT     !DA             ;DAR SHOULD = 1
007560  005777  171324                  TST     @RSWC           ;TEST FOR OVERFLOW
007564  001401                          BEQ     .+4             ;WORD COUNT DID OVERFLOW
007566  104010                          HLT     !WC             ;SHOULD = 0
007570  017700  171316                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
007574  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
007600  062701  000002                  ADD     #2,GOOD         ;UPDATE IT
007604  020001                          CMP     BAD,GOOD        ;IS RSBA CORRECT
007606  001401                          BEQ     .+4             ;YES EXECUTE CONTINUE
007610  104000                          HLT                     ;RSBA FAILED TO INCREMENT
```

```
1898  007612  013737  001102  001170  NXM:    MOV     OBUFSV,BPORTT   ;SAVE -B- PORT BUFFER
1899  007620  012737  027530  001102          MOV     #OUTBUF,OBUFSV  ;RESTORE OBUFSV
1900
1901                                  ;DESELECT THEN SELECT UNIT NUMBER IN RSCS2 CHECK TIMING
1902                                  ;* ************************************************************************
1903                                  . .ST 54                DESELECT THEN SELECT UNIT NUMBER TIMING TEST
1904                                  ;************************************************************************
1905  007626  104400                  TST54:  SCOPE
1906
1907  007630  104414                  UNITST: CLRDK                           ;CLEAR ALL RS REG
1908  007632  005004                          CLR     R4                      ;CLEAR R4
1909  007634  020437  001152                  CMP     R4,UNNUM                ;IS THIS CORRECT UNIT #?
1910  007640  001001                          BNE     3$                      ;NO THEN USE IT
1911  007642  005204                          INC     R4                      ;GET WRONG DRIVE
1912  007644  012737  177777  027530  3$:     MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
1913  007652  013777  001102  171232          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
1914  007660  012777  177777  171222          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
1915  007666  012703  000061                  MOV     #61,R3                  ;GET WRITE FUNCTION
1916  007672  013705  001152                  MOV     UNNUM,R5                ;GET CORRECT UNIT #
1917  007676  012701  172040                  MOV     #172040,R1              ;GET CS1 REG
1918  007702  010461  000010                  MOV     R4,10(R1)               ;LOAD WRONG UNIT # INTO CS2
1919  007706  000240                          NOP                             ;WAIT FOR DRIVE TO SETTLE
1920  007710  010561  000010                  MOV     R5,10(R1)               ;LOAD CORRECT UNIT #
1921  007714  010311                  1$:     MOV     R3,(R1)                 ;LOAD FUNCTION IN CS1
1922  007716  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
1923  007722  104001                          HLT     !CS1                    ;SHOULD = 260 RDY NEVER CAME UP
1924  007724  022777  004260  171152          CMP     #4260,@RSCS1            ;IS ERROR FLAG SET?
1925  007732  001400                          BEQ     .+4                     ;NO! X-FER OK
1926  007734  104047                          HLT     !CS1!ER!DS!DA           ;ERROR DURING X-FER
1927  007736  022777  000001  171150          CMP     #1,@RSDA                ;IS RSDA CORRECT
1928  007744  001401                          BEQ     .+4                     ;RSDA OK
1929  007746  104004                          HLT     !DA                     ;SHOULD = 1 SHOULD INCREMENT
1930  007750  005777  171134                  TST     @RSWC                   ;FETCH WORD COUNT
1931  007754  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
1932  007756  104010                          HLT     !WC                     ;SHOULD = 0 FAILED TO INCREMENT
1933  007760  022777  010600  171130          CMP     #10600,@RSDS            ;IS RSDS OK?
1934  007766  001401                          BEQ     .+4                     ;YES
1935  007770  104044                          HLT     !DS!DA                  ;NO
1936  007772  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
1937  007776  052701  000100                  BIS     #100,GOOD               ;SET IR BIT
1938  010002  017700  171100                  MOV     @RSCS2,BAD              ;GET CS2
1939  010006  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
1940  010010  001401                          BEQ     .+4                     ;YES
1941  010012  104000                          HLT                             ;BAD = CS2 GOOD IS CORRECT ANS
1942  010014  017700  171072                  MOV     @RSBA,BAD               ;GET BA DATA
1943  010020  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
1944  010024  062701  000002                  ADD     #2,GOOD                 ;UPDATE OUTBUFFER
1945  010030  020100                          CMP     GOOD,BAD                ;IS RSBA CORRECT
1946  010032  001401                          BEQ     .+4                     ;YES
1947  010034  104000                          HLT                             ;BA FAILED TO INCREMENT
```

```
                                        ;TEST CURRENT ADDRESS INHIBT-BAI IN RSCS2
                                        ;DO A ONE WORD WRITE AND SEE
                                        ;IF RSBA INCREMENTED AFTER THE X-FER

                                        ;*************************************************************************
                                        ;TEST 55                TEST BAI IN RSCS2
                                        ;*************************************************************************
010036  104400                          TST55:  SCOPE

010040  104414                          BAITST: CLRDK                           ;CLEAR ALL RS REG
010042  013777  001102  171042                  MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDR
010050  012777  177777  171032                  MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
010056  052777  000010  171022                  BIS     #BAI,@RSCS2     ;SET BAI BIT
010064  012777  000061  171012                  MOV     #61,@RSCS1      ;WRITE
010072  004737  026744                          JSR     PC,WAITRY       ;WAIT FOR READY
010076  104001                                  HLT     !CS1            ;RDY DID NOT SET
010100  013701  001102                  1$:     MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD BE
010104  017700  171002                          MOV     @RSBA,BAD       ;WHAT RSBA IS
010110  020100                                  CMP     GOOD,BAD        ;COMPARE
010112  001401                                  BEQ     .+4             ;YES
010114  104000                                  HLT                     ;BAD=OUTBUF GOOD = CORRECT ANS
010116  005777  170776                          TST     @RSER           ;ANY ERRORS?
010122  001401                                  BEQ     .+4             ;NO
010124  104040                                  HLT     !DS             ;YES
010126  104414                                  CLRDK                   ;CLEAR ALL RS REG
010130  032777  000010  170750                  BIT     #BAI,@RSCS2     ;DID BAI CLEAR?
010136  001401                                  BEQ     .+4             ;YES
010140  104002                                  HLT     !ER             ;BAI DID NOT SET
```

```
                                ;*****************************************************************************
                                ;TEST 56                    TEST NON-EXISTENT MEMORY ERROR BIT IN CS2
                                ;*****************************************************************************
010142  104400                  TST56:  SCOPE

010144  104414                  NXMTSM: CLRDK                           ;CLEAR ALL RS REG
010146  052777  000010  170732          BIS     #BAI,@RSCS2             ;SET BAI BIT
010154  012777  177600  170726          MOV     #-200,@RSWC             ;SET UP WORD COUNT
010162  012777  173000  170722          MOV     #173000,@RSBA           ;SET UP CURRENT ADDRESS
010170  012777  001471  170706          MOV     #1471,@RSCS1            ;READ AND LOAD A16 +A17 FOR 18 BIT ADDRESS
010176  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
010202  104040                          HLT     !DS                     ;READY NEVER CAME UP
010204  013701  001152          TSTNEM: MOV     UNNUM,GOOD              ;GET UNIT NO.
010210  052701  004310                  BIS     #4310,GOOD              ;SET BAI+OR BITS
010214  017700  170666                  MOV     @RSCS2,BAD              ;GET CS2
010220  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
010222  001401                          BEQ     .+4                     ;YES
010224  104000                          HLT                             ;BAD=CS2 GOOD=CORRECT ANS FOR CS2
010226  022777  145670  170650          CMP     #145670,@RSCS1          ;DID TRE SET?
010234  001401                          BEQ     .+4                     ;YES
010236  104001                          HLT     !CS1                    ;TRE SHOULD SET BECAUSE OF NEM
010240  012777  040000  170636          MOV     #TRE,@RSCS1             ;CLEAR TRE
010246  017700  170634                  MOV     @RSCS2,BAD              ;GET CS2
010252  013701  001152                  MOV     UNNUM,GOOD              ;GET DRIVE
010256  052701  000310                  BIS     #310,GOOD               ;SET IR
010262  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
010264  001401                          BEQ     .+4                     ;YES
010266  104200                          HLT     !CS2                    ;CS2=BAD GOOD IS CORRECT ANS FOR CS2

                                ;*****************************************************************************
                                ;TEST 57                    TEST BLOCK SEARCH FUNCTION, PIP AND DRY BIT AND ADDR. CONF BIT
                                ;*****************************************************************************
010270  104400                  TST57:  SCOPE

010272  104414                  BLOCK:  CLRDK                           ;CLEAR ALL RS REG
010274  012777  000032  170612          MOV     #32,@RSDA               ;DO A SEARCH FOR SECTOR 32
010302  013777  001102  170602          MOV     @#OBUFSV,@RSBA          ;LOAD REGS. TO MAKE
010310  012777  177777  170572          MOV     #-1,@RSWC               ;SURE THEY DO NOT CHANGE
010316  005037  001176                  CLR     WORK                    ;SETUP FOR TIMEOUT ROUTINE
010322  032777  001000  170600  4$:     BIT     #1000,@RSMR             ;WAIT FOR DISK TO
010330  001004                          BNE     3$                      ;REACH SECTOR 32
010332  005337  001176                  DEC     WORK                    ;TIME OUT
010336  001371                          BNE     4$                      ;ROUTINE
010340  104220                          HLT     !MR                     ;COULD NOT FIND SECTOR 32
```

```
2020  010342  005077  170546          3$:     CLR     @RSDA           ;NOW SEARCH FOR 0
2021  010346  012777  000031  170530          MOV     #31,@RSCS1      ;DO A BLOCK SEARCH FUNCTION
2022  010354  032777  000200  170534          BIT     #DRY,@RSDS      ;IS DRY CLEARED?
2023  010362  001402                          BEQ     1$              ;YES
2024  010364  104040                          HLT     !DS             ;DRY SHOULD BE CLEARED DURING A BLOCK SEARCH
2025  010366  000500                          BR      OOUT            ;GET OUT BECAUSE OF TIMING
2026  010370  032777  020000  170520  1$:     BIT     #20000,@RSDS    ;IS PIP SET?
2027  010376  001001                          BNE     .+4             ;YES
2028  010400  104040                          HLT     !DS             ;PIP SHOULD BE SET
2029  010402  012701  020000                  MOV     #20000,GOOD     ;SETUP FOR TIMEOUT ROUTINE
2030  010406  005301                  2$:     DEC     GOOD            ;DO TIMEOUT
2031  010410  001466                          BEQ     TTMOUT          ;TIMED OUT
2032  010412  032777  000200  170476          BIT     #DRY,@RSDS      ;DID DRY SET?
2033  010420  001772                          BEQ     2$              ;NO
2034  010422  022777  110600  170466          CMP     #110600,@RSDS   ;DID PIP CLEAR?
2035  010430  001401                          BEQ     .+4             ;YES
2036  010432  104040                          HLT     !DS             ;PIP BIT DID NOT CLEAR
2037  010434  022777  104230  170442          CMP     #104230,@RSCS1  ;DID SC SET?
2038  010442  001401                          BEQ     .+4             ;YES
2039  010444  104041                          HLT     !CS1!DS         ;SC DID NOT SET
2040  010446  013737  001152  001176          MOV     UNNUM,WORK      ;GET CORRECT AS BIT
2041  010454  005001                          CLR     GOOD            ;IN RSAS REG
2042  010456  000261                          SEC                     ;THAT SHOULD
2043  010460  006101                  5$:     ROL     GOOD            ;BE SET
2044  010462  005737  001176                  TST     WORK
2045  010466  001403                          BEQ     6$
2046  010470  005337  001176                  DEC     WORK
2047  010474  000771                          BR      5$
2048  010476  020177  170420          6$:     CMP     GOOD,@RSAS      ;IS RSAS CORRECT?
2049  010502  001403                          BEQ     7$              ;YES
2050  010504  017700  170412                  MOV     @RSAS,BAD       ;NO
2051  010510  104000                          HLT
2052  010512  010177  170404          7$:     MOV     GOOD,@RSAS      ;CLEAR AS REG
2053  010516  005777  170400                  TST     @RSAS           ;DID IT CLEAR?
2054  010522  001401                          BEQ     .+4             ;YES
2055  010524  104100                          HLT     !AS             ;NO
2056  010526  022777  010600  170362          CMP     #10600,@RSDS    ;DID ATA CLEAR?
2057  010534  001401                          BEQ     .+4             ;YES
2058  010536  104040                          HLT     !DS             ;NO
2059  010540  023777  001102  170344          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE?
2060  010546  001401                          BEQ     .+4             ;NO
2061  010550  104021                          HLT     !CS1!BA         ;BA MOVED WHY?
2062  010552  022777  177777  170330          CMP     #-1,@RSWC       ;DID WC MOVE?
2063  010560  001401                          BEQ     .+4             ;NO
2064  010562  104010                          HLT     !WC             ;WC MOVED WHY?
2065  010564  000401                          BR      OOUT            ;DONE GET OUT
2066  010566  104040          TTMOUT: HLT     !DS             ;DYR NEVER CAME UP
2067  010570                  OOUT:                           ;DONE
```

```
                                ;*****************************************************************
                                ;TEST 60                 ILLEGAL FUNCTION CODE TEST CODE 3 TO 51
                                ;*****************************************************************
010570  104400                  TST60:  SCOPE

                                ;TEST ILF BIT IN RSER AND ERR BIT IN RSDS
                                ;ALSO CHECKS TO SEE IF WC,BA, OR DA GOT MODIFIED
                                ;IF WISHING TO LOOP ON ONE FUNCTION ONLY, LOAD
                                ;FUNCTION INTO LOCATION ILLTAB: AND 0 IN FOLLOWING LOCATION

010572  013737  022560  001164  ILL51:  MOV     TIMES,TIMSV     ;SAVE LOOP COUNT
010600  012737  000010  022560          MOV     #10,TIMES       ;LOOP TEN TIMES
010606  104414                        CLRDK                   ;CLEAR ALL RS REG
010610  012703  027444          1$:     MOV     #ILLTAB,R3      ;GET STARTING ADD OF TABLE
010614  012300                  3$:     MOV     (R3)+,BAD       ;GET ILL FUN
010616  001513                          BEQ     ILFDN           ;DONE GET OUT
010620  013777  001102  170264          MOV     @#OBUFSV,@RSBA  ;SET UP REGS.
010626  012777  177777  170254          MOV     #-1,@RSWC       ;TO CHECK FOR CHANGE
010634  010077  170244          2$:     MOV     BAD,@RSCS1      ;DO ILLEGAL FUNCTION
010640  042700  000001                  BIC     #BIT0,BAD       ;CLEAR GO BIT
010644  010001                          MOV     BAD,GOOD        ;MOV ILLEGAL FUN INTO GOOD
010646  105777  170232          6$:     TSTB    @RSCS1          ;RDY SET?
010652  100375                          BPL     6$              ;NO
010654  052701  104200                  BIS     #104200,GOOD    ;SET ERROR BITS
010660  017700  170220          4$:     MOV     @RSCS1,BAD      ;PUT CS1 INTO BAD
010664  020100                          CMP     GOOD,BAD        ;IS CS1 CORRECT?
010666  001401                          BEQ     .+4             ;YES
010670  104000                          HLT                     ;GOOD IS WHAT CS1 SHOULD =BAD=CS1
010672  022777  000001  170220          CMP     #1,@RSER        ;DID ILF SET?
010700  001401                          BEQ     .+4             ;YES
010702  104043                          HLT     !CS1!ER!DS      ;ILF DID NOT SET
010704  022777  150600  170204          CMP     #150600,@RSDS   ;IS DS GOOD?
010712  001401                          BEQ     .+4             ;YES
010714  104043                          HLT     !CS1!ER!DS      ;ERR DID NOT SET
010716  017700  170164                  MOV     @RSCS2,BAD      ;GET CS2
010722  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
010726  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
010732  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
010734  001401                          BEQ     .+4             ;YES
010736  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
010740  013701  001156                  MOV     UNCMP,GOOD      ;GET CORRECT DRIVE
010744  042701  177400                  BIC     #177400,GOOD    ;CLEAR UNWANTED BITS
010750  017700  170146                  MOV     @RSAS,BAD       ;GET RSAS REG
010754  020001                          CMP     BAD,GOOD        ;DID CORRECT UNIT ANSWER?
010756  001401                          BEQ     .+4             ;YES
010760  104100                          HLT     !AS             ;NO WRONG DRIVE ANSWERED
```

```
2114  010762  023777  00.102  170122          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
2115  010770  001401                          BEQ     .+4             ;NO
2116  010772  104021                          HLT     !CS1!BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2117  010774  022777  177777  170106          CMP     #-1,@RSWC       ;DID WC MOVE?
2118  011002  001401                          BEQ     .+4             ;NO
2119  011004  104011                          HLT     !CS1!WC         ;WC MOVED
2120  011006  005777  170102                  TST     @RSDA           ;DID DA MOVE
2121  011012  001401                          BEQ     .+4             ;NO
2122  011014  104005                          HLT     !CS1!DA         ;DA MOVED
2123  011016  104414                          CLRDK                   ;CLEAR ALL ERRORS
2124  011020  005777  170074                  TST     @RSER           ;DID ERRORS CLEAR
2125  011024  001401                          BEQ     .+4             ;YES
2126  011026  104040                          HLT     !DS             ;ILF DID NOT CLEAR
2127  011030  022777  004200  170046          CMP     #4200,@RSCS1    ;DID ERRORS IN CS1 CLEAR
2128  011036  001401                          BEQ     .+4             ;YES
2129  011040  104040                          HLT     .DS
2130  011042  000137  010614                  JMP     3$              ;CONTINUE UNTIL DONE
2131  011046                  ILFDN:                                  ;DONE WITH ILLEGAL FUNCTION TEST
2132                          ;*****************************************************************************
2133                          ;TEST 61                ILLEGAL FUNCTION CODE TEST CODE 53 TO 77
2134                          ;*****************************************************************************
2135  011046  104400          TST61:  SCOPE
2136
2137                          ;TEST ILF BIT IN RSER AND ERR BIT IN RSDS
2138                          :ALSO CHECKS TO SEE IF WC,BA, OR DA GOT MODIFIED
2139                          ;IF WISHING TO LOOP ON ONE FUNCTION ONLY, LOAD
2140                          ;FUNCTION INTO LOCATION ILFTB2: AND 0 IN FOLLOWING LOCATION
2141
2142  011050  104414          ILLFUN: CLRDK                           ;CLEAR ALL RS REG
2143  011052  012703  027506          1$:     MOV     #ILFTB2,R3      ;GET TABLE OF ILL FUNS.
2144  011056  005037  001176          3$:     CLR     WORK            ;CLEAR WORK
2145  011062  012300                          MOV     (R3)+,BAD       ;GET ILL FUN
2146  011064  001554                          BEQ     ILFDNE          ;DONE GET OUT
2147  011066  013777  001102  170016          MOV     @#OBUFSV,@RSBA  ;SET UP REGS.
2148  011074  012777  177777  170006          MOV     #-1,@RSWC       ;TO CHECK FOR CHANGE
2149  011102  010037  001200                  MOV     BAD,WORK1       ;SHOULD WE TEST
2150  011106  042737  177707  001200          BIC     #177707,WORK1   ;BA AND WC
2151  011114  022737  000060  001200          CMP     #60,WORK1       ;TO INC
2152  011122  001003                          BNE     2$              ;NO
2153  011124  012737  000007  001176          MOV     #7,WORK         ;YES
2154  011132  010077  167746          2$:     MOV     BAD,@RSCS1      ;DO ILLEGAL FUNCTION
2155  011136  042700  000001          10$:    BIC     #BIT0,BAD       ;CLEAR GO BIT
2156  011142  010001                          MOV     BAD,GOOD        ;MOV ILLEGAL FUN INTO GOOD
```

```
2157  011144  105777  167734          6$:     TSTB    @RSCS1          ;RDY SET?
2158  011150  100375                          BPL     6$              ;NO
2159  011152  052701  144200                  BIS     #144200,GOOD    ;SET ERROR BITS
2160  011156  017700  167722                  MOV     @RSCS1,BAD      ;PUT CS1 INTO BAD
2161  011162  020100                          CMP     GOOD,BAD        ;IS CS1 CORRECT?
2162  011164  001401                          BEQ     .+4             ;YES
2163  011166  104000                          HLT                     ;GOOD IS WHAT CS1 SHOULD =BAD=CS1
2164  011170  022777  000001  167722          CMP     #1,@RSER        ;DID ILF SET?
2165  011176  001401                          BEQ     .+4             ;YES
2166  011200  104043                          HLT     !CS1!ER!DS      ;ILF DID NOT SET
2167  011202  022777  150600  167706          CMP     #150600,@RSDS   ;IS DS GOOD?
2168  011210  001401                          BEQ     .+4             ;YES
2169  011212  104043                          HLT     !CS1!ER!DS      ;ERR DID NOT SET
2170  011214  005777  167674                  TST     @RSDA           ;DID DA MOVE?
2171  011220  001401                          BEQ     .+4             ;NO
2172  011222  104005                          HLT     !CS1!DA         ;DA MOVED
2173  011224  005737  001176                  TST     WORK            ;IS THIS AN ILL WRITE FUN?
2174  011230  001025                          BNE     11$             ;YES
2175  011232  017700  167650                  MOV     @RSCS2,BAD      ;GET CS2
2176  011236  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
2177  011242  052701  001100                  BIS     #1100,GOOD      ;SET IR BIT
2178  011246  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2179  011250  001401                          BEQ     .+4             ;YES
2180  011252  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
2181  011254  023777  001102  167630          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
2182  011262  001401                          BEQ     .+4             ;NO
2183  011264  104021                          HLT     !CS1!BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2184  011266  022777  177777  167614          CMP     #-1,@RSWC       ;DID WC MOVE?
2185  011274  001401                          BEQ     .+4             ;NO
2186  011276  104011                          HLT     !CS1!WC         ;WC MOVED
2187  011300  000137  011366                  JMP     4$              ;CONTINUE UNTIL DONE
2188  011304  017700  167576          11$:    MOV     @RSCS2,BAD      ;GET CS2
2189  011310  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
2190  011314  052701  001300                  BIS     #1300,GOOD      ;SET IR BIT
2191  011320  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2192  011322  001401                          BEQ     .+4             ;YES
2193  011324  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
2194  011326  013737  001102  001176          MOV     @#OBUFSV,WORK   ;GET BUFFER ADDR.
2195  011334  062737  000002  001176          ADD     #2,WORK         ;UPDATE IT
2196  011342  023777  001176  167542          CMP     WORK,@RSBA      ;DID BA MOVE
2197  011350  001401                          BEQ     .+4             ;YES
2198  011352  104021                          HLT     !CS1!BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2199  011354  022777  000000  167526          CMP     #0,@RSWC        ;DID WC MOVE?
2200  011362  001401                          BEQ     .+4             ;NO
2201  011364  104011                          HLT     !CS1!WC         ;WC MOVED
2202  011366  104414          4$:     CLRDK                           ;CLEAR ALL ERRORS
2203  011370  022777  004200  167506          CMP     #4200,@RSCS1    ;DID ERRORS CLEAR
2204  011376  001401                          BEQ     .+4             ;YES
2205  011400  104040                          HLT     !DS             ;NO
2206  011402  005777  167512                  TST     @RSER           ;DID ERROR CLEAR
2207  011406  001401                          BEQ     .+4             ;NO
2208  011410  104040                          HLT     !DS             ;YES
2209  011412  000137  011056                  JMP     3$              ;CONTINUE UNTIL DONE
2210  011416          ILFDNE:                                         ;DONE WITH ILLEGAL FUNCTION TEST
```

```
                                        ;*****************************************************************************
                                        ;TEST 62                    TEST ILLEGAL FUNCTION CODE 67
                                        ;*****************************************************************************
011416  104400                  TST62:  SCOPE
                                
011420  104414                  ILF67:  CLRDK                           ;CLEAR ALL RS REG
011422  012777  177777  167460          MOV     #-1,@RSWC               ;SET WC TO -1
011430  013737  001102  001176          MOV     @#OBUFSV,WORK           ;GET OUTBUF ADD.
011436  062737  000002  001176          ADD     #2,WORK                 ;FOR TEST
011444  013777  001176  167440          MOV     WORK,@RSBA              ;LOAD ADDR.
011452  012777  000067  167424          MOV     #67,@RSCS1              ;DO FUNCTION 67
011460  105777  167420          1$:     TSTB    @RSCS1                  ;DONE YET?
011464  100375                          BPL     1$                      ;NO
011466  017700  167420                  MOV     @RSBA,BAD               ;GET BA REG
011472  013701  001102                  MOV     @#OBUFSV,GOOD           ;GET CORRECT ANS FOR RSBA
011476  020100                          CMP     GOOD,BAD                ;IS RSBA CORRECT?
011500  001401                          BEQ     .+4                     ;YES
011502  104000                          HLT                             ;BAD=RSBA GOOD=CORRECT ANS.
011504  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT NUMBER
011510  052701  001300                  BIS     #1300,GOOD              ;SET IR AND OR BITS
011514  017700  167366                  MOV     @RSCS2,BAD              ;GET CS2
011520  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
011522  001401                          BEQ     .+4                     ;YES
011524  104000                          HLT                             ;BAD=CS2 GOOD=CORRECT ANS
011526  022777  000001  167364          CMP     #1,@RSER                ;IS RSER CORRECT?
011534  001401                          BEQ     .+4                     ;YES
011536  104002                          HLT     !ER                     ;ER IS WRONG
011540  104414                          CLRDK                           ;CLEAR ALL RS REG
011542  005777  167352                  TST     @RSER                   ;DID ERROR CLEAR
011546  001401                          BEQ     .+4                     ;YES
011550  104040                          HLT     !DS                     ;NO
011552  012777  177700  167330          MOV     #-100,@RSWC             ;SET WC TO -100
011560  013737  001102  001176          MOV     @#OBUFSV,WORK           ;GET OUTBUF ADD.
011566  062737  000200  001176          ADD     #200,WORK               ;FOR TEST
011574  013777  001176  167310          MOV     WORK,@RSBA              ;LOAD ADDR
011602  012777  000067  167274          MOV     #67,@RSCS1              ;DO FUNCTION 67
011610  105777  167270          2$:     TSTB    @RSCS1                  ;DONE YET?
011614  100375                          BPL     2$                      ;NO
```

```
2249  011616  013701  001102          3$:     MOV     @#OBUFSV,GOOD   ;GET CORRECT ANS.
2250  011622  017700  167264                  MOV     @RSBA,BAD       ;GET BA REG
2251  011626  020100                          CMP     GOOD,BAD        ;IS RSBA CORRECT?
2252  011630  001401                          BEQ     .+4             ;YES
2253  011632  104000                          HLT                     ;BAD=RSBA GOOD=CORRECT ANS.
2254  011634  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT NUMBER
2255  011640  052701  001300                  BIS     #1300,GOOD      ;SET IR AND OR BITS
2256  011644  017700  167236                  MOV     @RSCS2,BAD      ;GET CS2
2257  011650  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2258  011652  001401                          BEQ     .+4             ;YES
2259  011654  104000                          HLT                     ;BAD=CS2 GOOD=CORRECT ANS
2260  011656  022777  000001  167234          CMP     #1,@RSER        ;IS RSER CORRECT?
2261  011664  001401                          BEQ     .+4             ;YES
2262  011666  104002                          HLT     !ER             ;ER IS WRONG
2263  011670  012777  040011  167206          MOV     #40011,@RSCS1   ;CLEAR ERRORS
2264  011676  022777  004210  167200          CMP     #4210,@RSCS1    ;DID THEY CLEAR IN CS1
2265  011704  001401                          BEQ     .+4             ;YES
2266  011706  104040                          HLT     !DS             ;NO
2267  011710  005777  167204                  TST     @RSER           ;DID RSER CLEAR
2268  011714  001401                          BEQ     .+4             ;YES
2269  011716  104040                          HLT     !DS             ;NO
2270  011720  005777  167176                  TST     @RSAS           ;DID RSAS CLEAR
2271  011724  001401                          BEQ     .+4             ;YES
2272  011726  104100                          HLT     !AS             ;NO
2273
2274                                  ;*****************************************************************************
2275                                  ;TEST 63                TEST PAR IN RSER
2276                                  ;*****************************************************************************
2277  011730  104400                  TST63:  SCOPE
2278
2279  011732  013737  001164  022560  PARTST: MOV     TIMSV,TIMES     ;RESTORE LOOP #
2280  011740  104414                          CLRDK                   ;CLEAR ALL RS REG
2281  011742  012777  000010  167150  1$:     MOV     #10,@RSER       ;SET PAR
2282  011750  022777  150600  167140          CMP     #150600,@RSDS   ;DID ERR,ATA AND DRY SET?
2283  011756  001401                          BEQ     .+4             ;YES
2284  011760  104042                          HLT     !DS!ER          ;ER SHOULD SET IF PAR SETS IN RSER
2285  011762  104414                          CLRDK                   ;CLEAR ALL RS REG
2286  011764  005777  167130                  TST     @RSER           ;DID PAR CLEAR?
2287  011770  001401                          BEQ     .+4             ;YES
2288  011772  104002                          HLT     !ER             ;PAR DID NOT CLEAR BY CLEAR  BIT
2289  011774  022777  010600  167114          CMP     #10600,@RSDS    ;DID ERROR BITS CLEAR
2290  012002  001401                          BEQ     .+4             ;YES
2291  012004  104040                          HLT     !DS             ;NO
```

```
                                ;CHECK BITS 12 TO 15 FOR 0
                                ;CHECK SECTOR FRACTION TO WATCH FOR MOVEMENT
                                ;CHECK CS BITS IN LA AND ADDRESS CONFIRM IN MR REG
                                ;
                                ;*************************************************************************
                                ;TEST 64                    LOOK AHEAD TEST
                                ;*************************************************************************
012006  104400                  TST64:  SCOPE
                                ;
012010  032777  170000  167106  LATST:  BIT     #170000,@RSLA   ;ARE BITS 12 TO 15 CLEARED?
012016  001401                          BEQ     .+4             ;YES
012020  104204                          HLT     !LA             ;BITS 12 TO 15 SHOULD BE CLEARED
012022  104400                  TST65:  SCOPE
                                ;
                                ;NOW TEST MOVEMENT IN SF BITS
                                ;
012024  012737  171005  001176          MOV     #171005,WORK    ;SET UP FOR TIME OUT ROUTIME
012032  017701  167066                  MOV     @RSLA,GOOD      ;GET READING FROM LA
012036  042701  007700                  BIC     #7700,GOOD      ;GET RID OF CS BITS
012042  005337  001176          1$:     DEC     WORK            ;WAIT FOR DISK
012046  001407                          BEQ     ERRR            ;TYPE ERROR
012050  017700  167050                  MOV     @RSLA,BAD       ;READ LA
012054  042700  007700                  BIC     #7700,BAD       ;CLEAR CS BITS
012060  020100                          CMP     GOOD,BAD        ;DID SF BITS CHANGE?
012062  001767                          BEQ     1$              ;WAIT FOR TIME OUT
012064  000422                          BR      LATDON          ;LA OK CONT
012066                          ERRR:
012066  104402  012072                  TYPE    ,.+2            ;.ASCIZ <15><12>''SECTOR FRACTIONS NOT MOVING''
012130  104204                          HLT     !LA             ;TYPE LOOK AHEAD REG
012132                          LATDON:                         ;DONE CONT.
```

```
                                ;*****************************************************************************
                                ;TEST 66                CHECK CS BITS TO INCREMENT AND  ADDRESS CONFIRM BIT IN MR
                                ;*****************************************************************************
012132  104400                  TST66:  SCOPE

012134  013737  022560  001164  CSTST:  MOV     TIMES,TIMSV     ;SAVE LOOP CT
012142  012737  000010  022560          MOV     #10,TIMES       ;LOOP 10 TIMES
012150  104414                        CLRDK                   ;CLEAR ALL RS REG.
012152  012701  001000                MOV     #1000,GOOD      ;LOAD COUNTER
012156  032777  001000  166744        BIT     #BIT9,@RSMR     ;IS ADD CONFIRM BIT 0?
012164  001407                        BEQ     ADDCF           ;YES CONTINUE
012166  005301                        DEC     GOOD            ;WAIT FOR
012170  001376                        BNE     .-2             ;DISK TO MOVE
012172  032777  001000  166730        BIT     #BIT9,@RSMR     ;IS AADD. CON. BIT BIT 0?
012200  001401                        BEQ     .+4             ;YES
012202  104220                        HLT     !MR             ;ADD. CONF. BIT ALWAYS A 1

                                ;NOW TEST TA BITS AND ADD. CON. BIT IN MR

012204  012777  177777  166702  ADDCF:  MOV     #-1,@RSDA       ;INIT RSDA
012212  012737  177777  001176  1$:     MOV     #-1,WORK        ;SETUP TIMEOUT COUNTER
012220  005277  166670                  INC     @RSDA           ;GET NEXT SECTOR
012224  022777  010000  166662        CMP     #10000,@RSDA    ;DONE ALL YET?
012232  001433                        BEQ     DONCS           ;YES
012234  005337  001176          2$:     DEC     WORK            ;DO TIMEOUT ROUTINE
012240  001427                        BEQ     TMEOUT          ;ADD. CON. NEVER CAME UP
012242  032777  001000  166660        BIT     #1000,@RSMR     ;DID ADD CONFIRM BIT SET?
012250  001771                        BEQ     2$              ;YES
012252  017700  166646                MOV     @RSLA,BAD       ;GET LA
012256  042700  000077                BIC     #77,BAD         ;CLEAR SF BITS
012262  012737  000006  001200        MOV     #6,WORK1        ;SET UP COUNTER
012270  006000                  3$:     ROR     BAD             ;MOV SA BITS RIGHT
012272  005337  001200                DEC     WORK1           ;DO 6 TIMES
012276  001374                        BNE     3$              ;DONE YET?
012300  017701  166610                MOV     @RSDA,GOOD      ;GET DA
012304  042701  177700                BIC     #177700,GOOD    ;CLEAR JUNK
012310  020100                        CMP     GOOD,BAD        ;ARE SA BITS = IN DA AND LA REG.?
012312  001401                        BEQ     .+4             ;OK
012314  104000                        HLT                     ;GOOD =DA BAD = LA
012316  000735                        BR      1$              ;NO WAIT

012320  104262                  TMEOUT: HLT     !MR!ER!DS       ;ADDRESS CONFIRM BIT NEVER SET COULD BE BAD OR
                                                                ;BAD LA OR BAD COMPARE BETWEEN LA AND DA
012322                          DONCS:                          ;TEST DONE CONTINUE
```

```
                                ;*****************************************************************************
                                ;TEST 67                    PARITY TEST
                                ;*****************************************************************************
012322  104400                  TST67:  SCOPE

012324  012701  031130          PART:   MOV     #PARITY , R1    ;GET TEST LOCATION
012330  012737  012354  000004          MOV     #1$,@#4         ;SETUP FOR TIMEOUT
012336  012777  000014  166630          MOV     #14,@CACHE      ;DISABLE CACHE
012344  012737  000001  031132          MOV     #1,CACH         ;CACHE IS AVAILABLE
012352  000401                        BR      2$              ;GET OVER STACK POP
012354  022626                  1$:     CMP     (SP)+,(SP)+     ;NO CACHE, RESET STACK
012356  013737  001164  022560  2$:     MOV     TIMSV,TIMES     ;RESTORE LOOP COUNTER
012364  012737  012566  000004          MOV     #PRTP,@#4       ;SETUP TIME OUT VECTOR
012372  012737  000340  000006          MOV     #340,@#6        ;SETUP PRIORITY OF 7
012400  012702  172100                  MOV     #MPR0,R2        ;GET PAR REG ADDR
012404  005712                  TSTAGN: TST     (R2)            ;DOES PAR REG EXIST?
012406  012712  000004                  MOV     #WWP,@R2        ;YES SET WRITE WRONG PARITY
012412  012737  012426  000004          MOV     #6$,@#4         ;SETUP FOR TRAP IF NO MEM MGMT
012420  005037  177572                  CLR     SR0             ;TURN OFF MEM MGMT(IF THERE)
012424  000401                        BR      1$              ;GET AROUND STACK POP(MEM MGMT THERE)
012426  022626                  6$:     CMP     (SP)+,(SP)+     ;NO MEM MGMT, POP STACK
012430  011111                  1$:     MOV     @R1,@R1         ;WRITE WRONG PARITY
012432  005711                          TST     @R1             ;READ IT
012434  005712                          TST     @R2             ;DID PARITY ERROR SET?
012436  100402                          BMI     2$              ;IF YES, THEN BRANCH
012440  005012                          CLR     @R2             ;CLEAR PARITY REG
012442  000452                          BR      PRTP1           ;GET NEXT PARITY REG
012444  042712  100004          2$:     BIC     #100004,@R2     ;TURN OFF WWP,PARITY ERROR
012450  052712  000001                  BIS     #1,@R2          ;SET PARITY ERROR IND. ENABLE
012454  012737  012564  000114          MOV     #5$,@#114       ;SET UP FOR PARITY TRAP
012462  104414                          CLRDK                   ;CLEAR ALL RS REG
012464  012777  031130  166420          MOV     #PARITY,@RSBA   ;SET UP CURRENT ADDRESS
012472  012777  177777  166410          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
012500  012777  000061  166376          MOV     #61,@RSCS1      ;GO WRITE
012506  105777  166372          3$:     TSTB    @RSCS1          ;DONE YET?
012512  100375                          BPL     3$              ;NO WAIT
012514  017700  166366                  MOV     @RSCS2,BAD      ;GET CS2
012520  012701  020100                  MOV     #20100,GOOD     ;EXPECTED RESULTS
012524  053701  001152                  BIS     UNNUM,GOOD      ;GET CORRECT UNIT # FOR CS2
012530  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
012532  001401                          BEQ     .+4             ;YES
012534  104000                          HLT                     ;CS2 SHOULD = GOOD
012536  022777  144260  166340          CMP     #144260,@RSCS1  ;IS CS1 CORRECT?
012544  001401                          BEQ     .+4             ;YES
012546  104040                          HLT     !DS             ;CS1 SHOULD = 144260
012550  005737  031132                  TST     CACH            ;DO WE HAVE CACHE?
012554  001402                          BEQ     4$              ;BRANCH IF NOT
012556  005077  166412                  CLR     @CACHE          ;ENABLE CACHE
012562  000411                  4$:     BR      NOPAR           ;GET OUT
012564  000002                  5$:     RTI                     ;FOR PARITY ERRORS

                                ;TRAPOUT ROUTINE

012566  022626                  PRTP:   CMP     (6)+,(6)+       ;CLEAR STACK
012570  022702  172136          PRTP1:  CMP     #172136,R2      ;DONE YET?
012574  001404                          BEQ     NOPAR           ;YES NO PAR REG
```

```
2422  012576  062702  000002                  ADD     #2,R2           ;NO TRY AGAIN
2423  012602  000137  012404                  JMP     TSTAGN          ;RETRY
2424
2425  012606  012737  000006  000004  NOPAR:  MOV     #6,@#4
2426  012614  005037  000006                  CLR     @#6
2427  012620  005037  031130                  CLR     PARITY          ;WRITE GOOD PARITY
2428                                  ;*****************************************************************
2429                                  ;TEST 70                TEST WRITE CHECK ERROR
2430                                  ;*****************************************************************
2431  012624  104400                  TST70:  SCOPE
2432
2433                                  ;WRITE A WORD OF 0 AND FLOAT A 1 TRSOUGH IT TO CAUSE WCE
2434                                  ;SET BIT14 IN ONCEE AND WRITE A WD OF -1 AND FLOAT 0
2435                                  ;TO CAUSE WCE
2436
2437  012626  104414                  WCETST: CLRDK                           ;CLEAR ALL RS REG
2438  012630  005037  027530                  CLR     OUTBUF                 ;WRITE A WD OF 0
2439  012634  013777  001102  166250  WCETT:  MOV     @#OBUFSV,@RSBA         ;SET UP CURRENT ADDRESS
2440  012642  012777  177777  166240          MOV     #-1,@RSWC              ;SET WORD COUNT TO -1
2441  012650  012777  000061  166226          MOV     #61,@RSCS1             ;GO WRITE
2442  012656  105777  166222          3$:     TSTB    @RSCS1                 ;DONE YET?
2443  012662  100375                  BPL     3$                             ;NO WAIT
2444  012664  032737  040000  001160          BIT     #BIT14,ONCEE           ;WRITE A 1 OR 0?
2445  012672  001410                  BEQ     2$                             ;WRITE A 0
2446  012674  012737  177777  027530          MOV     #-1,OUTBUF             ;WRITE A 1
2447  012702  000241                  CLC                                    ;CLEAR CARRY
2448  012704  006137  027530          6$:     ROL     OUTBUF                 ;FLOAT A 0 THROUGH BAD WD
2449  012710  103123                  BCC     WCEDON                         ;DONE GET OUT
2450  012712  000406                  BR      5$                             ;CHECK WCE
2451  012714  005037  027530          2$:     CLR     OUTBUF                 ;WRITE A 0
2452  012720  000261                  SEC                                    ;SET CARRY
2453  012722  006137  027530          1$:     ROL     OUTBUF                 ;FLOAT A 1
2454  012726  103503                  BCS     WCEDNE                         ;GET OUT WHEN DONE
2455  012730  013777  001102  166154  5$:     MOV     @#OBUFSV,@RSBA         ;SET UP CURRENT ADDRESS
2456  012736  012777  177777  166144          MOV     #-1,@RSWC              ;SET WORD COUNT TO -1
2457  012744  005077  166144                  CLR     @RSDA
2458  012750  012777  000051  166126          MOV     #51,@RSCS1             ;GO WRITE CHECK
2459  012756  105777  166122          4$:     TSTB    @RSCS1                 ;READY YET?
2460  012762  100375                  BPL     4$                             ;NO WAIT
2461  012764  017700  166116                  MOV     @RSCS2,BAD             ;GET CS2
2462  012770  013701  001152                  MOV     UNNUM,GOOD             ;SET UNIT #
2463  012774  052701  040300                  BIS     #40300,GOOD            ;SET BITS
2464  013000  020100                  CMP     GOOD,BAD                       ;IS CS2 CORRECT?
2465  013002  001413                  BEQ     7$                             ;YES
2466  013004  104000                  HLT                                    ;BAD=CS2 GOOD=CORRECT ANS
2467  013006  013700  027530                  MOV     OUTBUF,BAD             ;GET BAD WD THAT SHOULD CAUSE WCE
2468  013012  005001                  CLR     GOOD                           ;GET GOOD WD IF WRITING 0
2469  013014  032737  040000  001160          BIT     #BIT14,ONCEE           ;ARE WE WRITING 1 OR 0
2470  013022  001402                  BEQ     8$                             ;0
2471  013024  012701  177777                  MOV     #-1,GOOD               ;GET GOOD WD FOR 1
2472  013030  104000                  8$:     HLT                            ;GOOD = CORRECT WD WRITTEN
2473                                                                         ;BAD = INCORRECT WD THAT WCE DID NOT CATCH
2474  013032  022777  144250  166044  7$:     CMP     #144250,@RSCS1         ;DID TRE SET?
2475  013040  001401                  BEQ     .+4                            ;YES
2476  013042  104043                  HLT     !CS1!ER!DS                     ;TRE SHOULD SET IF WCE SETS
2477  013044  017700  166042                  MOV     @RSBA,BAD              ;FETCH CURRENT ADDRESS
```

```
2478  013050  013701  001102                MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
2479  013054  062701  000002                ADD     #2,GOOD         ;UPDATE IT
2480  013060  020001                        CMP     BAD,GOOD        ;IS RSBA CORRECT
2481  013062  001401                        BEQ     .+4             ;YES EXECUTE CONTINUE
2482  013064  104000                        HLT                     ;RSBA FAILED TO INCREMENT
2483  013066  104414                        CLRDK                   ;CLEAR ALL RS REG
2484  013070  013701  001152                MOV     UNNUM,GOOD      ;PUT DRIVE IN GOOD
2485  013074  052701  000100                BIS     #100,GOOD       ;SET IR BIT
2486  013100  017700  166002                MOV     @RSCS2,BAD      ;GET CS2
2487  013104  020100                        CMP     GOOD,BAD        ;IS CS2 CORRECT
2488  013106  001401                        BEQ     .+4             ;YES
2489  013110  104000                        HLT                     ;BAD =CS2 GOOD IS CORRECT ANS
2490  013112  022777  004200  165764        CMP     #4200,@RSCS1    ;DID TRE CLEAR?
2491  013120  001401                        BEQ     .+4             ;YES
2492  013122  104001                        HLT     !CS1            ;TRE DID NOT CLEAR WITH CLEAR
2493  013124  032737  040000  001160        BIT     #BIT14,ONCEE    ;FLOATION A 1 OR 0?
2494  013132  001673                        BEQ     1$              ;FLOAT 1
2495  013134  000663                        BR      6$              ;FLOAT 0
2496  013136  052737  040000  001160  WCEDNE: BIS    #BIT14,ONCEE    ;SET BIT14
2497  013144  104414                        CLRDK
2498  013146  012737  177777  027530        MOV     #-1,OUTBUFF
2499  013154  000137  012634                JMP     WCETT           ;NOW WRITE -1 IN OUTBUF
2500  013160  042737  040000  001160  WCEDON: BIC    #BIT14,ONCEE    ;CLEAR TEST FLAG
```

```
                                ;*****************************************************************
                                ;TEST 71                TEST WRITE CHECK ERROR ON -B- PORT
                                ;*****************************************************************
013166  104400                  TST71:  SCOPE

                                ;WRITE A WORD OF 0 AND FLOAT A 1 TRSOUGH IT TO CAUSE WCE
                                ;SET BIT14 IN ONCEE AND WRITE A WD OF -1 AND FLOAT 0
                                ;TO CAUSE WCE

013170  032737  020000  001160  WCETSB: BIT     #BIT13,ONCEE    ;-B- PORT?
013176  001402                        BEQ     1$              ;YES
013200  000137  013544                JMP     WCEDOS          ;NO GET OUT
013204  013737  001170  001102  1$:     MOV     BPORTT,OBUFSV   ;GET -B- PORT BUFFER
013212  104414                        CLRDK                   ;CLEAR ALL RS REG
013214  005077  165750                CLR     @BPORTT         ;WRITE A WD OF 0
013220  013777  001102  165664  WCETB:  MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
013226  012777  177777  165654        MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
013234  012777  002061  165642        MOV     #2061,@RSCS1    ;GO WRITE
013242  105777  165636          3$:   TSTB    @RSCS1          ;DONE YET?
013246  100375                        BPL     3$              ;NO WAIT
013250  032737  040000  001160        BIT     #BIT14,ONCEE    ;WRITE A 1 OR 0?
013256  001410                        BEQ     2$              ;WRITE A 0
013260  012777  177777  165702        MOV     #-1,@BPORTT     ;WRITE A 1
013266  000241                        CLC                     ;CLEAR CARRY
013270  006137  0<7530          6$:   ROL     OUTBUF          ;FLOAT A 0 THROUGH BAD WD
013274  103123                        BCC     WCEDOS          ;DONE GET OUT
013276  000406                        BR      5$              ;CHECK WCE
013300  005077  165664          2$:   CLR     @BPORTT         ;WRITE A 0
013304  000261                        SEC                     ;SET CARRY
013306  006177  165656          1$:   ROL     @BPORTT         ;FLOAT A 1
013312  103503                        BCS     WCEDNB          ;GET OUT WHEN DONE
013314  013777  001102  165570  5$:   MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
013322  012777  177777  165560        MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
013330  005077  165560                CLR     @RSDA
013334  012777  002051  165542        MOV     #2051,@RSCS1    ;GO WRITE CHECK
013342  105777  165536          4$:   TSTB    @RSCS1          ;READY YET?
013346  100375                        BPL     4$              ;NO WAIT
013350  017700  165532                MOV     @RSCS2,BAD      ;GET CS2
013354  013701  001152                MOV     UNNUM,GOOD      ;SET UNIT #
013360  052701  040300                BIS     #40300,GOOD     ;SET BITS
013364  020100                        CMP     GOOD,BAD        ;IS CS2 CORRECT?
013366  001413                        BEQ     7$              ;YES
013370  104000                        HLT                     ;CS2=BAD GOOD=CORRECT ANS
013372  017700  165572                MOV     @BPORTT,BAD     ;GET BAD WD THAT SHOULD CAUSE WCE
013376  005001                        CLR     GOOD            ;GET GOOD WD IF WRITING 0
013400  032737  040000  001160        BIT     #BIT14,ONCEE    ;ARE WE WRITING 1 OR 0
013406  001402                        BEQ     8$              ;0
013410  012701  177777                MOV     #-1,GOOD        ;GET GOOD WD FOR 1
013414  104000          8$:   HLT                             ;GOOD = CORRECT WD WRITTEN
                                                              ;BAD = INCORRECT WD THAT WCE DID NOT CATCH
```

```
2551  013416  022777  146250  165460  7$:     CMP     #146250,@RSCS1  ;DID TRE SET?
2552  013424  001401                          BEQ     .+4             ;YES
2553  013426  104043                          HLT     !CS1!ER!DS      ;TRE SHOULD SET IF WCE SETS
2554  013430  017700  165456                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
2555  013434  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
2556  013440  062701  000002                  ADD     #2,GOOD         ;UPDATE IT
2557  013444  020001                          CMP     BAD,GOOD        ;IS RSBA CORRECT
2558  013446  001401                          BEQ     .+4             ;YES EXECUTE CONTINUE
2559  013450  104000                          HLT                     ;RSBA FAILED TO INCREMENT
2560  013452  104414                          CLRDK                   ;CLEAR ALL RS REG
2561  013454  013701  001152                  MOV     UNNUM,GOOD      ;PUT DRIVE IN GOOD
2562  013460  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
2563  013464  017700  165416                  MOV     @RSCS2,BAD      ;GET CS2
2564  013470  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT
2565  013472  001401                          BEQ     .+4             ;YES
2566  013474  104000                          HLT                     ;BAD =CS2 GOOD IS CORRECT ANS
2567  013476  022777  004200  165400          CMP     #4200,@RSCS1    ;DID TRE CLEAR?
2568  013504  001401                          BEQ     .+4             ;YES
2569  013506  104001                          HLT     !CS1            ;TRE DID NOT CLEAR WITH CLEAR
2570  013510  032737  040000  001160          BIT     #BIT14,ONCEE    ;FLOATION A 1 OR 0?
2571  013516  001673                          BEQ     1$              ;FLOAT 1
2572  013520  000663                          BR      6$              ;FLOAT 0
2573  013522  052737  040000  001160  WCEDNB: BIS     #BIT14,ONCEE    ;SET BIT14
2574  013530  104414                          CLRDK
2575  013532  012777  177777  165430          MOV     #-1,@BPORTT
2576  013540  000137  013220                  JMP     WCETB           ;NOW WRITE -1 IN OUTBUF
2577  013544  012737  027530  001102  WCEDOS: MOV     #OUTBUF,OBUFSV  ;RESTORE OBUFSV
2578  013552  042737  040000  001160          BIC     #BIT14,ONCEE    ;CLEAR TEST FLAG
```

```
                                ;*****************************************************************************
                                ;TEST 72                    TEST PROGRAM ERROR BIT IN RSCS2
                                ;*****************************************************************************
013560  104400                  TST72:  SCOPE

013562  104414                  PGETST: CLRDK                           ;CLEAR ALL RS REG
013564  012737  177777  027530          MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
013572  013777  001102  165312          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
013600  012777  177000  165302          MOV     #177000,@RSWC           ;SET WORD COUNT
013606  012777  000061  165270          MOV     #61,@RSCS1              ;GO WRITE
013614  105777  165264          2$:     TSTB    @RSCS1                  ;IS RDY CLEARED YET?
013620  100775                          BMI     2$                      ;NO WAIT
013622  012777  000071  165254          MOV     #71,@RSCS1              ;GO READ
013630  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
013634  104001                          HLT     !CS1                    ;RDY NEVER CAME UP
013636  022777  144260  165240          CMP     #144260,@RSCS1          ;IS CS1 CORRECT?
013644  001401                          BEQ     .+4                     ;YES
013646  104001                          HLT     !CS1                    ;TRE SHOULD SET BY SETTING PGE
013650  005777  165246                  TST     @RSAS                   ;AS SHOULD = 0
013654  001401                          BEQ     .+4                     ;YES
013656  104100                          HLT     !AS                     ;RSAS SHOULD = 0
013660  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
013664  052701  002300                  BIS     #2300,GOOD              ;SET PGE, IR, AND OR
013670  017700  165212                  MOV     @RSCS2,BAD              ;GET CS2
013674  020100                          CMP     GOOD,BAD                ;IS IT CORRECT?
013676  001401                          BEQ     .+4                     ;YES
013700  104000                          HLT                             ;BAD = CS2
013702  005777  165202                  TST     @RSWC                   ;SHOULD NOT BE 0
013706  001001                          BNE     .+4                     ;BECAUSE PGE SHOJLD ABORT
013710  104011                          HLT     !WC!CS1                 ;CURRENT OPERATION
013712  005777  165202                  TST     @RSER                   ;DID ANY ERRORS SET?
013716  001401                          BEQ     .+4                     ;NO
013720  104040                          HLT     !DS                     ;RMR SHOULD BE SET
013722  052777  040000  165154          BIS     #TRE,@RSCS1             ;CLEAR ERRORS
013730  042701  002000                  BIC     #PGE,GOOD               ;CLEAR PGE ERROR
013734  017700  165146                  MOV     @RSCS2,BAD              ;GET CS2
013740  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
013742  001401                          BEQ     .+4                     ;YES
013744  104200                          HLT     !CS2                    ;PGE DID NOT CLEAR BY CLEARING TRE BAD = CS2
013746  022777  004260  165130          CMP     #4260,@RSCS1            ;DID SC CLEAR
013754  001401                          BEQ     .+4                     ;YES
013756  104040                          HLT     !DS                     ;DID NOT CLEAR BY CLEARING TRE
```

```
                                ;*****************************************************************************
                                ;TEST 73                    TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSDA
                                ;*****************************************************************************
013760  104400                  TST73:  SCOPE

013762  104414                  RMRT1:  CLRDK                           ;CLEAR ALL RS REG
013764  013777  001102  165120          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
013772  012777  177700  165110          MOV     #177700,@RSWC           ;SET WORD COUNT
014000  012703  172060                  MOV     #172060,R3              ;GET RSLA REG
014004  011304                  1$:     MOV     @R3,R4                  ;WAIT FOR
014006  042704  000017                  BIC     #17,R4                  ;THE MIDDLE
014012  022704  000020                  CMP     #20,R4                  ;OF SECTOR 0
014016  001372                          BNE     1$                      ;BEFORE DOING A SEARCH
014020  012777  000031  165056          MOV     #31,@RSCS1              ;SEARCH
014026  012777  007777  165060          MOV     #7777,@RSDA             ;CAUSE ERROR
014034  004737  026744                  JSR     PC,WAITRY               ;WAIT FOR READY
014040  104001                          HLT     !CS1                    ;RDY NEVER CAME UP
014042  022777  000004  165050          CMP     #4,@RSER                ;DID RMR SET?
014050  001401                          BEQ     .+4                     ;YES
014052  104002                          HLT     !ER                     ;ER SHOULD = 4
014054  022777  007777  165032          CMP     #7777,@RSDA             ;DID DA GET MODIFIED?
014062  001001                          BNE     .+4                     ;NO
014064  104004                          HLT     !DA
014066  022777  150600  165022          CMP     #150600,@RSDS           ;DID ERR SET?
014074  001401                          BEQ     .+4                     ;YES
014076  104042                          HLT     !DS!ER                  ;ER DID NOT SET BECAUSE OF RMR
014100  022777  104230  164776          CMP     #104230,@RSCS1          ;IS CS1 CORRECT?
014106  001401                          BEQ     .+4                     ;YES
014110  104040                          HLT     !DS                     ;CS1 SHOULD = 144260
014112  104414                          CLRDK                           ;CLEAR ALL RS REG
014114  005777  165000                  TST     @RSER                   ;DID RMR CLEAR?
014120  001401                          BEQ     .+4                     ;YES
014122  104002                          HLT     !ER                     ;RMR DID NOT CLEAR WITH A CLEAR
014124  022777  004200  164752          CMP     #4200,@RSCS1            ;IS CS1 CORRECT?
014132  001401                          BEQ     .+4                     ;YES
014134  104040                          HLT     !DS                     ;NO

                                ;*****************************************************************************
                                ;TEST 74                    TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSER
                                ;*****************************************************************************
014136  104400                  TST74:  SCOPE

014140  104414                  RMRT2:  CLRDK                           ;CLEAR ALL RS REG
014142  013777  001102  164742          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
014150  012777  177700  164732          MOV     #177700,@RSWC           ;SET WORD COUNT
014156  012777  000061  164720          MOV     #61,@RSCS1              ;GO WRITE
014164  105777  164714          2$:     TSTB    @RSCS1                  ;IS RDY SET?
014170  100775                          BMI     2$                      ;YES WAIT FOR IT TO CLEAR
014172  012777  177773  164720          MOV     #177773,@RSER           ;CAUSE ERROR
```

```
2670  014200  004737  026744            JSR     PC,WAITRY
2671  014204  104001                    HLT     !CS1            ;RDY NEVER CAME UP
2672  014206  022777  000004  164704    CMP     #4,@RSER        ;DID RMR SET?
2673  014214  001401                    BEQ     .+4             ;YES
2674  014216  104002                    HLT     !ER             ;ER SHOULD = 4
2675  014220  022777  150600  164670    CMP     #150600,@RSDS   ;DID ERR SET?
2676  014226  001401                    BEQ     .+4             ;YES
2677  014230  104042                    HLT     !DS!ER          ;ERR DID NOT SET BECAUSE OF RMR
2678  014232  022777  144260  164644    CMP     #144260,@RSCS1  ;IS CS1 CORRECT?
2679  014240  001401                    BEQ     .+4             ;YES
2680  014242  104040                    HLT     !DS             ;CS1 SHOULD = 144260
2681  014244  104414                    CLRDK                   ;CLEAR ALL RS REG
2682
2683                          ;*************************************************************************
2684                          ;TEST 75                TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSCS1
2685                          ;*************************************************************************
2686  014246  104400          TST75:  SCOPE
2687
2688  014250  104414          RMRT3:  CLRDK                   ;CLEAR ALL RS REG
2689  014252  013777  001102  164632    MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
2690  014260  012777  177700  164622    MOV     #177700,@RSWC   ;SET WORD COUNT
2691  014266  012777  000061  164610    MOV     #61,@RSCS1      ;GO WRITE
2692  014274  105777  164604  2$:     TSTB    @RSCS1          ;IS RDY SET?
2693  014300  100775                    BMI     2$              ;YES WAIT FOR IT TO CLEAR
2694  014302  012777  000030  164574    MOV     #30,@RSCS1      ;CAUSE ERROR
2695  014310  004737  026744            JSR     PC,WAITRY       ;WAIT FOR READY
2696  014314  104001                    HLT     !CS1            ;RDY NEVER CAME UP
2697  014316  022777  000004  164574    CMP     #4,@RSER        ;DID RMR SET?
2698  014324  001401                    BEQ     .+4             ;YES
2699  014326  104002                    HLT     !ER             ;ER SHOULD = 4
2700  014330  022777  150600  164560    CMP     #150600,@RSDS   ;DID ERR SET?
2701  014336  001401                    BEQ     .+4             ;YES
2702  014340  104042                    HLT     !DS!ER          ;ERID NOT SET BECAUSE OF RMR
2703  014342  022777  144260  164534    CMP     #144260,@RSCS1  ;IS CS1 CORRECT?
2704  014350  001401                    BEQ     .+4             ;YES
2705  014352  104040                    HLT     !DS             :CS1 SHOULD = 144260
2706  014354  104414                    CLRDK                   ;CLEAR ALL RS REG
```

```
                        ;*****************************************************************************
                        ;TEST 76                TEST THAT RMR DOES NOT SET BY WRITTING INTO RSAS
                        ;*****************************************************************************
014356  104400           TST76:  SCOPE

014360  104414           RMRT4:  CLRDK                           ;CLEAR ALL RS REG
014362  013777  001102  164522           MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
014370  012777  177700  164512           MOV     #177700,@RSWC   ;SET WORD COUNT
014376  012703  172060                   MOV     #172060,R3      ;GET RSLA REG
014402  011304           1$:     MOV     @R3,R4                  ;WAIT FOR
014404  042704  000017                   BIC     #17,R4          ;THE MIDDLE
014410  022704  000020                   CMP     #20,R4          ;OF SECTOR 0
014414  001372                           BNE     1$              ;BEFORE DOING A SEARCH
014416  012777  000031  164460           MOV     #31,@RSCS1      ;SEARCH
014424  012777  000000  164470           MOV     #0,@RSAS        ;TRY TO CAUSE ERROR
014432  005037  001176                   CLR     WORK            ;CLEAR COUNTER
014436  032777  000200  164452  2$:      BIT     #BIT7,@RSDS     ;WAIT FOR DRY
014444  001004                           BNE     3$              ;READY CONT
014446  005237  001176                   INC     WORK            ;COUNT
014452  001371                           BNE     2$              ;RETRY
014454  104001                           HLT     'CS1            ;RDY NEVER CAME UP
014456  005777  164436           3$:     TST     @RSER           ;DID RMR SET?
014462  001401                           BEQ     .+4             ;NO
014464  104002                           HLT     !ER             ;ER SHOULD = 0
014466  022777  110600  164422           CMP     #110600,@RSDS   ;DID ERR SET?
014474  001401                           BEQ     .+4             ;NO
014476  104042                           HLT     !DS!ER          ;DS SHOULD = 110600
014500  022777  104230  164376           CMP     #104230,@RSCS1  ;IS CS1 CORRECT?
014506  001401                           BEQ     .+4             ;YES
014510  104040                           HLT     !DS             ;CS1 SHOULD = 144260
014512  104414                           CLRDK                   ;CLEAR ALL RS REG
014514  022777  004200  164362           CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
014522  001401                           BEQ     .+4             ;YES
014524  104040                           HLT     !DS             ;NO
```

```
                                        ;*****************************************************************************
                                        ;TEST 77                    TEST DCK IN RSER
                                        ;*****************************************************************************
014526  104400                  TST77:  SCOPE

                                        ;DO A WRITE AND THEN A CLEAR FUNCTION THAT SHOULD CAUSE DCK TO SET

014530  104414                  DCKTST: CLRDK                           ;CLEAR ALL RS REG
014532  022737  000004  001162          CMP     #4,RS04DT               ;IS THIS A LA DISK?
014540  001004                          BNE     7$                      ;NO
014542  012737  177640  001202          MOV     #177640,WORK2           ;GET WC FOR LA DISK
014550  000411                          BR      1$                      ;CONTINUE
014552  012737  177500  001202  7$:     MOV     #177500,WORK2           ;GET WC FOR RS04
014560  005737  001162                  TST     RS04DT                  ;IS THIS A RS04?
014564  001003                          BNE     1$                      ;YES
014566  012737  177600  001202          MOV     #177600,WORK2           ;NO
014574  013777  001202  164306  1$:     MOV     WORK2,@RSWC             ;LOAD WC
014602  012737  177777  027530          MOV     #-1,OUTBUF              ;WRITE -1
014610  013777  001102  164274          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
014616  052777  000010  164262  4$:     BIS     #10,@RSCS2              ;SET BAI BIT
014624  012777  000061  164252          MOV     #61,@RSCS1              ;GO WRITE
014632  105777  164246          5$:     TSTB    @RSCS1                  ;IS RDY SET?
014636  100375                          BPL     5$                      ;WAIT FOR WRITE TO FINISH
014640  005077  164250          2$:     CLR     @RSDA                   ;SET DSK ADDRESS TO 0
014644  005037  027530                  CLR     OUTBUF                  ;WRITE 0
014650  013777  001102  164234          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
014656  012777  177777  164224          MOV     #-1,@RSWC               ;LOAD WC
014664  012702  172060                  MOV     #172060,R2              ;PUT RSLA ADDR INTO R2
014670  011203                  3$:     MOV     (R2),R3                 ;GET LA AND WAIT FOR
014672  042703  000077                  BIC     #77,R3                  ;SECTOR 40
014676  022703  004000                  CMP     #4000,R3                ;BEFORE
014702  001372                          BNE     3$                      ;WRITING
014704  012777  000061  164172          MOV     #61,@RSCS1              ;GO WRITE
014712  011203                  6$:     MOV     (R2),R3                 ;GET RSLA AND WAIT FOR
014714  042703  000017                  BIC     #17,R3                  ;MIDDLE OF SECTOR
014720  022703  000020                  CMP     #20,R3                  ;0 BEFORE EXECUTING
014724  001372                          BNE     6$                      ;A CLEAR FUNCTION
014726  012777  000040  164152          MOV     #40,@RSCS2              ;CLEAR ALL REG. DO IT THIS WAY
014734  013777  001152  164144          MOV     UNNUM,@RSCS2            ;DO NOT USE TRAP
```

```
2780  014742  105777  164136          INCW:   TSTB    @RSCS1          ;IS BUSY CLEARED
2781  014746  100401                          BMI     6$              ;FLAG CLEARED
2782  014750  104001                          HLT     !CS1            ;RDY NEVER CAME UP
2783  014752  013777  001102  164132  6$:     MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
2784  014760  013777  001202  164122          MOV     WORK2,@RSWC     ;LOAD WC
2785  014766  012777  000071  164110          MOV     #71,@RSCS1      ;GO READ
2786  014774  105777  164104          5$:     TSTB    @RSCS1          ;IS RDY SET?
2787  015000  100375                          BPL     5$              ;WAIT FOR READ TO FINISH
2788  015002  022777  100000  164110          CMP     #100000,@RSER   ;DID DCK SET?
2789  015010  001401                          BEQ     .+4             ;YES
2790  015012  104002                          HLT     !ER             ;DCK DID NOT SET
2791  015014  022777  150600  164074          CMP     #150600,@RSDS   ;DID ERR SET?
2792  015022  001401                          BEQ     .+4             ;YES
2793  015024  104040                          HLT     !DS             ;ER DID NOT SET BY DCK
2794  015026  022777  144270  164050          CMP     #144270,@RSCS1  ;IS CS1 CORRECT?
2795  015034  001401                          BEQ     .+4             ;YES
2796  015036  104044                          HLT     !DS!DA
2797  015040  017700  164042                  MOV     @RSCS2,BAD      ;GET CS2
2798  015044  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
2799  015050  052701  000100                  BIS     #100,GOOD       ;SET IR
2800  015054  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2801  015056  001401                          BEQ     .+4             ;YES
2802  015060  104000                          HLT
2803  015062  012701  177700                  MOV     #177700,GOOD    ;NO
2804  015066  017700  164016          1$:     MOV     @RSWC,BAD       ;DID TRANSFER STOP AT END OF SECTOR?
2805  015072  020100                          CMP     GOOD,BAD
2806  015074  001401                          BEQ     .+4             ;YES
2807  015076  104000                          HLT                     ;NO
2808  015100  012701  027530                  MOV     #OUTBUF,GOOD    ;GET BA
2809  015104  022737  000004  001162          CMP     #4,RS04DT       ;LA DISK?
2810  015112  001003                          BNE     7$              ;NO
2811  015114  062701  000100                  ADD     #100,GOOD       ;YES
2812  015120  000410                          BR      3$              ;CONTINUE
2813  015122  005737  001162          7$:     TST     RS04DT          ;RS04?
2814  015126  001003                          BNE     2$              ;YES
2815  015130  062701  000200                  ADD     #200,GOOD       ;RS03
2816  015134  000402                          BR      3$
2817  015136  062701  000400          2$:     ADD     #400,GOOD       ;GET CORRECT ANS FOR BA
2818  ^^^142  017700  163744          3$:     MOV     @RSBA,BAD       ;GET BA
2819  015146  020001                          CMP     BAD,GOOD        ;IS BA CORRECT?
2820  015150  001401                          BEQ     .+4             ;YFS
2821  015152  104000                          HLT                     ;NO
2822  015154  104414                          CLRDK                   ;CLEAR ALL RS REG
2823  015156  005777  163736                  TST     @RSER           ;DID DCK CLEAR?
2824  015162  001401                          BEQ     .+4             ;YES
2825  015164  104002                          HLT     !ER             ;DCK DID NOT CLEAR WITH CLEAR
2826  015166  012777  177500  163714          MOV     #177500,@RSWC   ;CLEAR DCK ON
2827  015174  013777  001102  163710          MOV     @#OBUFSV,@RSBA  ;DRIVE BY WRITING
2828  015202  012777  000061  163674          MOV     #61,@RSCS1      ;GOOD DATA
2829  015210  105777  163670          4$:     TSTB    @RSCS1          ;ON DRIVE
2830  015214  100375                          BPL     4$
```

```
                                        ;TEST THE ABILITY OF THE DISK CONTROL TO
                                        ;INCREMENT THE TRACK REGISTER.
                                        ;
                                        ;A ONE WORD WRITE WILL BE EXECUTED
                                        ;RSDA=7777 RSWC = -1
                                        ;AT THE COMPLETION OF THE WRITE RSDA = 10000
                                        ;*************************************************************************
                                        ;TEST 100               TEST DISK ADDRESS REGISTER
                                        ;*************************************************************************
015216  104400                          TST100: SCOPE

015220  104414                          DKADR:  CLRDK                       ;CLEAR ALL RS REG
015222  012777  177777  163660                  MOV     #177777,@RSWC       ;SET WORD COUNT TO -1
015230  013777  001102  163654                  MOV     @#OBUFSV,@RSBA      ;SET UP CURRENT ADDRESS
015236  012777  007777  163650                  MOV     #7777,@RSDA         ;SET RSDA TO ALL ONES
015244  012777  000061  163632                  MOV     #61,@RSCS1          ;GO WRITE ONE WORD
015252  004737  026744                          JSR     PC,WAITRY           ;WAIT FOR READY
015256  104001                                  HLT     !CS1                ;RDY DID NOT COME UP
015260  027727  163630  010000  5$:     CMP     @RSDA,#10000        ;DOES RSDA=0
015266  001401                                  BEQ     .+4                 ;RSDA OK
015270  104004                                  HLT     !DA                 ;DA DID NOT INCREMENT

                                        ;*************************************************************************
                                        ;TEST 101               TEST IAE ERROR
                                        ;*************************************************************************
015272  104400                          TST101: SCOPE

                                        ;IAE ERROR SHOULD SET ERR,ATA AND SC BITS

015274  104414                          IAERR:  CLRDK                       ;CLEAR ALL RS REG
015276  012777  177777  163604                  MOV     #177777,@RSWC       ;SET WC TO -1
015304  013777  001102  163600                  MOV     @#OBUFSV,@RSBA      ;SET UP BUS ADDRESS
015312  012777  017777  163574                  MOV     #17777,@RSDA        ;SET DA TO RECEIVE ERROR
015320  012777  000061  163556                  MOV     #61,@RSCS1          ;GO WRITE ONE WD
015326  105777  163552          7$:     TSTB    @RSCS1              ;TEST FOR ERR OR RDY
015332  100401                                  BMI     .+4                 ;OK CONT.
015334  000774                                  BR      7$                  ;WAIT
015336  022777  002000  163554                  CMP     #2000,@RSER         ;DID IAE SET?
015344  001401                                  BEQ     .+4                 ;YES
015346  104002                                  HLT     !ER                 ;IAE SHOULD BE SET
015350  022777  150600  163540                  CMP     #150600,@RSDS       ;DID ERR SET?
015356  001401                                  BEQ     .+4                 ;YES
015360  104140                                  HLT     !DS!AS              ;ERR SHOULD BE SET
015362  022777  144260  163514                  CMP     #144260,@RSCS1      ;DID SC SET?
015370  001401                                  BEQ     .+4                 ;YES
015372  104001                                  HLT     !CS1                ;SC SHOULD BE SET
015374  104414                                  CLRDK                       ;CLEAR ALL RS REG
015376  005777  163516                          TST     @RSER               ;CLR ERRORS?
015402  001401                                  BEQ     .+4                 ;YES
015404  104002                                  HLT     !ER                 ;ERR DID NOT CLR WITH 40 IN CS2
```

```
                                ;IN THIS ROUTINE THE PROGRAM WILL GENERATE A
                                ;NON-EXISTENT DISK ERROR
                                ;
                                ;*************************************************************************
                                ;TEST 102                TEST FOR NON=EXISTENT DISK ERROR
                                ;*************************************************************************
015406  104400                  TST102: SCOPE
                                ;
015410  104414                  NEDTST: CLRDK                           ;CLEAR ALL RS REG
015412  012737  000401  001176          MOV     #401,WORK               ;SET UP FOR N.E.D. NUMBER
015420  005001                          CLR     GOOD                    ;LOOK FOR NON EXISTENT DRIVES
015422  033737  001176  001154  1$:     BIT     WORK,UNITSV             ;ON THE SYSTEM
015430  001405                          BEQ     3$                      ;FOUND NON EXISTENT DRIVE
015432  005201                          INC     GOOD                    ;CONTAINS UNIT #
015434  006137  001176                  ROL     WORK                    ;KEEP LOOKING
015440  103452                          BCS     NEDDON                  ;COULD NOT FIND ANY NON EXISTENT DRIVES
015442  000767                          BR      1$                      ;LOOK FOR NED
015444  010177  163436          3$:     MOV     GOOD,@RSCS2             ;LOAD NED IN CS2
015450  005077  163440                  CLR     @RSDA                   ;WRITE DRIVE REG
015454  005777  163440                  TST     @RSER                   ;DID ANY BITS SET IN RSER?
015460  001401                          BEQ     .+4                     ;NO
015462  104040                          HLT     !DS                     ;WHY DID RSER CHANGE?
015464  017700  163416                  MOV     @RSCS2,BAD              ;GET CS2
015470  052701  010100                  BIS     #10100,GOOD             ;SET NED AND IR
015474  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
015476  001401                          BEQ     .+4                     ;YES
015500  104000                          HLT                             ;GOOD=CORRECT CS2 BAD=CS2
015502  022777  160200  163374          CMP     #160200,@RSCS1          ;IS CS1 CORRECT?
015510  001401                          BEQ     .+4                     ;YES
015512  104200                          HLT     !CS2                    ;TRE SHOULD SET BY NED ERROR
015514  005777  163402                  TST     @RSAS                   ;DID ANY BITS SET?
015520  001401                          BEQ     .+4                     ;NO
015522  104100                          HLT     !AS                     ;WHY DID AT BITS SET?
015524  112777  000100  163406          MOVB    #100,@RSCS1B            ;CLEAR TRE
015532  032777  010000  163346          BIT     #NED,@RSCS2             ;DID NED CLEAR
015540  001401                          BEQ     .+4                     ;YES
015542  104200                          HLT     !CS2                    ;NED DID NOT CLEAR
015544  017737  163344  001176          MOV     @RSDA,WORK              ;READ DRIVE REG
015552  032777  010000  163326          BIT     #NED,@RSCS2             ;DID NED SET?
015560  001001                          BNE     .+4
015562  104040                          HLT     !DS                     ;NED DID NOT SET
015564  000431                          BR      NNDD                    ;GET OUT
015566  032737  010000  001160  NEDDON: BIT     #BIT12,ONCEE            ;DWAS THIS TYPED BEFORE?
015574  001025                          BNE     NNDD                    ;YES
015576  104402  015602                  TYPE    ,..+2                   ;.ASCIZ <15><12>''COULD NOT FIND A NON-EXISTENT DRIVE''
015650  052737  010000  001160  NNDD:   BIS     #BIT12,ONCEE            ;SET TYPED FLAG
```

```
                                ;*****************************************************************************
                                ;TEST 103                TEST THAT DAO IN RSER AND LBT IN RSDS DO SET
                                ;*****************************************************************************
015656  104400                  TST103: SCOPE

015660  104414                  DAOTST: CLRDK                           ;CLEAR ALL RS REG
015662  022737  000004  001162          CMP     #4,RS04DT               ;RS03LA?
015670  001004                        BNE     3$                      ;NO
015672  012777  177737  163210        MOV     #-41,@RSWC              ;LOAD WORD COUNT
015700  000411                        BR      1$                      ;CONT
015702  012777  177577  163200  3$:   MOV     #-201,@RSWC             ;LOAD WC FOR RS04
015710  005737  001162                TST     RS04DT                  ;IS THIS A RS04?
015714  001003                        BNE     1$                      ;YES
015716  012777  177677  163164        MOV     #-101,@RSWC             ;NO
015724  012777  007777  163162  1$:   MOV     #7777,@RSDA             ;SET RSDA=TO ALL ONES
015732  013777  001102  163152  2$:   MOV     @#OBUFSV,@RSBA          ;CURRENT ADDRESS=OUTBUF
015740  012777  000061  163136        MOV     #61,@RSCS1              ;WRITE
015746  004737  026744                JSR     PC,WAITRY               ;WAIT FOR READY
015752  104001                        HLT     !CS1                    ;RDY DID NOT SET
015754  022777  001000  163136        CMP     #1000,@RSER             ;DID DAO SET?
015762  001401                        BEQ     .+4                     ;YES
015764  104002                        HLT     !ER                     ;DAO DID NOT SET
015766  022777  152600  163122        CMP     #152600,@RSDS           ;DID LBT SET?
015774  001401                        BEQ     .+4                     ;YES
015776  104040                        HLT     !DS                     ;LBT DID NOT SET
016000  005777  163100                TST     @RSCS1                  ;IS ERROR FLAG SET
016004  100401                        BMI     .+4                     ;ERROR IS SET
016006  104001                        HLT     !CS1                    ;SC DID NOT SET
016010  104414                        CLRDK                           ;CLEAR ALL RS REG
016012  022777  010600  163076        CMP     #10600,@RSDS            ;DID ATA +LBT CLEAR
016020  001401                        BEQ     .+4                     ;YES
016022  104040                        HLT     !DS                     ;ATA DID NOT CLEAR BY CLR BIT
016024  005777  163070                TST     @RSER                   ;DID DAO CLEAR?
016030  001401                        BEQ     .+4                     ;YES
016032  104002                        HLT     !ER                     ;DAO DID NOT CLEAR WITH CLEAR
```

```
                        ;*****************************************************************************
                        ;TEST 104                TEST THAT LBT DOES SET AND DAO DOES NOT
                        ;*****************************************************************************
016034  104400          TST104: SCOPE

016036  104414          DAOTT:  CLRDK                   ;CLEAR ALL RS REG
016040  022737  000004  001162  CMP     #4,RS04DT       ;RS03LA?
016046  001004                  BNE     3$              ;NO
016050  012777  177741  163032  MOV     #-37,@RSWC      ;LOAD WORD COUNT
016056  000411                  BR      1$              ;CONT
016060  012777  177601  163022  3$:     MOV     #-177,@RSWC     ;LOAD WC FOR RS04
016066  005737  001162          TST     RS04DT          ;IS THIS A RS04?
016072  001003                  BNE     1$              ;YES
016074  012777  177701  163006  MOV     #-77,@RSWC      ;NO
016102  012777  007777  163004  1$:     MOV     #7777,@RSDA     ;SET RSDA=TO ALL ONES
016110  013777  001102  162774  2$:     MOV     @#OBUFSV,@RSBA  ;CURRENT ADDRESS=OUTBUF
016116  012777  000061  162760          MOV     #61,@RSCS1      ;WRITE
016124  004737  026744                  JSR     PC,WAITRY       ;WAIT FOR READY
016130  104001                  HLT     !CS1            ;RDY DID NOT SET
016132  005777  162762          TST     @RSER           ;ANY ERRORS?
016136  001401                  BEQ     .+4             ;NO
016140  104002                  HLT     !ER             ;YES
016142  022777  012600  162746  CMP     #12600,@RSDS    ;DID LBT SET?
016150  001401                  BEQ     .+4             ;YES
016152  104040                  HLT     !DS             ;LBT DID NOT SET
016154  005777  162724          TST     @RSCS1          ;IS ERROR FLAG SET
016160  100001                  BPL     .+4             ;NO
016162  104001                  HLT     !CS1            ;ERROR
016164  104414                  CLRDK                   ;CLEAR ALL RS REG
016166  022777  010600  162722  CMP     #10600,@RSDS    ;DID LBT CLEAR
016174  001401                  BEQ     .+4             ;YES
016176  104040                  HLT     !DS             ;ATA DID NOT CLEAR BY CLR BIT
```

```
                                ;*****************************************************************************
                                ;TEST 105                EXECUTE FUNCTION WITH ERROR BITS SET
                                ;*****************************************************************************
016200  104400                  TST105: SCOPE

016202  104414                  ERTST:  CLRDK                           ;CLEAR ALL RS REG
016204  012777  177017  162706          MOV     #177017,@RSER           ;LOAD ER
016212  017700  162704          MOV     @RSAS,BAD               ;GET AS REG
016216  013701  001156          MOV     UNCMP,GOOD              ;GET UNIT ATA BIT
016222  042701  177400          BIC     #177400,GOOD            ;CLEAR JUNK
016226  020100                  CMP     GOOD,BAD                ;IS AS REG CORRECT?
016230  001401                  BEQ     .+4                     ;YES
016232  104100                  HLT     !AS                     ;AS BIT SHOULD BE SET
016234  022777  104200  162642  CMP     #104200,@RSCS1          ;DID ERRS SET IN CS1?
016242  001401                  BEQ     .+4                     ;YES
016244  104040                  HLT     !DS                     ;CS1 SHOULD =104200
016246  013777  001156  162646  MOV     UNCMP,@RSAS             ;CLEAR ATA BIT
016254  005777  162642          TST     @RSAS                   ;DID IT CLEAR?
016260  001401                  BEQ     .+4                     ;YES
016262  104100                  HLT     !AS                     ;COULD NOT CLEAR AS BIT
                                                                ;BY LOADING A 1 INTO IT
016264  022777  004200  162612  CMP     #4200,@RSCS1            ;DID SC CLEAR BY
016272  001401                  BEQ     .+4                     ;CLEARING ATA
016274  104002                  HLT     !ER                     ;NO
016276  012737  177777  027530  MOV     #177777,OUTBUF          ;DATA TO BE XFERED
016304  013777  001102  162600  MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
016312  012777  177777  162570  MOV     #-1,@RSWC               ;LOAD WC WITH -1
016320  012777  000071  162556  MOV     #71,@RSCS1              ;DO READ FUNCTION
016326  032777  000001  162550  BIT     #1,@RSCS1               ;DID GO BIT CLEAR
016334  001401                  BEQ     .+4                     ;YES
016336  104001                  HLT     !CS1                    ;GO BIT SHOULD BE CLEARED
016340  105777  162540  1$:     TSTB    @RSCS1                  ;WAIT FOR READY
016344  100375                  BPL     1$                      ;WAIT
016346  022777  144270  162530  CMP     #144270,@RSCS1          ;DID ERRS CLEAR BY SETTING GO BIT?
016354  001401                  BEQ     .+4                     ;YES
016356  104002                  HLT     .ER                     ;NO
```

```
3030  016360  017700  162522            MOV   @RSCS2,BAD       ;GET CS2
3031  016364  012701  001100            MOV   #1100,GOOD       ;GET CORRECT ANS
3032  016370  053701  001152            BIS   UNNUM,GOOD       ;GET UNIT #
3033  016374  020100                     CMP   GOOD,BAD         ;IS CS2 CORRECT?
3034  016376  001401                     BEQ   .+4              ;YES
3035  016400  104000                     HLT                    ;GOOD = WHAT CS2 SHOULD =
3036  016402  022777  150600  162506     CMP   #150600,@RSDS    ;DID ERR BITS SET?
3037  016410  001401                     BEQ   .+4              ;NO
3038  016412  104040                     HLT   !DS              ;ERR BIT SHOULD BE 1
3039  016414  022777  177777  162466     CMP   #-1,@RSWC        ;DID WC MOVE?
3040  016422  001401                     BEQ   .+4              ;NO
3041  016424  104010                     HLT   !WC              ;WC SHOULD = 1777777
3042  016426  005777  162462            TST   @RSDA            ;DID DA MOV
3043  016432  001401                     BEQ   .+4              ;NO
3044  016434  104004                     HLT   !DA              ;DA SHOULD =0
3045  016436  023777  001102  162446     CMP   @#OBUFSV,@RSBA   ;DID BA MOVE
3046  016444  001401                     BEQ   .+4              ;NO
3047  016446  104020                     HLT   !BA              ;BA MOVED
3048  016450  033777  001156  162444     BIT   UNCMP,@RSAS      ;AS SHOULD BE SET
3049  016456  001001                     BNE   .+4              ;IS IT?
3050  016460  104100                     HLT   !AS              ;NO
3051  016462  022777  177017  162430     CMP   #177017,@RSER    ;DID ER CHANGE?
3052  016470  001401                     BEQ   .+4              ;NO
3053  016472  104002                     HLT   !ER              ;ER SHOULD NOT CHANGE
```

```
3054                                    ;*****************************************************************************
3055                                    ;TEST 106                PAT AND MCPE TEST
3056                                    ;*****************************************************************************
3057  016474  104400                    TST106: SCOPE
3058
3059  016476  104414                    PATST:  CLRDK                           ;CLEAR ALL RS REG
3060  016500  052777  000020  162400            BIS     #BIT4,@RSCS2            ;SET PAT
3061  016506  005777  162416                    TST     @RSMR                   ;READ DRIVE REG
3062  016512  017700  162370                    MOV     @RSCS2,BAD              ;GET CS2
3063  016516  012701  000120                    MOV     #120,GOOD               ;MDPE SHOULD
3064  016522  053701  001152                    BIS     UNNUM,GOOD              ;NOT SET
3065  016526  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
3066  016530  001401                            BEQ     .+4                     ;YES
3067  016532  104000                            HLT                             ;BAD = CS2 GOOD = CORRECT ANS
3068  016534  012777  000010  162366            MOV     #10,@RSMR               ;CAUSE PAR TO SET IN RSER
3069  016542  022777  000010  162350            CMP     #10,@RSER               ;DID PAR SET?
3070  016550  001401                            BEQ     .+4                     ;YES
3071  016552  104140                            HLT     !AS!DS
3072  016554  017700  162342                    MOV     @RSAS,BAD               ;GET AS REG
3073  016560  013701  001156                    MOV     UNCMP,GOOD              ;GET UNIT ATA BIT
3074  016564  042701  177400                    BIC     #177400,GOOD            ;CLEAR JUNK
3075  016570  020100                            CMP     GOOD,BAD                ;IS AS REG CORRECT?
3076  016572  001401                            BEQ     .+4                     ;YES
3077  016574  104100                            HLT     !AS                     ;AS BIT SHOULD BE SET
3078  016576  022777  104200  162300            CMP     #104200,@RSCS1          ;DID ERRS SET IN CS1?
3079  016604  001401                            BEQ     .+4                     ;YES
3080  016606  104040                            HLT     !DS                     ;CS1 SHOULD =104200
3081  016610  104414                            CLRDK                           ;CLEAR RS REG
3082  016612  022777  004200  162264            CMP     #4200,@RSCS1            ;IS CS1 CORRECT?
3083  016620  001401                            BEQ     .+4                     ;CLEARING ATA
3084  016622  104002                            HLT     !ER                     ;NO
3085  016624  017700  162256                    MOV     @RSCS2,BAD              ;CHECK TO SEE
3086  016630  013701  001152                    MOV     UNNUM,GOOD              ;IF PAT CLEARS
3087  016634  052701  000100                    BIS     #100,GOOD
3088  016640  020100                            CMP     GOOD,BAD
3089  016642  001401                            BEQ     .+4
3090  016644  104000                            HLT                             ;PAT DID NOT CLEAR
```

```
                                ;*****************************************************************************
                                ;TEST 107                SET PAT BIT AND LOAD FUNCTION
                                ;*****************************************************************************
016646  104400                  TST107: SCOPE

016650  104414                  SETPAT: CLRDK                           ;CLEAR ALL REG
016652  052777  000010  162226          BIS     #BAI,@RSCS2             ;SET BAI
016660  012737  177777  027530          MOV     #177777,OUTBUF          ;DATA TO BE XFERED
016666  013777  001102  162216          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
016674  012777  177000  162206          MOV     #-1000,@RSWC            ;LOAD WC WITH -1
016702  052777  000020  162176          BIS     #BIT4,@RSCS2            ;SET PAT BIT
016710  012777  000071  162166          MOV     #71,@RSCS1              ;DO READ FUNCTION
016716  105777  162162          1$:     TSTB    @RSCS1                  ;WAIT FOR READY
016722  100375                          BPL     1$                      ;WAIT
016724  022777  144270  162152          CMP     #144270,@RSCS1          ;DID CS1 GET LOADED?
016732  001401                          BEQ     .+4                     ;NO
016734  104040                          HLT     !DS                     ;IT SHOULD NOT
016736  023777  001102  162146          CMP     @#OBUFSV,@RSBA          ;DID BA MOVE?
016744  001401                          BEQ     .+4                     ;NO
016746  104020                          HLT     !BA                     ;YES
016750  022777  177000  162132          CMP     #-1000,@RSWC            ;DID WC MOVE?
016756  001401                          BEQ     .+4                     ;NO
016760  104010                          HLT     !WC                     ;YES WHY?

                                ;*****************************************************************************
                                ;TEST 110                DO FUNCTION THEN SET PAT BIT
                                ;*****************************************************************************
016762  104400                  TST110: SCOPE
016764  104414                  FUNDO:  CLRDK                           ;CLEAR ALL REG
016766  052777  000010  162112          BIS     #BAI,@RSCS2             ;SET BAI
016774  012737  177777  027530          MOV     #177777,OUTBUF          ;DATA TO BE XFERED
017002  013777  001102  162102          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
017010  012777  177000  162072          MOV     #-1000,@RSWC            ;LOAD WC WITH -1
017016  012777  000071  162060  3$:     MOV     #71,@RSCS1              ;DO A READ
017024  100774                          BMI     3$                      ;WAIT FOR BUSY
017026  052777  000020  162052          BIS     #BIT4,@RSCS2            ;SET PAT
017034  105777  162044          2$:     TSTB    @RSCS1                  ;WAIT FOR READY
017040  100375                          BPL     2$
017042  022777  144270  162034          CMP     #144270,@RSCS1          ;DID MCPE SET?
017050  001401                          BEQ     .+4                     ;NO
017052  104002                          HLT     !ER                     ;YES
017054  017700  162026                  MOV     @RSCS2,BAD              ;GET CS2
017060  012701  000730                  MOV     #730,GOOD               ;GET CORRECT ANS
017064  053701  001152                  BIS     UNNUM,GOOD              ;GET UNIT #
017070  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
017072  001401                          BEQ     .+4                     ;YES
017074  104000                          HLT                             ;GOOD = WHAT CS2 SHOULD =
```

```
3138  017076  022777  010600  162012          CMP     #10600,@RSDS    ;DID ERR BITS SET?
3139  017104  001401                          BEQ     .+4             ;NO
3140  017106  104040                          HLT     !DS             ;ERR BIT SHOULD BE 1
3141  017110  005777  162004                  TST     @RSER           ;IS ER CLEAR?
3142  017114  001401                          BEQ     .+4             ;YES
3143  017116  104044                          HLT     !DS!DA          ;NO ERRORS SHOULD BE SET
3144  017120  104414                          CLRDK                   ;CLEAR ALL RS REG
3145  017122  022777  004200  161754          CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
3146  017130  001401                          BEQ     .+4             ;YES
3147  017132  104040                          HLT     !DS
3148                                  ;*************************************************************************
3149                                  ;TEST 111               TEST PAR BY SETTING PAT
3150                                  ;*************************************************************************
3151  017134  104400                  TST111: SCOPE
3152
3153  017136  104414                  PATTST: CLRDK                   ;CLEAR ALL RS REG
3154  017140  052777  000010  161740          BIS     #BAI,@RSCS2     ;SET BAI
3155  017146  012737  177777  027530          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
3156  017154  013777  001102  161730          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
3157  017162  012777  177000  161720          MOV     #-1000,@RSWC    ;LOAD WC WITH -1
3158  017170  012777  000061  161706          MOV     #61,@RSCS1      ;DO WRITE FUNCTION
3159  017176  105777  161702          1$:     TSTB    @RSCS1          ;WAIT FOR READY
3160  017202  100775                          BMI     1$              ;WAIT
3161  017204  052777  000020  161674          BIS     #BIT4,@RSCS2    ;SET PAT
3162  017212  105777  161666          2$:     TSTB    @RSCS1          ;WAIT FOR READY
3163  017216  100375                          BPL     2$
3164  017220  022777  144260  161656          CMP     #144260,@RSCS1  ;DID MCPE SET?
3165  017226  001401                          BEQ     .+4             ;NO
3166  017230  104002                          HLT     !ER             ;YES
3167  017232  017700  161650                  MOV     @RSCS2,BAD      ;GET CS2
3168  017236  012701  000230                  MOV     #230,GOOD       ;GET CORRECT ANS-- DO NOT CHECK IR - REASON 50 CYCLE
3169  017242  053701  001152                  BIS     UNNUM,GOOD      ;GET UNIT #
3170  017246  042700  000100                  BIC     #BIT6,BAD       ;CLEAR IR BIT FOR CS2 COMPARE
3171  017252  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3172  017254  001401                          BEQ     .+4             ;YES
3173  017256  104000                          HLT                     ;GOOD = WHAT CS2 SHOULD =
3174  017260  022777  150600  161630          CMP     #150600,@RSDS   ;DID ERR BITS SET?
3175  017266  001401                          BEQ     .+4             ;NO
3176  017270  104040                          HLT     !DS             ;ERR BIT SHOULD BE 1
3177  017272  022777  000010  161620          CMP     #10,@RSER       ;DID PAR SET?
3178  017300  001401                          BEQ     .+4             ;YES
3179  017302  104044                          HLT     !DS!DA          ;NO
3180  017304  104414                          CLRDK                   ;CLEAR ALL RS REG
3181  017306  022777  004200  161570          CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
3182  017314  001401                          BEQ     .+4             ;YES
3183  017316  104040                          HLT     !DS
3184  017320  005777  161574                  TST     @RSER           ;DID PAR CLEAR?
3185  017324  001401                          BEQ     .+4             ;YES
3186  017326  104040                          HLT     !DS
```

```
                                ;*****************************************************************************
                                ;TEST 112                TEST THE ABILITY TO FILL THE LAST SECTOR
                                ;*****************************************************************************
017330  104400                  TST112: SCOPE

017332  104414                  LASTSC: CLRDK                           ;CLEAR ALL RS REG
017334  012777  007777  161552          MOV     #7777,@RSDA             ;SET RSDA=TO ALL ONES
017342  022737  000004  001162          CMP     #4,RS04DT               ;LA DISK?
017350  001004                        BNE     2$                      ;NO
017352  012777  177740  161530        MOV     #-40,@RSWC              ;LOAD WORD COUNT
017360  000411                        BR      1$                      ;CONTINUE
017362  012777  177700  161520  2$:   MOV     #-100,@RSWC             ;WORD COUNT=-100
017370  005737  001162                TST     RS04DT                  ;IS THIS A RS04?
017374  001403                        BEQ     1$                      ;NO
017376  012777  177600  161504        MOV     #-200,@RSWC             ;YES
017404  013777  001102  161500  1$:   MOV     @#OBUFSV,@RSBA          ;CURRENT ADDRESS=OUTBUF
017412  012777  000061  161464        MOV     #61,@RSCS1              ;WRITE
017420  004737  026744                JSR     PC,WAITRY               ;WAIT FOR READY
017424  104001                        HLT     !CS1                    ;RDY DID NOT SET
017426  005777  161466                TST     @RSER                   ;DID ANY ERROR BITS SET?
017432  001401                        BEQ     .+4                     ;NO
017434  104002                        HLT     !ER                     ;GOT AN ERROR
017436  022777  012600  161452        CMP     #12600,@RSDS            ;DID LBT SET?
017444  001401                        BEQ     .+4                     ;YES
017446  104040                        HLT     !DS                     ;LBT DID NOT SET
017450  005777  161430                TST     @RSCS1                  ;IS ERROR FLAG SET
017454  100001                        BPL     .+4                     ;ERROR IS SET
017456  104001                        HLT     !CS1                    ;SC DID NOT SET
017460  104414                        CLRDK                           ;CLEAR ALL RS REG
017462  022777  010600  161426        CMP     #10600,@RSDS            ;DID ATA +LBT CLEAR
017470  001401                        BEQ     .+4                     ;YES
017472  104040                        HLT     !DS                     ;ATA DID NOT CLEAR BY CLR BIT
```

```
                                    ;FILL SECTOR WITH ALL ONES.
                                    ;NOW WRITE 1ST WORD IN SECTOR
                                    ;TEST REMAINING 63 WORDS FOR 0
                                    ;
                                    ;*****************************************************************************
                                    ;TEST 113                TEST FOR ZERO'S IN PARTIAL FILLED SECTOR
                                    ;*****************************************************************************
017474  104400                      TST113: SCOPE
017476  104414                      SECT:   CLRDK                       ;CLEAR ALL RS REG
017500  012737  177777  027530              MOV     #-1,OUTBUF          ;PUT -1NTO OUTBUF
017506  013777  001102  161376              MOV     @#OBUFSV,@RSBA      ;SET UP CURRENT ADDR
017514  022737  000004  001162              CMP     #4,RS04DT           ;RS03LA DISK?
017522  001004                            BNE     4$                  ;NO
017524  012777  177740  161356            MOV     #-40,@RSWC          ;LOAD WORD COUNT
017532  000411                            BR      5$                  ;CONTINUE
017534  012777  177600  161346  4$:       MOV     #-200,@RSWC         ;LOAD WC FOR RS04
017542  005737  001162                    TST     RS04DT              ;RS04?
017546  001003                            BNE     5$                  ;YES
017550  012777  177700  161332            MOV     #-100,@RSWC         ;SET WORD COUNT TO -100
017556  052777  000010  161322  5$:       BIS     #BAI,@RSCS2         ;SET BAI BIT
017564  012777  000061  161312            MOV     #61,@RSCS1          ;WRITE
017572  105777  161306          3$:       TSTB    @RSCS1              ;IS RDY SET?
017576  100375                            BPL     3$                  ;NO
017600  005077  161310                    CLR     @RSDA               ;SET DSK ADDRESS TO 0
017604  012737  177777  027530            MOV     #-1,OUTBUF          ;PUT 177777 INTO OUTBUF
017612  013777  001102  161272            MOV     @#OBUFSV,@RSBA      ;SET UP CURRENT ADDR
017620  012777  177777  161262            MOV     #-1,@RSWC           ;SET WORD COUNT TO -1
017626  052777  000010  161252            BIS     #10,@RSCS2          ;SET BAI BIT
017634  012777  000061  161242            MOV     #61,@RSCS1          ;WRITE
017642  105777  161236          1$:       TSTB    @RSCS1              ;IS RDY SET?
017646  100375                            BPL     1$                  ;NO
017650  042777  000010  161230            BIC     #10,@RSCS2          ;CLEAR BAI BIT
017656  005737  001162                    TST     RS04DT              ;RS04?
017662  001404                            BEQ     7$                  ;NO
017664  012737  000200  001176            MOV     #200,WORK           ;YES
017672  000403                            BR      8$                  ;CONT
017674  012737  000100  001176  7$:       MOV     #100,WORK           ;SET UP BUFFER
017702  013701  001102          8$:       MOV     @#OBUFSV,R1         ;GET STARTING ADD OF BUF
017706  012721  177777                    MOV     #-1,(R1)+           ;LOAD FIRST WD WITH -1
017712  005021                  6$:       CLR     (R1)+               ;LOAD REST WITH 0
017714  005337  001176                    DEC     WORK                ;DONE YET?
017720  001374                            BNE     6$                  ;NO
017722  005077  161166                    CLR     @RSDA               ;SET DSK ADDRESS TO 0
017726  013777  001102  161156            MOV     @#OBUFSV,@RSBA      ;SET UP CURRENT ADDR
017734  022737  000004  001162            CMP     #4,RS04DT           ;RS03LA DISK?
017742  001004                            BNE     11$                 ;NO
017744  012777  177740  161136            MOV     #-40,@RSWC          ;LOAD WORD COUNT
017752  000412                            BR      10$                 ;CONTINUE
017754  005737  001162          11$:      TST     RS04DT              ;RS04?
017760  001404                            BEQ     9$                  ;NO
017762  012777  177600  161120            MOV     #-200,@RSWC         ;YES
017770  000403                            BR      10$                 ;CONT
017772  012777  177700  161110  9$:       MOV     #-100,@RSWC         ;SET WORD COUNT TO -100
020000  012777  000051  161076  10$:      MOV     #51,@RSCS1          ;WRITE CHECK
```

```
3273  020006  032777  000200  161070  2$:     BIT     #200,@RSCS1     ;IS RDY SET?
3274  020014  001774                          BEQ     2$              ;NO
3275  020016  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
3276  020022  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
3277  020026  017700  161054                  MOV     @RSCS2,BAD      ;GET CS2
3278  020032  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3279  020034  001401                          BEQ     .+4             ;YES
3280  020036  104002                          HLT     !ER             ;THERE WAS A WRITE CHECK ERROR
3281
3282                          ;*************************************************************************
3283                          ;TEST 114               IF MEMORY MANAGEMENT IS AVAILABLE CHECK THE EXTENDED ME'4ORY ADDR
3284                          ;*************************************************************************
3285  020040  104400          TST114: SCOPE
3286
3287  020042  104414          EXTTST: CLRDK                           ;CLEAR ALL RS REG.
3288  020044  013737  022560  001164          MOV     TIMES,TIMSV     ;SAVE LOOP #
3289  020052  012737  000010  022560          MOV     #10,TIMES       ;LOOP 10 TIMES
3290  020060  012737  020564  000004          MOV     #EXTTRP,4       ;SETUP TIMEOUT TRAP
3291  020066  012737  000340  000006          MOV     #340,6
3292  020074  005737  177572                  TST     @#SR0           ;IF MEMORY MANAGEMENT IS NOT
3293                                                                  ;AVAILABLE THE PROGRAM WILL TRAP
3294                                                                  ;AND TRANSFER TO END OF THE TEST
3295  020100  012737  020556  000004          MOV     #EXTRP,4
3296  020106  012737  007600  172356          MOV     #7600,@#KIPAR7  ;OPEN I/O REGISTERS
3297  020114  005037  172340                  CLR     @#KIPAR0        ;FREE FIRST 4K
3298  020120  012737  000200  172342          MOV     #200,@#KIPAR1   ;ENABLE SECOND 4K
3299  020126  012737  002000  172344          MOV     #2000,@#KIPAR2
3300  020134  012737  177406  172300          MOV     #400*256.-400+UP+RW,@#KIPDR0    ;SET KIPDR0=RW UP 400 BLOCKS
3301  020142  012737  177406  172302          MOV     #400*256.-400+UP+RW,@#KIPDR1    ;SET KIPDR1=RW UP 400 BLOCKS
3302  020150  012737  177406  172304          MOV     #400*256.-400+UP+RW,@#KIPDR2    ;SET KIPDR2=RW UP 400 BLOCKS
3303  020156  012737  177406  172316          MOV     #400*256.-400+UP+RW,@#KIPDR7    ;SET KIPDR7=RW UP 400 BLOCKS
3304  020164  012737  000001  177572          MOV     #1,@#SR0        ;TURN ON MEMORY MANAGEMENT
3305  020172  012702  040000                  MOV     #40000,R2       ;R2 EQUALS BASE ADDR
```

```
3306  020176  012712  177777          7$:   MOV   #177777,(R2)    ;INSERT PATTERN INTO 200000
3307  020202  012777  177776  160700        MOV   #-2,@RSWC       ;SETUP WORDCOUNT
3308  020210  012777  177777  160674        MOV   #177777,@RSBA   ;SETUP BUS ADDR
3309  020216  012777  000061  160660        MOV   #61,@RSCS1      ;WRITE TWO WORDS ON DISK.  RSBA
3310                                                              ;STARTS AT 177777 TO FORCE CARRY
3311                                                              ;TO SET A16
3312  020224  105777  160654               TSTB  @RSCS1          ;WAIT FOR READY
3313  020230  100375                       BPL   .-4
3314  020232  005777  160646               TST   @RSCS1
3315  020236  100002                       BPL   1$
3316  020240  104046                       HLT   !ER!DA!DS       ;STATUS ERROR AFTER 2 WORD WRITE
3317  020242  000447                       BR    2$              ;USING MEX0
3318  020244  022777  004660  160632  1$:  CMP   #4660,@RSCS1    ;IS CS1 CORRECT
3319  020252  001402                       BEQ   3$              ;YES
3320  020254  104002                       HLT   !ER             ;CS2 DID NOT COMPARE
3321  020256  000441                       BR    2$
3322  020260  005012                 3$:   CLR   (R2)            ;CLEAR LOCATION 200000
3323  020262  005077  160626               CLR   @RSDA           ;SETUP DA
3324  020266  012777  177777  160616        MOV   #177777,@RSBA   ;SETUP BA
3325  020274  012777  177776  160606        MOV   #-2,@RSWC       ;SETUP WC
3326  020302  012777  000071  160574        MOV   #71,@RSCS1      ;READ TWO WORDS INTO LOCATIONS
3327                                                              ;177777 AND 200000.
3328  020310  105777  160570               TSTB  @RSCS1          ;WAIT FOR READY
3329  020314  100375                       BPL   .-4
3330  020316  005777  160562               TST   @RSCS1          ;ANY ERRORS?
3331  020322  100002                       BPL   4$              ;BRANCH IF NO
3332  020324  104002                       HLT   !ER             ;ERROR OFTER READING 2 WORDS
3333  020326  000415                       BR    2$
3334  020330  022777  004670  160546  4$:  CMP   #4670,@RSCS1    ;IS CS1 CORRECT?
3335  020336  001402                       BEQ   5$              ;YES
3336  020340  104002                       HLT   !ER             ;CS1 DID NOT COMPARE
3337  020342  000407                       BR    2$              ;READ STARTING AT 177777
3338  020344  022712  177777          5$:  CMP   #177777,(R2)    ;WAS DATA READ INTO LOCATION
3339  020350  001404                       BEQ   2$              ;200000 CORRECTLY? - BRANCH IF YES
3340  020352  012701  177777               MOV   #177777,GOOD
3341  020356  011200                       MOV   (R2),BAD
3342  020360  104000                       HLT                   ;DATA COMPARE ERROR AT 200000
3343  020362  000240                 2$:   NOP
```

```
3344  020364  104414                    EXTT1:  CLRDK                           ;CLEAR ALL REG
3345  020366  012737  004000  172344            MOV     #4000,@#KIPAR2
3346  020374  012702  040000                    MOV     #40000,R2               ;R2 EQUALS THE BASE ADDR
3347  020400  012712  177777            7$.     MOV     #177777,(R2)            ;INSERT PATTERN INTO 400000
3348  020404  012777  177777  160500            MOV     #177777,@RSBA           ;SETUP BUS ADDR
3349  020412  012777  177776  160470            MOV     #-2,@RSWC               ;LOAD WC
3350  020420  012777  000461  160456            MOV     #461,@RSCS1             ;SET BIT A16 AND WRITE
3351  020426  105777  160452                    TSTB    @RSCS1                  ;WAIT FOR READY
3352  020432  100375                            BPL     .-4
3353  020434  005777  160444                    TST     @RSCS1                  ;ANY ERRORS?
3354  020440  100001                            BPL     4$                      ;BRANCH IF NO
3355  020442  104002                            HLT     !ER                     ;ERROR AFTER READING 2 WORDS
3356  020444  022777  005260  160432  4$:     CMP     #5260,@RSCS1            ;IS CS1 CORRECT?
3357  020452  001401                            BEQ     10$                     ;BRANCH IF YES
3358  020454  104002                            HLT     !ER                     ;NO CS1 DID NOT COMPARE
3359                                                                            ;READ STARTING AT 377777
3360  020456  005012                    10$:    CLR     (R2)                    ;CLEAR LOCATION 400000
3361                                                                            ;READ TWO WORDS STARTING AT 377777
3362  020460  012777  177776  160422            MOV     #-2,@RSWC               ;SETUP WC
3363  020466  005077  160422                    CLR     @RSDA                   ;SETUP DA
3364  020472  012777  177777  160412            MOV     #177777,@RSBA
3365  020500  012777  000471  160376            MOV     #471,@RSCS1             ;CLEAR A 17 SET A16,READ
3366  020506  105777  160372                    TSTB    @RSCS1                  ;WAIT FOR READY
3367  020512  100375                            BPL     .-4
3368  020514  005777  160364                    TST     @RSCS1                  ;ANY ERRORS?
3369  020520  100002                            BPL     11$                     ;BRANCH IF NO
3370  020522  104002                            HLT     !ER                     ;ERROR WHILE READING TWO WORDS
3371  020524  000414                            BR      EXTRP
3372  020526  022777  005270  160350  11$:     CMP     #5270,@RSCS1            ;IS CS1 CORRECT?
3373  020534  001401                            BEQ     12$                     ;BRANCH IF YES
3374  020536  104002                            HLT     !ER                     ;CS1 DID NOT COMPARE
3375                                                                            ;READ STARTING AT 377777
3376  020540  022712  177777            12$:    CMP     #177777,(R2)            ;WAS DATA READ INTO LOCATION 400000
3377  020544  001404                            BEQ     EXTRP                   ;CORRECTLY? - BRANCH IF YES
3378  020546  012701  177777                    MOV     #177777,GOOD
3379  020552  011200                            MOV     (R2),BAD
3380  020554  104000                            HLT                             ;DATA COMPARE ERROR AT 400000 IF
3381                                                                            ;RECEIVED=0 - LOCATION WASN'T ACCESSED
3382  020556  005037  177572            EXTRP:  CLR     @#SR0                   ;TURN OFF MEMORY MANAGEMENT
3383  020562  000401                            BR      EXT1
3384  020564  000240                    EXTTRP: NOP                             ;UPDATE TEST NUMBERS
3385  020566  012706  000500            EXT1:   MOV     #500,SP                 ;RESTORE STACK
3386  020572  012737  000006  000004    MEMOUT: MOV     #6,4
3387  020600  005037  000006                    CLR     6
```

```
                        ;*****************************************************************************
                        ;TEST 115               TEST PROGRAM INTERRUPT BY MOVING 300 INTO RSCS1
                        ;*****************************************************************************
020604  104400          TST115: SCOPE

020606  104414          QES:    CLRDK                       ;CLEAR ALL DRIVES
020610  012706  000500          MOV     #500,SP             ;SETUP STACK
020614  012777  020666  160312  MOV     #PGTRAP,@RSVEC      ;SET UP VECTOR
020622  012777  000340  160306  MOV     #340,@RSVCPS        ;SET TRAP PS
020630  012737  000200  177776  MOV     #200,@#PS           ;SET PS AT PRIORITY 4
020636  012777  000300  160240  MOV     #300,@RSCS1         ;THIS SHOULD CAUSE A TRAP
020644  012737  000500  001176  MOV     #500,WORK           ;SETUP LOOP
020652  005337  001176  1$:     DEC     WORK                ;DEC LOOP SHOULD
020656  001375                  BNE     1$                  ;INTERRUPE BEFORE LOOP IS DONE
020660  104001                  HLT     !CS1                ;SHOULD NEVER GET HERE
020662  000137  020702          JMP     QESDON              ;GET OUT

020666  022626          PGTRAP: CMP     (6)+,(6)+           ;TRAP OK
020670  022777  004200  160206  CMP     #4200,@RSCS1        ;DID IE CLEAR?
020676  001401                  BEQ     .+4                 ;YES
020700  104001                  HLT     !CS1                ;IE SHOULD BE CLEARED
020702                  QESDON:

                        ;*****************************************************************************
                        ;TEST 116               TEST THAT DISK DOES NOT INTERRUPT WHEN PS IS AT 5
                        ;*****************************************************************************
020702  104400          TST116: SCOPE

020704  012706  000500  INTR5:  MOV     #500,SP             ;SETUP STACK
020710  013737  001164  022560  MOV     TIMSV,TIMES         ;RESTORE LOOP COUNTER
020716  104414                  CLRDK                       ;CLEAR ALL RS REG
020720  012777  021000  160206  MOV     #INT112,@RSVEC      ;SET UP INTERRUPT VECTOR
020726  012777  000340  160202  MOV     #340,@RSVCPS        ;SET PRIO.
020734  012737  000240  177776  MOV     #240,@#PS           ;LOCK OUT ALL INTERRUPTS ABOVE
020742  013700  177776          MOV     @#PS,BAD            ;GET PS
020746  012777  177777  160134  MOV     #177777,@RSWC       ;SET WORD COUNT TO -1
020754  013777  001102  160130  MOV     @#OBUFSV,@RSBA      ;LOAD CURRENT ADDRESS
020762  012777  000161  160114  MOV     #161,@RSCS1         ;GO WRITE (INTERRUPT ENABLED)
020770  004737  026744          JSR     PC,WAITRY           ;WAIT FOR READY
020774  104001                  HLT     !CS1                ;NO RDY NEVER CAME UP
020776  000403                  BR      INTDON              ;RESTART ROUTINE
                        ;PROCESSOR SHOULD NOT TRAP TO INT112

021000  012701  000240  INT112: MOV     #240,GOOD           ;WHAT PS SHOULD HAVE
021004  104000                  HLT                         ;GOOD = CORRECT ANS FOR PS
021006                  INTDON:                             ;DONE GET OUT
```

```
                                        ;*****************************************************************************
                                        ;TEST 117               TEST THAT DISK DOES INTERRUPT WHEN PS IS AT 4
                                        ;*****************************************************************************
021006  104400                  TST117: SCOPE

021010  012706  000500          INTR4:  MOV     #500,SP         ;SETUP STACK
021014  104414                          CLRDK                   ;CLEAR ALL RS REG
021016  012777  021112  160110          MOV     #INT114,@RSVEC  ;SET UP DISK TRAP VECTOR
021024  012777  000340  160104          MOV     #340,@RSVCPS    ;SET PRIO.
021032  012737  000200  177776          MOV     #200,@#PS       ;SET PROCESSOR TO PRIORITY 4
021040  013700  177776                  MOV     @#PS,BAD        ;GET PS
021044  012701  000200                  MOV     #200,GOOD       ;GET CORRECT PS
021050  012777  177777  160032          MOV     #177777,@RSWC   ;SET WORD COUNT TO -1
021056  013777  001102  160026          MOV     @#OBUFSV,@RSBA  ;LOAD CURRENT ADDRESS
021064  012777  000161  160012          MOV     #161,@RSCS1     ;WRITE (INTERRUPT ENABLE
021072  005037  001176                  CLR     WORK
021076  005237  001176                  INC     WORK            ;WAIT FOR INTERRUPT TO OCCUR
021102  001375                          BNE     .-4
021104  104000                          HLT                     ;GOOD=CORRECT PS BAD=WRONG PS
021106  104042                          HLT     !ER!DS
021110  000405                          BR      DONINT          ;CONT
021112  022777  004260  157764  INT114: CMP     #4260,@RSCS1    ;DID IE CLEAR?
021120  001401                          BEQ     .+4             ;YES
021122  104001                          HLT     !CS1            ;WHY DID NOT IE CLEAR
021124                          DONINT:

                                        ;*****************************************************************************
                                        ;TEST 120               TEST INTERRUPT ON ERROR
                                        ;*****************************************************************************
021124  104400                  TST120: SCOPE

021126  012706  000500          ERINT:  MOV     #500,SP         ;SETUP STACK
021132  012737  000200  177776          MOV     #200,@#PS       ;SET PS AT PRI 4
021140  012777  021216  157766          MOV     #ERRINT,@RSVEC  ;SET UPINTERRUPT ADD.
021146  104414                          CLRDK                   ;CLEAR ALL RS REG
021150  012777  000340  157760          MOV     #340,@RSVCPS    ;SET PRIO.
021156  012777  177777  157730          MOV     #177777,@RSDA   ;SET RSDA=TO ALL ONES
021164  012777  177600  157716          MOV     #177600,@RSWC   ;WORD COUNT=-200
021172  013777  001102  157712          MOV     @#OBUFSV,@RSBA  ;CURRENT ADDRESS=OUTBUF
021200  012777  000161  157676          MOV     #161,@RSCS1     ;WRITE
021206  004737  026744                  JSR     PC,WAITRY       ;WAIT FOR READY
021212  104042                  1$:     HLT     !ER!DS          ;Y DIDN'T PGM INTERRUPT IS RDY SET?
021214  000406                          BR      FINTST          ;GET OUT
021216  022777  144260  157660  ERRINT: CMP     #144260,@RSCS1  ;IS CS1 RIGHT?
021224  001401                          BEQ     .+4             ;YES
021226  104042                          HLT     !ER!DS
021230  022626                          CMP     (6)+,(6)+       ;CLEAR STACK
021232                          FINTST:
```

```
                                        ;*****************************************************************************
                                        ;TEST 121                DYNAMIC FUNCTION TEST
                                        ;*****************************************************************************
021232  104400                          TST121: SCOPE
                                        ;EXECUTE FUNCTION MODIFY UNIT # AND DO A DRIVE SEARCH
                                        ;DRIVE SEARCH WILL ONLY BE DONE IF THERE ARE AT LEAST 2 DRIVES
                                        ;2ND DRIVE MAY NOT BE TESTED YET SO IF THIS TEST FAILS CHECK 2ND DRIVE
                                        ;BEFORE TRYING TO DEBUG THIS TEST

021234  104414                          MODNUM: CLRDK                           ;CLEAR ALL RS REG
021236  013737  022560  001164                  MOV     TIMES,TIMSV             ;SAVE LOOP COUNT
021244  012737  000010  022560                  MOV     #10,TIMES               ;LOOP ONLY 10 TIMES
021252  005037  001200                          CLR     WORK1                   ;CLEAR WORK LOC.
021256  005003                                  CLR     R3
021260  005004                                  CLR     R4
021262  012702  022210                          MOV     #DVTAB,R2               ;SETUP TABLE
021266  012737  000401  001176                  MOV     #401,WORK               ;SETUP TO TEST FOR MORE DRIVES
021274  033737  001176  001154  7$:             BIT     WORK,UNITSV             ;IS DRIVE ON SYSTEM?
021302  001403                                  BEQ     6$                      ;NO
021304  020437  001152                          CMP     R4,UNNUM                ;IS THIS THE SAME DRIVE?
021310  001017                                  BNE     8$                      ;NO
021312  005204                          6$:     INC     R4                      ;UPDATE 2ND UNIT #
021314  000241                                  CLC
021316  006137  001176                          ROL     WORK                    ;CHECK FOR NEXT DRIVE
021322  103364                                  BCC     7$                      ;NOT DONE YET
021324  032737  000010  001200                  BIT     #BIT3,WORK1             ;MULTI DRIVE?
021332  001016                                  BNE     12$                     ;YES
021334  013705  001152                          MOV     UNNUM,R5                ;LOAD UNIT NO
021340  005205                                  INC     R5                      ;CHANGE IT
021342  042705  177770                          BIC     #177770,R5              ;CLEAR JUNK
021346  000410                                  BR      12$
021350  052737  000010  001200  8$:             BIS     #BIT3,WORK1             ;SET FOUND MULTI DRIVE
021356  010422                                  MOV     R4,(R2)+                ;LOAD UNT # INTO TABLE
021360  005203                                  INC     R3                      ;COUNT # OF DRIVES
021362  010337  001172                          MOV     R3,SAVEE                ;SAVE IT
021366  000751                                  BR      6$
021370  012777  021504  157536  12$:            MOV     #TSTVEC,@RSVEC          ;SETUP INT. TRAP
021376  012777  000340  157532                  MOV     #340,@RSVCPS            ;SETUP PRIO.
021404  005037  027530                          CLR     OUTBUF                  ;CLR TO READ INTO
021410  013777  001102  157474                  MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
021416  012777  177000  157464                  MOV     #-1000,@RSWC            ;SET WORD COUNT
021424  012777  000060  157462  1$:             MOV     #60,@RSDA               ;LOAD DA
021432  012702  022210                          MOV     #DVTAB,R2               ;GET TABLE
021436  012777  000161  157440                  MOV     #161,@RSCS1             ;GO WRITE
021444  005703                                  TST     R3                      ;MORE THEN 1 DRIVE?
021446  001003                                  BNE     13$                     ;YES
021450  010577  157432                          MOV     R5,@RSCS2               ;NO MODIFY UNIT #
021454  000407                                  BR      14$
```

```
3530  021456  012277  157424          13$:    MOV     (R2)+,@RSCS2    ;LOAD UNIT#
3531  021462  012777  000131  157414          MOV     #131,@RSCS1     ;DO SEARCH
3532  021470  005303                          DEC     R3              ;DONE ALL DRIVES YET?
3533  021472  001371                          BNE     13$             ;NO
3534  021474  012737  000200  177776  14$:    MOV     #200,@#PS       ;ENABLE INTERRUPTS
3535  021502  000001                  WTDV:   WAIT
3536  021504  013777  001152  157374  TSTVEC: MOV     UNNUM,@RSCS2    ;GET 1ST DRIVE
3537  021512  017700  157366                  MOV     @RSCS1,BAD      ;GET CS1
3538  021516  042700  100000                  BIC     #BIT15,BAD      ;CLEAR SC
3539  021522  012701  004260                  MOV     #4260,GOOD      ;GET CORRECT ANS
3540  021526  020100                          CMP     GOOD,BAD        ;IS CS1 CORRECT?
3541  021530  001402                          BEQ     4$              ;NO! X-FER OK
3542  021532  104000                          HLT                     ;CS1 SHOULD = 14270 OR 4270
3543  021534  104140                          HLT     !DS!AS
3544  021536  005777  157346          4$:     TST     @RSWC           ;TEST WC
3545  021542  001401                          BEQ     .+4             ;WORD COUNT DID OVERFLOW
3546  021544  104010                          HLT     !WC             ;SHOULD = 0
3547  021546  013701  001152                  MOV     UNNUM,GOOD      ;GET CORRECT
3548  021552  052701  000100                  BIS     #100,GOOD       ;ANS OF CS2
3549  021556  017700  157324                  MOV     @RSCS2,BAD      ;GET CS2
3550  021562  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3551  021564  001401                          BEQ     .+4             ;YES
3552  021566  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
3553  021570  017700  157316                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
3554  021574  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
3555  021600  062701  002000                  ADD     #2000,GOOD      ;UPDATE IT
3556  021604  020001                          CMP     BAD,GOOD        ;IS RSBA CORRECT
3557  021606  001401                          BEQ     .+4             ;YES EXECUTE CONTINUE
3558  021610  104000                          HLT                     ;RSBA FAILED TO INCREMENT
3559  021612  022737  000004  001162          CMP     #4,RS04DT       ;RS03LA?
3560  021620  001006                          BNE     2$              ;NO
3561  021622  022777  000100  157264          CMP     #100,@RSDA      ;IS DA CORRECT?
3562  021630  001420                          BEQ     3$              ;OK
3563  021632  104104                          HLT     !DA!AS
3564  021634  000416                          BR      3$              ;CONTINUE
3565  021636  005737  001162          2$:     TST     RS04DT          ;IS THIS A RS04?
3566  021642  001006                          BNE     5$              ;YES
3567  021644  022777  000070  157242          CMP     #70,@RSDA       ;IS DA CORRECT?
3568  021652  001407                          BEQ     3$              ;YES
3569  021654  104104                          HLT     !DA!AS          ;DA NOT CORRECT
3570  021656  000405                          BR      3$              ;CONTINUE
3571  021660  022777  000064  157226  5$:     CMP     #64,@RSDA       ;WAS RSDA INCREMENTED
3572  021666  001401                          BEQ     .+4             ;RSDA OK
3573  021670  104046                          HLT     !DA!ER!DS       ;RSDA SHOULD CONTAIN A 64
3574  021672  012777  040000  157204  3$:     MOV     #TRE,@RSCS1     ;CLEAR ALL ERRORS IF ANY
3575  021700  032737  000010  001200          BIT     #BIT3,WORK1     ;MULTI DRIVE?
3576  021706  001461                          BEQ     WTDV1           ;NO
3577  021710  012777  021734  157216  1$:     MOV     #TTVEC,@RSVEC   ;SETUP INT FOR NEXT DRIVE
3578  021716  012716  021732                  MOV     #WTDV2,(SP)     ;GET WAIT
3579  021722  012777  000100  157154          MOV     #100,@RSCS1     ;SET IE
3580  021730  000002                          RTI                     ;RETURN
3581  021732  000001                  WTDV2:  WAIT
```

```
3582                                    ;SERVICE ROUTINE FOR SEARCH FUNCTIONS
3583  021734  005002                    TTVEC:  CLR     R2              ;CLEAR UNIT #
3584  021736  000241                            CLC
3585  021740  012737  000401  001176            MOV     #401,WORK
3586  021746  033777  001176  157146    1$:     BIT     WORK,@RSAS      ;DID THIS DRIVE INT?
3587  021754  001006                            BNE     2$              ;YES
3588  021756  005202                            INC     R2              ;UPDATE UNIT #
3589  021760  000241                            CLC
3590  021762  006137  001176                    ROL     WORK
3591  021766  103367                            BCC     1$
3592  021770  104100                            HLT     !AS             ;WHY DID WE INT WITH NO ATA???
3593  021772  010277  157110            2$:     MOV     R2,@RSCS2       ;GET DRIVE
3594  021776  022777  110600  157112            CMP     #110600,@RSDS   ;DID PIP CLEAR?
3595  022004  001401                            BEQ     .+4             ;YES
3596  022006  104140                            HLT     !DS!AS          ;PIP BIT DID NOT CLEAR
3597  022010  022777  104230  157066            CMP     #104230,@RSCS1  ;DID SC SET?
3598  022016  001401                            BEQ     .+4             ;YES
3599  022020  104140                            HLT     !AS!DS          ;SC DID NOT SET
3600  022022  005337  001172                    DEC     SAVEE           ;COUNT # OF INT
3601  022026  001411                            BEQ     WTDV1           ;DONE YET?
3602  022030  013777  001176  157064            MOV     WORK,@RSAS      ;CLEAR AS
3603  022036  012777  000100  157040            MOV     #100,@RSCS1     ;SET IE
3604  022044  012716  021732                    MOV     #WTDV2,(SP)     ;RETURN TO WAIT
3605  022050  000002                            RTI
3606  022052  012737  000340  177776  WTDV1:    MOV     #340,@#PS
3607  022060  012706  000500                    MOV     #500,SP         ;CLEAR STACK
3608  022064  013777  001136  157042            MOV     RSVCPS,@RSVEC   ;RESTORE INT VECTOR
3609  022072  005077  157040                    CLR     @RSVCPS
3610  022076  104400                    MODDON: SCOPE                   ;DONE
3611  022100  013737  001164  022560            MOV     TIMSV,TIMES     ;RESTORE LOOP COUNT
3612  022106  012737  000340  177776            MOV     #340,@#PS       ;RESTORE PS
3613  022114  012737  000001  001000            MOV     #1,ICNT         ;FUGE TEST NUMBERS
3614  022122  000137  001720            OUT:    JMP     @#TRYNX         ;TEST NEXT DRIVE
3615                                    .SBTTL          $DONE - BELL AND SCOPE ROUTINE
3616
3617  022126  104400                    DONE:   SCOPE                   ;TERMINATIONG SCOPE FOR LOOPING
3618  022130  062737  000001  001006            ADD     #1,PCNT+2       ;ADD 1 TO THE PASS COUNT
3619  022136  005537  001004                    ADC     PCNT            ;MAKE IT DOUBLE PREC.
3620  022142  032777  002000  156656            BIT     #SW10,@SWR      ;RING THE BELL?
3621  022150  001004                            BNE     4$              ;NO!
3622  022152  104402  022156                    TYPE    ,.+2            ;.ASCIZ <BELL><177>
3623  022162  013700  000042            4$:     MOV     @#42,R0         ;GET MONITOR ADDRESS
3624  022166  001405                            BEQ     $END1           ;IF NONE
3625  022170  000005                            RESET
3626  022172  004710                    $ENDAD: JSR     7,(0)           ;GO TO MONITOR
3627  022174  000240  000240  000240            240,240,240             ;SAVE ROOM FOR ACT11
3628  022202  000137  001204            $END1:  JMP     @#BEGIN         ;RETURN
3629
3630  022206  000000                    .TBIT:  0                       ;T BIT FLAG
3631
3632  022210  000010                    DVTAB:  .BLKW   10
```

```
                        .SBTTL          $TYPE - TTY TYPEOUT ROUTINE

                        ;THIS ROUTINE IS USE TO TYPE ASCII MESSAGES ON THE TTY. THE
                        ;CALL CAN BE IN ONE OF 3 FORMS: 1) "TYPE ,ADR" - TYPES THE
                        ;MESSAGE STARTING IN LOCATION "ADR:", 2) "TYPE ,CHAR" - TYPES
                        ;THE ASCII "CHAR", AND 3) "PRINT <<15><12>'MESSAGE'> - TYPES
                        ;THE MESSAGE WHICH IS INLINE ASCII. THE FILLER CHARACTER WHICH IS
                        ;TYPED AFTER A LINE FEED IS IN FILCHR AND THE NUMBER OF FILLERS
                        ;IS IN FILCHR+1.

022230  010446          .TYPE:  MOV     R4,-(6)         ;SAVE R4
022232  010546                  MOV     R5,-(6)         ;SAVE R5
022234  017605  000004          MOV     @4(6),R5        ;GET ADDRESS TO BE TYPED
022240  032705  177400          BIT     #177400,R5      ;IS IT A TYPEM?
022244  001002                  BNE     1$              ;NO
022246  016605  000004          MOV     4(6),R5         ;GET ADDRESS OF CHARACTER
022252  105715          1$:     TSTB    (R5)            ;TERMINATOR?
022254  001423                  BEQ     2$              ;GET OUT IF SO
022256  122715  000012          CMPB    #12,(R5)        ;IS THE CHAR A LINE FEED
022262  001012                  BNE     4$              ;NO - GET OUT
022264  113704  001015          MOVB    FILCHR+1,R4     ;GET THE FILL COUNT
022270  113777  001014  156526  5$:     MOVB    FILCHR,@TPB     ;TYPE A FILLER
022276  105777  156514          TSTB    @TPS            ;DONE YET?
022302  100375                  BPL     .-4             ;NO - WAIT
022304  005304                  DEC     R4              ;DEC COUNT
022306  001370                  BNE     5$              ;LOOP UNTIL 0
022310  112577  156510          MOVB    (R5)+,@TPB      ;LOAD AND TYPE THE CHARACTER
022314  105777  156476          TSTB    @TPS            ;IS THE PRINTER READY
022320  100375                  BPL     .-4             ;WAIT UNTIL IT IS
022322  000753                  BR      1$              ;GET THE NEXT CHARACTER
022324  017646  000004          2$:     MOV     @4(6),-(6)      ;GET ADDRESS TO BE TYPED
022330  062766  000002  000006  ADD     #2,6(6)         ;ADD 2 TO THE ADDRESS
022336  022666  000004          CMP     (6)+,4(6)       ;IS IT .+2?
022342  001006                  BNE     3$              ;NO
022344  062705  000002          ADD     #2,R5           ;ADD 2 TO THE ADDRESS
022350  042705  000001          BIC     #1,R5           ;BACK UP TO AN EVEN BYTE
022354  010566  000004          MOV     R5,4(6)         ;RESTORE ADDRESS
022360  012605          3$:     MOV     (6)+,R5         ;RESTORE R5
022362  012604                  MOV     (6)+,R4         ;RESTORE R4
022364  000002                  RTI                     ;RETURN
```

```
                                        .SBTTL          $SCOPE - SCOPE LOOP HANDLER

                                        ;THIS ROUTINE HANDLES THE ITERATIONS, LOOPING, ERROR
                                        ;LOOPING, AND THE DISPLAYING OF THE TEST NUMBER.
                                        ;"SCOPE" IS PLACED BETWEEN EACH SUBTEST IN THE TEST AND
                                        ;RECORDS THE STARTING ADDRESS OF THE SUBTEST IN "LAD:"

022366  104416                  .SCOPE: KBDIN                   ;GO CHECK FOR ^G
022370  032777  000400  156430          BIT     #SW8,@SWR       ;LOOP ON SPEC. TEST?
022376  001404                          BEQ     1$              ;NO LOOP ON SPEC. TEST
022400  127737  156422  001000          CMPB    @SWR,ICNT       ;ON RIGHT TEST?   *SW7-0*
022406  001453                          BEQ     .OVER           ;NOT RIGHT TEST
022410  032777  040000  156410  1$:     BIT     #SW14,@SWR      ;LOOP ON TEST?
022416  001045                          BNE     .KIT            ;LOOP ON TEST IS SET
022420  000416                          BR      3$              ;SKIP - NOP FOR XOR TESTER
022422  013746  000004                  MOV     @#4,-(6)        ;PUSH @#4 ON STACK
022426  012737  022446  000004          MOV     #4$,@#4         ;SET FOR TIMEOUT
022434  005737  177060                  TST     @#177060        ;ERROR ON XOR?
022440  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
022444  000422                          BR      .SVLAD          ;NO ERROR - GO TO NEXT TEST
022446  022626                  4$:     CMP     (6)+,(6)+       ;CLEAR STACK
022450  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
022454  000426                          BR      .KIT            ;ERROR - LOOP ON TEST
022456  032777  004000  156342  3$:     BIT     #SW11,@SWR      ;KILL ITERATIONS
022464  001012                          BNE     .SVLAD          ;YES - KILL ITERATIONS
022466  105737  001001                  TSTB    ICNT+1          ;FIRST ONE?
022472  001404                          BEQ     2$              ;BRANCH IF FIRST
022474  123737  022560  001001          CMPB    TIMES,ICNT+1    ;DONE?
022502  003013                          BGT     .KIT            ;BRANCH IF NOT
022504  112737  000001  001001  2$:     MOVB    #1,ICNT+1       ;FIRST ITERATION
022512  105237  001000          .SVLAD: INCB    ICNT            ;COUNT TEST NUMBERS
022516  011637  001010                  MOV     (6),LAD         ;SAVE LOOP ADDRESS
022522  013777  001000  156300          MOV     ICNT,@DISPLAY   ;DISPLAY TEST NO. AND ITERATION COUNT
022530  000002                          RTI                     ;RETURN

022532  105237  001001          .KIT:   INCB    ICNT+1          ;INC THE ITERATION COUNT
022536  013777  001000  156264  .OVER:  MOV     ICNT,@DISPLAY   ;SET UP DISPLAY
022544  005737  001010                  TST     LAD             ;FIRST ONE?
022550  001760                          BEQ     .SVLAD          ;YES
022552  013716  001010                  MOV     LAD,(6)         ;FUDGE RETURN ADDRESS
022556  000002                          RTI                     ;FIXES PS

022560  000100                  TIMES:  100                     ;RUN 100 TIMES
```

```
3716                                    .SBTTL          $HLT - HLT ROUTINE (ERROR TYPEOUT)
3717
3718                                    ;THIS ROUTINE PRINTS OUT ERROR MESSAGES STARTING WITH THE
3719                                    ;ADDRESS OF THE "HLT". IT ALSO COUNTS THE NUMBER OF ERRORS
3720                                    ;AND HAS THE CAPABILITY OF LOOPING ON ERROR, BELL ON ERROR,
3721                                    ;"HALT" ON ERROR, AND INHIBIT TYPEOUTS. AN OPTIONAL ARGUMENT
3722                                    ;(HLT+3) WILL BE PLACED IN ".HLTCT:" FOR ADITIONAL TYPEOUTS.
3723
3724  022562  104416                  .HLT:   KBDIN                   ;GO CHECK FOR ^G
3725  022564  032777  002000  156234          BIT     #SW10,@SWR      ;BELL ON ERROR?
3726  022572  001402                          BEQ     1$              ;NO - SKIP
3727  022574  104402  000007                  TYPE    ,BELL           ;RING BELL
3728  022600  005237  001002          1$:     INC     ERRORS          ;COUNT THE NUMBER OF ERRORS
3729  022604  032777  020000  156214          BIT     #SW13,@SWR      ;SKIP TYPEOUT IF SET
3730  022612  001025                          BNE     2$              ;SKIP TYPEOUTS
3731  022614  104402  022620                  TYPE    ,.+2            ;.ASCIZ <15><12>
3732  022624  011637  001012                  MOV     (6),HLTADR      ;PUT ADDRESS OF INSTRUCTION ON STACK
3733  022630  162737  000002  001012          SUB     #2,HLTADR       ;FUDGE ADDRESS
3734  022636  117737  156150  022720          MOVB    @HLTADR,.HLTCT  ;GET HLT ARGUEMENT
3735  022644  013746  001012                  MOV     HLTADR,-(6)     ;PUT HLTADR ON STACK
3736  022650  104404                          TYPEO                   ;TYPE STACK IN OCTAL
3737  022652  104402  022656                  TYPE    ,.+2            ;.ASCIZ " "
3738  022662  004737  026232                  JSR     PC,RSREG        ;GO TO USER ERROR ROUTINE
3739  022666  005777  156134          2$:     TST     @SWR            ;HALT ON ERROR
3740  022672  100001                          BPL     .+4             ;SKIP IF CONTINUE
3741  022674  000000                          HALT                    ;HALT ON ERROR!
3742  022676  032777  001000  156122          BIT     #SW9,@SWR       ;CHECK FOR INHIBIT LOOP ON ERROR
3743  022704  001003                          BNE     3$              ;SKIP IF LOOP ON ERROR
3744  022706  105037  001001                  CLRB    ICNT+1          ;CLEAR ITERATION COUNT
3745  022712  000002                          RTI                     ;RETURN
3746  022714  000137  022532          3$:     JMP     .KIT            ;LOOP ON TEST UNTIL NO ERRORS
3747
3748  022720  000000                  .HLTCT: 0                       ;HLT ARGUMENT
```

```
                                        .SBTTL          $OCTAL - OCTAL TYPEOUT ROUTINE

                                        ;THIS ROUTINE IS USED TO TYPE AN OCTAL NUMBER ON THE TTY. IT WILL TYPE
                                        ;ALL 6 CHARACTERS, SUPPRESS LEADING ZEROES, OR TYPE THE
                                        ;16 BI.S. IT IS CALLED VIA THE TYPOCT, TYPBIT, OR TYPOCS MACRO'S.

022722  012737  170101  023110  .TYPEB: MOV     #170101,.PR     ;SET BIT FLAG AND 16. CHARACTER COUNT
022730  000411                  BR      .PTIT           ;NOW TYPE IT IN BIT FORM
022732  112737  000001  023110  .TYPEO: MOVB    #1,.PR          ;SET ZERO FILL SWITCH
022740  000402                  BR      .+6             ;SKIP
022742  005037  023110          .TYPES: CLR     .PR             ;SUPRESS LEADING ZERO'S
022746  112737  177772  023111          MOVB    #-6,.PR+1       ;SET COUNT
022754                          .PTIT:
022754  010446                  MOV     R4,-(6)         ;PUSH R4 ON STACK
022756  010546                  MOV     R5,-(6)         ;PUSH R5 ON STACK
022760  016605  000010          MOV     10(6),R5        ;GET THE DATA
022764  012704  023112          MOV     #.PR+2,R4       ;SET POINTER TO FIRST ASCII CHAR.
022770  105014                  CLRB    (4)             ;CLEAR FIRST BYTE
022772  000411                  BR      .PRF            ;ROTATE FIRST BIT
022774  105014                  .PRL:   CLRB    (4)             ;CLEAR BYTE OF CHARACTER
022776  032737  000100  023110          BIT     #100,.PR        ;BIT TYPING MODE?
023004  001004                  BNE     .PRF            ;YES - SKIP 2 ROTATES
023006  006105                  ROL     R5              ;ROTATE BIT INTO C
023010  106114                  ROLB    (4)             ;PACK IT
023012  006105                  ROL     R5              ;ROTATE BIT INTO C
023014  106114                  ROLB    (4)             ;PACK IT
023016  006105                  .PRF:   ROL     R5              ;ROTATE BIT INTO C
023020  106114                  ROLB    (4)             ;PACK IT
023022  105714                  TSTB    (4)             ;IS IT ZERO?
023024  001402                  BEQ     .+6             ;SKIP INC
023026  105237  023110          INCB    .PR             ;SET FILL SWITCH
023032  105737  023110          TSTB    .PR             ;CHECK FILL SWITCH
023036  001402                  BEQ     .+6             ;SKIP BITSET
023040  152724  000060          BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
023044  105237  023111          INCB    .PR+1           ;INC COUNT
023050  001351                  BNE     .PRL            ;REPEAT
023052  022704  023112          CMP     #.PR+2,R4       ;EMPTY BUFFER?
023056  001002                  BNE     .+6             ;SKIP IF NOT
023060  112724  000060          MOVB    #'0,(4)+        ;LOAD 1 ZERO
023064  105014                  CLRB    (4)             ;NULL TERMINATOR
023066  104402  023112          TYPE    ,.PR+2          ;TYPE IT
023072  012605                  MOV     (6)+,R5         ;POP STACK INTO R5
023074  012604                  MOV     (6)+,R4         ;POP STACK INTO R4
023076  016666  000002  000004  MOV     2(6),4(6)       ;GET RID OF
023104  012616                  MOV     (6)+,(6)        ;DATA WORD
023106  000002                  RTI                     ;RETURN

023110  000012          .PR:    .BLKW   12              ;COUNT, SWITCH, AND OUTPUT BUFFER
```

```
                                .SBTTL          $POWER - POWER DOWN AND UP ROUTINES

                                ;THIS IS THE POWER FAIL ROUTINE WHICH WILL SAVE ALL
                                ;THE GENERAL REGISTERS AND USER DEFINED REGISTERS THEN
                                ;WAIT FOR POWER TO GO DOWN AND BE RESTORED.
                                ;IF THERE ISN'T ENOUGH TIME FOR SAVING ALL THE REGISTERS,
                                ;THE PROGRAM WILL HALT AT '.ILLUP'.

023134  012777  023260  000124  .POWER: MOV     #.ILLUP,@.PUVEC ;SET FOR FAST UP
023142  012777  000340  000120          MOV     #340,@.PUVEC$+2 ;PRIO:7
023150  010046                        MOV     R0,-(6)         ;PUSH R0 ON STACK
023152  010146                        MOV     R1,-(6)         ;PUSH R1 ON STACK
023154  010246                        MOV     R2,-(6)         ;PUSH R2 ON STACK
023156  010346                        MOV     R3,-(6)         ;PUSH R3 ON STACK
023160  010446                        MOV     R4,-(6)         ;PUSH R4 ON STACK
023162  010546                        MOV     R5,-(6)         ;PUSH R5 ON STACK
023164  010637  023264                MOV     SP,.SAVR6       ;SAVE SP
023170  012777  023200  000070        MOV     #.POWUP,@.PUVEC ;SET UP VECTOR
023176  000000                        HALT                    ;WAIT FOR PF

023200  013706  023264  .POWUP: MOV     .SAVR6,SP       ;GET SP
023204  005001                  CLR     R1              ;WAIT LOOP FOR THE TTY
023206  005201                  1$:     INC     R1              ;WAIT FOR THE INC
023210  001376                  BNE     1$              ;OF  WORD
023212  012605                  MOV     (6)+,R5         ;POP STACK INTO R5
023214  012604                  MOV     (6)+,R4         ;POP STACK INTO R4
023216  012603                  MOV     (6)+,R3         ;POP STACK INTO R3
023220  012602                  MOV     (6)+,R2         ;POP STACK INTO R2
023222  012601                  MOV     (6)+,R1         ;POP STACK INTO R1
023224  012600                  MOV     (6)+,R0         ;POP STACK INTO R0
023226  012737  023134  000024  MOV     #.POWER,@#24    ;SET UP THE POWER DOWN VECTOR
023234  012737  000340  000026  MOV     #340,@#26       ;PRIO:7
023242  104402  023246          TYPE    ,.+2            ;.ASCIZ <15><12>''POWER''
023256  000002                  RTI                     ;RETURN

023260  000000  .ILLUP: HALT                    ;THE POWER UP SEQUENCE WAS STARTED
023262  000776          BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE

023264  000000  .SAVR6: 0                       ;PUT THE SP HERE
023266  000024  000026  .PUVEC: 24,26           ;POWER UP VECTOR
```

```
                                        .SBTTL          $RDOCT - OCTAL INPUT ROUTINE

                                        ;THIS ROUTINE CALLS RDLIN, INPUTS A LINE FROM THE TTY AND CONVERTS
                                        ;IT INTO AN OCTAL NUMBER WHICH IS THE FIRST WORD ON THE STACK.

023272  011646                  .RDOCT: MOV     (6),-(6)        ;MOVE THE PC
023274  016666  000004  000002          MOV     4(6),2(6)       ;MOVE THE PS
023302  010146                          MOV     R1,-(6)         ;PUSH R1 ON STACK
023304  010246                          MOV     R2,-(6)         ;PUSH R2 ON STACK
023306  010346                          MOV     R3,-(6)         ;PUSH R3 ON STACK
023310  104412                  4$:     RDLIN                   ;READ A LINE INTO INPUT
023312  005001                          CLR     R1              ;INIT DATA WORD
023314  005037  027442                  CLR     CTN             ;CLEAR COUNT WORD
023320  012703  023546                  MOV     #INPUT,R3       ;INIT POINTER
023324  112302                  1$:     MOVB    (3)+,R2         ;GET A BYTE
023326  122702  000015                  CMPB    #15,R2          ;WAS IT A ,CR?
023332  001421                          BEQ     2$              ;GET OUT IF YES
023334  122702  000060                  CMPB    #'0,R2          ;CHECK FOR 0 OR GREATER
023340  003024                          BGT     3$              ;ERROR - LESS THAN 0
023342  122702  000067                  CMPB    #'7,R2          ;CHECK FOR 7 OR LESS
023346  002421                          BLT     3$              ;ERROR - GREATER THAN 7
023350  006002                          ROR     R2              ;GET
023352  006002                          ROR     R2              ;INTO
023354  006002                          ROR     R2              ;POSITION
023356  006101                          ROL     R1              ;FIRST BIT
023360  006102                          ROL     R2              ;GET
023362  006101                          ROL     R1              ;SECOND BIT
023364  006102                          ROL     R2              ;GET
023366  006101                          ROL     R1              ;THIRD BIT
023370  005237  027442                  INC     CTN             ;YES HE TYPED SOMETHING
023374  000753                          BR      1$              ;LOOP
023376  010166  000012          2$:     MOV     R1,12(6)        ;SAVE THE RESULT
023402  012603                          MOV     (6)+,R3         ;POP STACK INTO R3
023404  012602                          MOV     (6)+,R2         ;POP STACK INTO R2
023406  012601                          MOV     (6)+,R1         ;POP STACK INTO R1
023410  000002                          RTI                     ;RETURN

023412                          3$:
023412  104402  023416                  TYPE    ,.+2            ;.ASCIZ '?'<15><12>
023422  000732                          BR      4$              ;TRY AGAIN
```

```
                                .SBTTL          $RDLIN - TTY INPUT ROUTINE

                                ;THIS ROUTINE INPUTS A LINE TERMINATED BY A RETURN INTO ADDRESS
                                ;INPUT AND RETURNS A LINE FEED. THE BUFFER HAS A NULL TERMINATOR
                                ;INSTEAD OF THE RETURN. RUBOUTS ARE HANDLED BY RETYPING
                                ;THE LINE. BUFFER OVERFLOW ERRORS LIKE A RUBOUT.

023424  010546          .RDLIN: MOV     R5,-(6)         ;SAVE R5
023426  012705  023546  1$:     MOV     #INPUT,R5       ;GET ADDRESS
023432  022705  023566  2$:     CMP     #INPUT+16.,R5   ;BUFFER FULL?
023436  001423                  BEQ     4$              ;YES - TYPE "?"
023440  105737  177560          TSTB    @#177560        ;WAIT FOR
023444  100375                  BPL     .-4             ;A CHARACTER
023446  113715  177562          MOVB    @#177562,(5)    ;GET CHARACTER
023452  142715  000200          BICB    #200,(5)        ;GET RID OF JUNK
023456  122715  000025          CMPB    #25,(5)         ;IS IT A ^U
023462  001006                  BNE     5$              ;BRANCH IF NOT
023464  104402  023470          TYPE    ,.+2            ;.ASCIZ "^U"<15><12>
023476  000753                  BR      1$              ;START OVER
023500  122715  000177  5$:     CMPB    #177,(5)        ;IS IT A RUBOUT
023504  001005                  BNE     3$              ;SKIP IF NOT
023506                  4$:
023506  104402  023512          TYPE    ,.+2            ;.ASCIZ "?"<15><12>
023516  000743                  BR      1$              ;ZAP THE BUFFER AND LOOP
023520  111527  000000  3$:     MOVB    (5),#0          ;SET UP FOR TYPING
023524  104402  023522          TYPE    ,3$+2           ;ECHO IT
023530  122725  000015          CMPB    #15,(5)+        ;CHECK FOR RETURN
023534  001336                  BNE     2$              ;LOOP IF NOT RETURN
023536  104402  000012          TYPE    ,12             ;TYPE A LINE FEED
023542  012605                  MOV     (6)+,R5         ;RESTORE R5
023544  000002                  RTI                     ;RETURN

023546  000020          INPUT:  .BLKB   16.             ;TTY INPUT AREA
                                .SBTTL          $TRAP - TRAP HANDLER

                                ;THIS ROUTINE DECODES A TRAP CALL AND JUMPS TO THE APROPRATE
                                ;SUBROUTINE. THE CALL IS A "TRAP+N" WHERE N IS A MULTIPLE OF 2.
                                ;THE "SET" MACRO WILL CREATE THE TABLE NEEDED. IT HAS TO
                                ;FOLLOW THIS MACRO.

023566  011646          .TRAP:  MOV     (6),-(6)        ;GET ADDRESS OF TRAP +2
023570  162716  000002          SUB     #2,(6)          ;MAKE IT ADDRESS OF TRAP
023574  017616  000000          MOV     @(6),(6)        ;GET TRAP INSTRUCTION
023600  062716  117206          ADD     #.TRP+2-TRAP,(6);GET DATA AND MAKE IT AN OFFSET
023604  013607          .TRP:   MOV     @(6)+,PC        ;GO TO PROPER SUBROUTINE

                        .SCOPE                          ;SCOPE   =  TRAP+0      (104400)
023610  022230          .TYPE                           ;TYPE    =  TRAP+2      (104402)
023612  022732          .TYPEO                          ;TYPEO   =  TRAP+4      (104404)
023614  022742          .TYPES                          ;TYPES   =  TRAP+6      (104406)
023616  023272          .RDOCT                          ;RDOCT   =  TRAP+10     (104410)
023620  023424          .RDLIN                          ;RDLIN   =  TRAP+12     (104412)
023622  026214          .CLRDK                          ;CLRDK   =  TRAP+14     (104414)
023624  027272          .KBDIN                          ;KBDIN   =  TRAP+16     (104416)
023626  027152          .SUSWR                          ;SUSWR   =  TRAP+20     (104420)
023630  027354          .CNTLU                          ;CNTLU   =  TRAP+22     (104422)
```

```
                                        ;ROUTINE TO ALLOW THE OPERATOR TO SET BITS
                                        ;IN THE I/O REGISTERS VIA THE SWITCH REGISTER

                                        ;WORD COUNT REGISTER
023632  012706  000500          SRSWC:  MOV     #500,SP         ;SET UP STACK FOR TRAP CALL
023636  104416                  1$:     KBDIN                   ;CHECK THE WORLD
023640  017777  155162  155242          MOV     @SWR,@RSWC      ;MOV SWR INTO WORD COUNT REG
023646  017777  155236  155154          MOV     @RSWC,@DISPLAY  ;DISPLAY IN LIGHTS
023654  000770                          BR      1$

                                        ;CURRENT ADDRESS REGISTER
023656  012706  000500          SRSBA:  MOV     #500,SP         ;INIT THE STACK
023662  104416                  1$:     KBDIN                   ;CTW
023664  017777  155136  155220          MOV     @SWR,@RSBA      ;MOV SWR INTO CURRENT ADDR REG
023672  017777  155214  155130          MOV     @RSBA,@DISPLAY  ;SHOW IN LIGHTS
023700  000770                          BR      1$

                                        ;DISK ADDRESS REGISTER
023702  012706  000500          SRSDA:  MOV     #500,SP         ;INIT THE STACK
023706  104416                  1$:     KBDIN                   ;CTW
023710  017777  155112  155176          MOV     @SWR,@RSDA      ;MOV SWR INTO DISK ADDR REG
023716  017777  155172  155104          MOV     @RSDA,@DISPLAY  ;SHOW IN LIGHTS
023724  000770                          BR      1$

                                        :DRIVE STATUS REGISTER
023726  012706  000500          SRSDS:  MOV     #500,SP         ;INIT THE STACK
023732  104416                  1$:     KBDIN                   ;CTW
023734  017777  155066  155154          MOV     @SWR,@RSDS      ;MOV SWR INTO DRIVE STATUS
023742  017777  155150  155060          MOV     @RSDS,@DISPLAY  ;SHOW IN LIGHTS
023750  000770                          BR      1$

                                        ;DRIVE ERROR REGISTER
023752  012706  000500          SRSER:  MOV     #500,SP         ;INIT THE STACK
023756  104416                  1$:     KBDIN                   ;CTW
023760  017777  155042  155132          MOV     @SWR,@RSER      ;LOAD ER REG
023766  017777  155126  155034          MOV     @RSER,@DISPLAY  ;DISPLAY IT IN LIGHTS
023774  000770                          BR      1$              ;LOOP

                                        ;WATCH LOOK AHEAD REGISTER
023776  017777  155122  155024  SRSLA:  MOV     @RSLA,@DISPLAY  ;SHOW IN LIGHTS
024004  000774                          BR      SRSLA
```

```
 3974                                        ;RSCS2 REGISTER
 3975  024006  012706  000500                SRCS2:  MOV     #500,SP         ;INIT THE STACK
 3976  024012  104416                        1$:     KBDIN                   ;CTW
 3977  024014  017777  155006  155064                MOV     @SWR,@RSCS2     ;LOAD CS2
 3978  024022  017777  155060  155000                MOV     @RSCS2,@DISPLAY ;DISPLAY IT
 3979  024030  000770                              BR      1$
 3980
 3981                                        ;RSAS REGISTER
 3982  024032  012706  000500                SRAS:   MOV     #500,SP         ;INIT THE STACK
 3983  024036  104416                        1$:     KBDIN                   ;CTW
 3984  024040  017777  154762  155054                MOV     @SWR,@RSAS      ;LOAD RSAS
 3985  024046  017777  155050  154754                MOV     @RSAS,@DISPLAY  ;DISPLAY IT
 3986  024054  000770                              BR      1$
 3987
 3988                                        ;RSMR REGISTER
 3989  024056  012706  000500                RSMRR:  MOV     #500,SP         ;INIT THE STACK
 3990  024062  104416                        1$:     KBDIN                   ;CTW
 3991  024064  017777  154736  155036                MOV     @SWR,@RSMR      ;LOAD RSMR
 3992  024072  017777  155032  154730                MOV     @RSMR,@DISPLAY  ;DISPLAY IT
 3993  024100  000770                              BR      1$
 3994
 3995                                        ;DISK CONTROL STATUS REGISTER
 3996  024102  012706  000500                SRSCS1: MOV     #500,SP         ;INIT THE STACK
 3997  024106  104416                        1$:     KBDIN                   ;CTW
 3998  024110  012737  000340  177776                MOV     #340,@#PS       ;LOCK UP INTERRUPTS
 3999  024116  012777  177777  154764                MOV     #177777,@RSWC   ;SET WORD COUNT -1 WORD
 4000  024124  013777  001102  154760                MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
 4001  024132  017777  154670  154744                MOV     @SWR,@RSCS1     ;MOV SWR INTO CONTROL REG
 4002  024140  032777  000001  154736                BIT     #BIT0,@RSCS1    ;IS FUNCTION BITS SET
 4003  024146  001757                              BEQ     1$              ;FUNCTION BITS NOT SET
 4004  024150  105777  154730                2$:     TSTB    @RSCS1          ;TEST FOR DISK READY
 4005  024154  100375                              BPL     2$              ;DISK STILL NOT READY
 4006  024156  000753                              BR      1$              ;DISK NOT BUSY SECT NEW CR
```

```
                                        ;THIS ROUTINE GIVES THE OPERATOR THE ABILITY TO
                                        ;SELECT DA, WC, UNIT # AND DESIRED PATTERN. PATTERN = NUMBER TYPED
                                        ;WITH SW12 SET THE PROGRAM WILL LOOP ON A READ WITH LOC OUTBUF+2 AS
                                        ;THE BA ADDR. WITH BIT12 0 IN THE SWR THE PROGRAM
                                        ;WILL WRITE WITH OUTBUF AS THE BA ADDR. BAI IS ALWAYS SET
                                        ;SWITCHES 0 TO 11 WILL DETERMINE THE DA
                                        ;EXAMPLE:       TYPE UNIT # 5
                                        ;               TYPE POSITIVE (OCTAL) WC 64
                                        ;               TYPE PATTERN DESIRED 1252525

024160  012706  000500          TKSEL:  MOV     #500,SP         ;SET STACK
024164  000240                          NOP
024166  104402  024172                  TYPE    ,.+2            ;.ASCIZ <15><12>''TYPE UNIT # ''
024212  104410                          RDOCT
024214  012637  001152                  MOV     (6)+,UNNUM
024220  104402  024224                  TYPE    ,.+2            ;.ASCIZ <15><12>''TYPE POSITIVE (OCTAL) WC ''
024260  104410                          RDOCT
024262  012637  001176                  MOV     (6)+,WORK
024266  005137  001176                  COM     WORK
024272  104402  024276                  TYPE    ,.+2            ;.ASCIZ <15><12>''TYPE PATTERN DESIRED ''
024326  104410                          RDOCT
024330  012637  027530                  MOV     (6)+,OUTBUF
024334  042737  000001  027270          BIC     #BIT0,SWI       ;CLEAR THE BEENHEREBIT
024342  104420                          SUSWR                   ;INIT SWITCHLESS
024344  017737  154456  001202  TK1:    MOV     @SWR,WORK2      ;SAVE SWR
024352  104414                  TK2:    CLRDK                   ;CLEAR ALL RS REG
024354  052777  000010  154524          BIS     #BIT3,@RSCS2    ;SET BAI
024362  017737  154440  001200          MOV     @SWR,WORK1      ;GET SWR FOR DSK ADDR
024370  042737  170000  001200          BIC     #170000,WORK1   ;CLEAR UNIT #
024376  013777  001200  154510  TKKS:   MOV     WORK1,@RSDA     ;LOAD THE DA
024404  013777  001176  154476          MOV     WORK,@RSWC      ;LOAD WORD COUNT
024412  032777  010000  154406          BIT     #BIT12,@SWR     ;READ?
024420  001412                          BEQ     WTE             ;NO
024422  012777  027532  154462          MOV     #OUTBUF+2,@RSBA ;LOAD CURRENT ADDRESS
024430  012777  000071  154446          MOV     #71,@RSCS1      ;GO AND READ
024436  105777  154442          WT:     TSTB    @RSCS1          ;TEST FOR READY
024442  100375                          BPL     .-4
024444  000407                          BR      SWRCHG
024446  012777  027530  154436  WTE:    MOV     #OUTBUF,@RSBA
024454  012777  000061  154422          MOV     #61,@RSCS1
024462  000765                          BR      WT
024464  017777  154414  154336  SWRCHG: MOV     @RSCS1,@DISPLAY ;DISPLAY CS1
024472  005777  154406                  TST     @RSCS1          ;ANY ERRORS?
024476  100001                          BPL     1$              ;NO
024500  104014                          HLT     !DA!WC
024502  104416                  1$:     KBDIN                   ;CHECK FOR NEW VALUE
024504  027737  154316  001202          CMP     @SWR,WORK2      ;DID SWR CHANGE?
024512  001314                          BNE     TK1             ;YES
024514  000716                          BR      TK2             ;NO
```

```
                                ;*****************************************************************************
                                ;TEST 122                WRITE LOCK TEST
                                ;*****************************************************************************
024516  104400                  TST122: SCOPE

024520                          WRTLCK:
024520  104402  024524                  TYPE    ,.+2            ;.ASCIZ <15><12>''LOAD SW WITH UNIT # AND CONT''
024564  022737  000176  001026          CMP     #SWREG,SWR
024572  001402                          BEQ     7$              ;CHECK IF SWITCHLESS CPU
024574  000000                          HALT
024576  000401                          BR      8$              ;GO AROUND TRAP CALL
024600  104422                  7$:     CNTLU                   ;GET SWREG VALUE
024602  017737  154220  001152  8$:     MOV     @SWR,UNNUM      ;GET UNIT #
024610  104414                          CLRDK                   ;CLEAR ALL REG
024612  005037  027530                  CLR     OUTBUF          ;PUT A 0 INTO DATA BUFFER
024616  012777  027530  154266          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
024624  012777  007700  154262          MOV     #7700,@RSDA     ;TO A WRITE
024632  012777  177777  154250          MOV     #-1,@RSWC
024640  012777  000061  154236          MOV     #61,@RSCS1
024646  105777  154232          6$:     TSTB    @RSCS1          ;WAIT FOR DONE
024652  100375                          BPL     6$
024654  104402  024660                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRITE LOCK ENABLE AND CONTINUE''
024726  000000                          HALT
024730  012777  000000  154156  1$:     MOV     #0,@RSDA
024736  022777  014600  154152          CMP     #14600,@RSDS
024744  001401                          BEQ     .+4
024746  104044                          HLT     !DS!DA          ;DS SHOULD=14600
024750  012777  000100  154136          MOV     #100,@RSDA
024756  022777  010600  154132          CMP     #10600,@RSDS
024764  001401                          BEQ     .+4
024766  104044                          HLT     !DS!DA          ;DS SHOULD=10600
024770  104402  024774                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LOC SW 0 AND CONT''
025030  000000                          HALT
025032  022777  014600  154056  2$:     CMP     #14600,@RSDS
025040  001401                          BEQ     .+4
025042  104044                          HLT     !DS!DA          ;DS SHOULD=14600
025044  012777  000300  154042          MOV     #300,@RSDA
025052  022777  010600  154036          CMP     #10600,@RSDS
025060  001401                          BEQ     .+4
025062  104044                          HLT     !DS!DA          ;DS SHOULD=10600
025064  104402  025070                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LOC SW 1 AND CONT''
025124  000000                          HALT
025126  022777  014600  153762  3$:     CMP     #14600,@RSDS
025134  001401                          BEQ     .+4
025136  104044                          HLT     !DS!DA          ;DS SHOULD=14600
025140  012777  000700  153746          MOV     #700,@RSDA
025146  022777  010600  153742          CMP     #10600,@RSDS
025154  001401                          BEQ     .+4
025156  104044                          HLT     !DS!DA          ;DS SHOULD=10600
025160  104402  025164                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LCK SW 2 AND CONT''
025220  000000                          HALT
```

```
4107  025222  022777  014600  153666  4$:     CMP     #14600,@RSDS
4108  025230  001401                          BEQ     .+4
4109  025232  104044                          HLT     !DS!DA          ;DS SHOULD=14600
4110  025234  012777  001700  153652          MOV     #1700,@RSDA
4111  025242  022777  010600  153646          CMP     #10600,@RSDS
4112  025250  001401                          BEQ     .+4
4113  025252  104044                          HLT     !DS!DA          ;DS SHOULD=10600
4114  025254  104402  025260                  TYPE    ..+2            ;.ASCIZ <15><12>''SET WRT LCK SW 3 AND CONT''
4115  025314  000000                  HALT:   HALT
4116  025316  022777  014600  153572          CMP     #14600,@RSDS
4117  025324  001401                          BEQ     .+4
4118  025326  104044                          HLT     !DS!DA          ;DS SHOULD=14600
4119  025330  012777  003700  153556          MOV     #3700,@RSDA
4120  025336  022777  010600  153552          CMP     #10600,@RSDS
4121  025344  001401                          BEQ     .+4
4122  025346  104044                          HLT     !DS.DA          ;DS SHOULD=10600
4123  025350  104402  025354                  TYPE    ..+2            ;.ASCIZ <15><12>''SET WRT LCK SW 4 AND CONT''
4124  025410  000000                          HALT
4125  025412  022777  014600  153476          CMP     #14600,@RSDS
4126  025420  001401                          BEQ     .+4
4127  025422  104044                          HLT     !DS!DA          ;DS SHOULD=14600
4128  025424  012777  006000  153462          MOV     #6000,@RSDA
4129  025432  022777  010600  153456          CMP     #10600,@RSDS
4130  025440  001401                          BEQ     .+4
4131  025442  104044                          HLT     !DS!DA          ;DS SHOULD=10600
4132  025444  104402  025450                  TYPE    ..+2            ;.ASCIZ <15><12>''SET WRT LCK SW 5 AND CONT''
4133  025504  000000                          HALT
4134  025506  022777  014600  153402          CMP     #14600,@RSDS
4135  025514  001401                          BEQ     .+4
4136  025516  104044                          HLT     !DS!DA          ;DS SHOULD=14600
4137  025520  012777  007700  153366          MOV     #7700,@RSDA
4138  025526  022777  014600  153362          CMP     #14600,@RSDS
4139  025534  001401                          BEQ     .+4
4140  025536  104044                          HLT     !DS!DA          ;DS SHOULD=14600
4141  025540  012737  177777  027530          MOV     #-1,OUTBUF      ;PUT A 1 INTO DATA BUFFER
4142  025546  012777  027530  153336          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
4143  025554  012777  007700  153332          MOV     #7700,@RSDA     ;TO A WRITE
4144  025562  012777  177777  153320          MOV     #-1,@RSWC
4145  025570  012777  000061  153306          MOV     #61,@RSCS1      ;TRY TO WRITE
4146  025576  105777  153302          7$:     TSTB    @RSCS1          ;WAIT FOR DONE
4147  025602  100375                          BPL     7$
4148  025604  105777  153274          5$:     TSTB    @RSCS1          ;WAIT FOR READY
4149  025610  100375                          BPL     5$
4150  025612  022777  154600  153276          CMP     #154600,@RSDS
4151  025620  001401                          BEQ     .+4
4152  025622  104044                          HLT     !DS!DA          ;DS SHOULD=154600
```

```
4153  025624  022777  004000  153266          CMP     #4000,@RSER
4154  025632  001401                          BEQ     .+4
4155  025634  104044                          HLT     !DS!DA          ;ER SHOULD=4000
4156  025636  104414                          CLRDK                   ;CLEAR ALL REG
4157  025640  022777  014600  153250          CMP     #14600,@RSDS    ;DID WLE CLEAR?
4158  025646  001401                          BEQ     .+4             ;NO
4159  025650  104040                          HLT     !DS             ;A CLEAR SHOULD NOT CLEAR WLE
4160  025652  005037  027530                  CLR     OUTBUF          ;PUT A 0 INTO DATA BUFFER
4161  025656  012777  027530  153226          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
4162  025664  012777  007700  153222          MOV     #7700,@RSDA     ;TO A WRITE
4163  025672  012777  177777  153210          MOV     #-1,@RSWC
4164  025700  012777  000071  153176          MOV     #71,@RSCS1      ;DO A READ TO SEE IF DISK DID
4165  025706  105777  153172          8$:     TSTB    @RSCS1          ;ACTUALLY GET WRITTEN ON TO
4166  025712  100375                          BPL     8$              ;WAIT FOR DONE
4167  025714  005737  027530                  TST     OUTBUF          ;IS DATA STILL 0 ON THE DSK?
4168  025720  001401                          BEQ     .+4             ;YES
4169  025722  104040                          HLT     !DS             ;NO DSK DID GET WRITTEN ONTO WITH WLE SET
4170  025724  104402  025730                  TYPE    ,.+2            ;.ASCIZ <15><12>"RESET ALL W/L SWITCHES'
4171  025762  000000                          HALT
4172  025764  022777  010600  153124          CMP     #10600,@RSDS    ;DID WLE CLEAR
4173  025772  001401                          BEQ     .+4             ;YES
4174  025774  104040                          HLT     !DS             ;NO
4175
4176                          ;ROUTINE FOR FINDING MEMORY ON "B" PORT
4177  025776  012737  026062  000004  FINDM:  MOV     #MAXREF,4       ;SET UP I/O BUS TRAP
4178  026004  012737  000340  000006          MOV     #340,6          ;SET PS
4179  026012  032777  010000  153006          BIT     #BIT12,@SWR     ;INHIBIT OBUFSV FROM CHANGING?
4180  026020  001003                          BNE     EXREF           ;YES
4181  026022  062737  020000  001102          ADD     #20000,OBUFSV   ;ADD 4 K
4182  026030  005777  153046          EXREF:  TST     @OBUFSV         ;LEGAL LOC ? IF NO TRAPS
4183  026034  012737  000006  000004          MOV     #6,4            ;RESTORE I/O BUS TRAP
4184  026042  005037  000006                  CLR     6
4185  026046  022737  177446  001102          CMP     #177446,OBUFSV  ;TEST FOR GREATER THEN 28K
4186  026054  103403                          BLO     MAXRF1          ;YES
4187  026056  000137  007022                  JMP     WRTSTB          ;RETRY WRITING
4188  026062  022626                  MAXREF: CMP     (6)+,(6)+       ;CLEAR STACK
4189  026064  012737  000006  000004  MAXRF1: MOV     #6,4            ;RESTORE I/O BUS TRAP
4190  026072  005037  000006                  CLR     6
4191  026076  012737  027530  001102          MOV     #OUTBUF,OBUFSV  ;RESTORE ORIGINAL VALUE
4192  026104  032777  020000  152714          BIT     #BIT13,@SWR     ;INHIBIT TYPEOUT?
4193  026112  001031                          BNE     1$              ;YES
4194  026114  032737  020000  001160          BIT     #BIT13,ONCEE    ;DID WE TYPE THIS YET?
4195  026122  001025                          BNE     1$              ;YES
4196  026124  104402  026130                  TYPE    ,.+2            ;.ASCIZ <15><.2>"COULD NOT FIND MEMORY ON -B- PORT"<15><
4197                          .EVEN
4198  026176  052737  020000  001160  1$:     BIS     #BIT13,ONCEE    ;SET TYPE FLAG
4199  026204  104400                          SCOPE                   ;UPDATE
4200  026206  104400                          SCOPE                   ;TEST NUMBERS
4201  026210  000137  007612                  JMP     NXM             ;CONT TESTING
4202
4203                          ;CLEAR ALL DISK REGISTERS
4204  026214  012777  000040  152664  .CLRDK: MOV     #40,@RSCS2      ;CLEAR ALL DSK REG
4205  026222  013777  001152  152656          MOV     UNNUM,@RSCS2    ;GET UNIT NUMBER
4206  026230  000002                          RTI
```

```
                                        ;ERROR TYPTXTOUT ROUTINE

026232  005737  022720        RSREG:  TST     .HLTCT          ;SHOULD WE TYPTXT GOOD AND BAD
026236  001021                        BNE     8$              ;NO
026240  104402  026244                TYPE    ,.+2            ;.ASCIZ '' BAD=''
026252  010046                        MOV     BAD,-(6)        ;PUT BAD ON STACK
026254  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026256  104402  026262                TYPE    ,.+2            ;.ASCIZ '' GOOD=''
026272  010146                        MOV     GOOD,-(6)       ;PUT GOOD ON STACK
026274  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026276  000137  026734                JMP     PTDONE          ;GET OUT
026302                          8$:
026302  104402  026306                TYPE    ,.+2            ;.ASCIZ '' CS1=''
026314  017746  152564                MOV     @RSCS1,-(6)     ;PUT @RSCS1 ON STACK
026320  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026322                          1$:
026322  104402  026326                TYPE    ,.+2            ;.ASCIZ '' ER=''
026334  017746  152560                MOV     @RSER,-(6)      ;PUT @RSER ON STACK
026340  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026342                          2$:
026342  104402  026346                TYPE    ,.+2            ;.ASCIZ '' CS2=''
026354  017746  152526                MOV     @RSCS2,-(6)     ;PUT @RSCS2 ON STACK
026360  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026362  032737  000200  022720        BIT     #200,.HLTCT     ;TYPTXT SECOND SET ?
026370  001076                        BNE     SEEC            ;YES
026372  032737  000100  022720        BIT     #AS,.HLTCT      ;TYPTXT ER ?
026400  001410                        BEQ     3$              ;NO
026402  104402  026406                TYPE    ,.+2            ;.ASCIZ '' AS=''
026414  017746  152502                MOV     @RSAS,-(6)      ;PUT @RSAS ON STACK
026420  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026422  032737  000020  022720  3$:   BIT     #BA,.HLTCT      ;TYPTXT BUS ASSRESS
026430  001410                        BEQ     4$              ;NO
026432  104402  026436                TYPE    ,.+2            ;.ASCIZ '' BA=''
026444  017746  152442                MOV     @RSBA,-(6)      ;PUT @RSBA ON STACK
026450  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026452  032737  000004  022720  4$:   BIT     #DA,.HLTCT      ;TYPTXT DA ?
026460  001410                        BEQ     5$              ;NO
026462  104402  026466                TYPE    ,.+2            ;.ASCIZ '' DA=''
026474  017746  152414                MOV     @RSDA,-(6)      ;PUT @RSDA ON STACK
026500  104404                        TYPEO                   ;TYPE STACK IN OCTAL
026502  032737  000010  022720  5$:   BIT     #WC,.HLTCT      ;TYPTXT WC?
026510  001410                        BEQ     6$              ;NO
026512  104402  026516                TYPE    ,.+2            ;.ASCIZ '' WC=''
026524  017746  152360                MOV     @RSWC,-(6)      ;PUT @RSWC ON STACK
026530  104404                        TYPEO                   ;TYPE STACK IN OCTAL
```

```
 4252  026532  032737  000040  022720  6$:     BIT     #DS,.HLTCT      ;DRIVE STATUS
 4253  026540  001475                          BEQ     PTDONE          ;NO
 4254  026542  104402  026546                  TYPE    ,.+2            ;.ASCIZ " DS="
 4255  026554  017746  152336                  MOV     @RSDS,-(6)      ;PUT @RSDS ON STACK
 4256  026560  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4257  026562  000137  026734                  JMP     PTDONE          ;GET OUT
 4258  026566  042737  000200  022720  SEEC:   BIC     #200,.HLTCT     ;CLEAR COMMON BIT
 4259  026574  032737  000240  022720          BIT     #DT,.HLTCT      ;TYPTXT DRIVE TYPE?
 4260  026602  001410                          BEQ     9$              ;NO
 4261  026604  104402  026610                  TYPE    ,.+2            ;.ASCIZ " DT="
 4262  026616  017746  152310                  MOV     @RSDT,-(6)      ;PUT @RSDT ON STACK
 4263  026622  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4264  026624  032737  000210  022720  9$:     BIT     #DB,.HLTCT      ;TYPTXT DATA BUFFER
 4265  026632  001410                          BEQ     10$             ;NO
 4266  026634  104402  026640                  TYPE    ,.+2            ;.ASCIZ " DB="
 4267  026646  017746  152254                  MOV     @RSDB,-(6)      ;PUT @RSDB ON STACK
 4268  026652  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4269  026654  032737  000220  022720  10$:    BIT     #MR,.HLTCT      ;TYPTXT MN?
 4270  026662  001410                          BEQ     11$             ;NO
 4271  026664  104402  026670                  TYPE    ,.+2            ;.ASCIZ " MR="
 4272  026676  017746  152226                  MOV     @RSMR,-(6)      ;PUT @RSMR ON STACK
 4273  026702  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4274  026704  032737  000204  022720  11$:    BIT     #LA,.HLTCT      ;TYPTXT LA?
 4275  026712  001410                          BEQ     PTDONE          ;NO
 4276  026714  104402  026720                  TYPE    ,.+2            ;.ASCIZ " LA="
 4277  026726  017746  152172                  MOV     @RSLA,-(6)      ;PUT @RSLA ON STACK
 4278  026732  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4279  026734  052737  100000  001160  PTDONE: BIS     #BIT15,ONCEE    ;SET FORND ERROR FLAG
 4280  026742  000207                          RTS     PC
 4281
 4282  026744  005037  001176          WAITRY: CLR     WORK            ;CLEAR COUNTER
 4283  026750  105777  152130          1$:     TSTB    @RSCS1          ;TEST READY
 4284  026754  100406                          BMI     2$              ;OK CONT
 4285  026756  005237  001176                  INC     WORK            ;UPDATE COUNTER
 4286  026762  005737  001176                  TST     WORK            ;DONE YET?
 4287  026766  001403                          BEQ     3$              ;READY DID NOT COME UP
 4288  026770  000767                          BR      1$              ;CONTINUE WAITING
 4289  026772  062716  000002          2$:     ADD     #2,(SP)         ;UPDATE RETURN PC
 4290  026776  000207                  3$:     RTS     PC              ;RETURN
```

```
                                        ;RANDOM DATA GENERATOR SUBROUTINE
                                        
027000  013737  027142  027146  RANDOM: MOV     LONUM,LOSAV
027006  013737  027144  027150          MOV     HINUM,HISAV
027014  013700  027142          RAND1:  MOV     LONUM,R0        ;SET UP R0 WITH 5 DIGITS LOW
027020  013704  027144                  MOV     HINUM,R4        ;SET UP R1 WITH 5 DIGITS HIGH
027024  012703  000007                  MOV     #7,R3           ;SET UP SHIFT COUNT
027030  005002                          CLR     R2              ;CLEAR R2
027032  006300                  SHIFT:  ASL     R0              ;SHIFT R0 LEFT AND
027034  006104                          ROL     R4              ;ROTATE CARRY INTO LSB OF R1 INTO
027036  006102                          ROL     R2              ;ROTATE CARRY OUT OF R1 INTO R2
027040  005303                          DEC     R3              ;DECREMENT R3
027042  001373                          BNE     SHIFT           ;CONTINUE SHIFT LOOP
027044  063700  027142                  ADD     LONUM,R0        ;ADDN IN NUMBER TO MAKE X 129
027050  005504                          ADC     R4              ;PROPOGATE CARRY
027052  063704  027144                  ADD     HINUM,R4        ;ADDN IN NUMBER TO MAKE X 129
027056  005502                          ADC     R2              ;PROPOGATE CARRY
027060  062700  001057                  ADD     #1057,R0        ;ADDN LOW CONSTANT
027064  005504                          ADC     R4              ;PROPOGATE CARRIES
027066  005502                          ADC     R2              ;PROPOGATE AGAIN
027070  062704  047401                  ADD     #47401,R4       ;ADDN HIGH CONSTANT
027074  005502                          ADC     R2              ;PROPOGATE CARRY
027076  062702  000006                  ADD     #6,R2           ;ADDN HIGHEST CONSTANT
027102  062700  000002                  ADD     #2,R0           ;REPRIME R0 WITH HIGH DIGIT
027106  005504                          ADC     R4              ;PROPOGATE CARRY
027110  010037  027142                  MOV     R0,LONUM        ;PUT R0 BACK IN LONUM
027114  010021                          MOV     R0,(R1)+        ;LOAD WC
027116  005337  001176                  DEC     WORK
027122  001406                          BEQ     EXGEN
027124  010437  027144                  MOV     R4,HINUM        ;PUT R1 BACK IN HINUM
027130  010421                          MOV     R4,(1)+         ;HOLD HINUM FOR PROGRAM
027132  005337  001176                  DEC     WORK
027136  001326                          BNE     RAND1
027140  000205                  EXGEN:  RTS     R5              ;RETURN TO PROGRAM
027142  000000                  LONUM:  0
027144  000000                  HINUM:  0
027146  000000                  LOSAV:  0
027150  000000                  HISAV:  0
027152                          RANEND:
                                        
027152  032737  000001  027270  .SUSWR: BIT     #BIT0,SWI
027160  001037                          BNE     XXX
027162  013746  000006                  MOV     6,-(SP)         ;SAVE 6 ON STACK
027166  013746  000004                  MOV     4,-(SP)         ;SAVE 4 ON STACK
027172  012737  027212  000004          MOV     #1$,4           ;SET UP TRAP ADDRESS
027200  022777  177777  151620          CMP     #-1,@SWR        ;TEST 177570
027206  001402                          BEQ     2$              ;FAKE OUT
027210  000407                          BR      3$              ;HARDWARE AVAILABLE
027212  022626                  1$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
027214  012737  000176  001026  2$:     MOV     #SWREG,SWR      ;SET UP SOFTWARE REGISTERS
027222  012737  000174  001030          MOV     #DISPREG,DISPLAY
027230  022737  000176  001026  3$:     CMP     #SWREG,SWR      ;1ST TIME THRU?
027236  001004                          BNE     4$              ;NO CHANGE STILL 177570
027240  005737  000042                  TST     42              ;ANY XXDP OR ACT
027244  001001                          BNE     4$              ;SWR=000000
027246  104422                          CNTLU                   ;GET INITIAL SETTINGS
```

```
 4347  027250  012637  000004          4$:     MOV     (SP)+,4         ;REPLACE 4 FROM STACK
 4348  027254  012637  000006                  MOV     (SP)+,6         ;REPLACE 6 FROM STACK
 4349  027260  052737  000001  027270  XXX:    BIS     #BIT0,SWI       ;SET THE BEENHEREBIT
 4350  027266  000002                          RTI                     ;ALL DONE
 4351
 4352  027270  000000                  SWI:    0
 4353
 4354
 4355
 4356  027272  005737  000042          .KBDIN: TST     42              ;GOT XXDP OR ACT
 4357  027276  001057                          BNE OKT                 ;YES,GET OUT
 4358  027300  022737  000176  001026          CMP     #SWREG,SWR      ;GOT SWITCH-LESS MACHINE?
 4359  027306  001053                          BNE     OKT             ;NO GET OUT
 4360  027310  105777  151504                  TSTB    @TKS            ;HAVE A CHARACTER
 4361  027314  100050                          BPL     OKT             ;NO GET OUT
 4362  027316  017737  151500  027440          MOV     @TKB,..MSG
 4363  027324  042737  177600  027440          BIC     #177600,..MSG   ;STRIP OFF GARBAGE
 4364  027332  122737  000007  027440          CMPB    #7,..MSG        ;DO WE HAVE A ^G
 4365  027340  001036                          BNE OKT                 ;NO,GET OUT
 4366  027342  104402  027346                  TYPE    ,..+2           ;.ASCIZ <15><12>''^G''
 4367  027354                  .CNTLU:
 4368  027354  104402  027360                  TYPE    ,..+2           ;.ASCIZ <15><12>''SWR= ''
 4369  027370  013746  000176                  MOV     SWREG,-(6)      ;PUT SWREG ON STACK
 4370  027374  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4371  027376  104402  027402                  TYPE    ,..+2           ;.ASCIZ ''    NEW= ''
 4372  027414  104410                          RDOCT
 4373  027416  012637  027440                  MOV     (SP)+,..MSG     ;GET NEW VALUE OFF STACK
 4374  027422  005737  027442                  TST     CTN             ;DID HE TYPE <CR> OF 000000?
 4375  027426  001403                          BEQ     OKT             ;DONT CHANGE IF <CR>
 4376  027430  013737  027440  000176          MOV     ..MSG,SWREG     ;CHANGE VALUE OF SWREG
 4377  027436  000002                  OKT:    RTI                     ;ALL DONE-EXIT
 4378
 4379  027440  000000                  ..MSG:  0
 4380  027442  000000                  CTN:    0
```

```
                                        ;TABLES FOR ILLEGAL FUNCTION TESTS
                                        
027444  000003                  ILLTAB: 3
027446  000005                          5
027450  000007                          7
027452  000013                          13
027454  000015                          15
027456  000017                          17
027460  000023                          23
027462  000025                          25
027464  000027                          27
027466  000033                          33
027470  000035                          35
027472  000037                          37
027474  000041                          41
027476  000043                          43
027500  000045                          45
027502  000047                          47
027504  000000                          0

027506  000053                  ILFTB2: 53
027510  000055                          55
027512  000057                          57
027514  000063                          63
027516  000065                          65
027520  000073                          73
027522  000075                          75
027524  000077                          77
027526  000000                          0
027530  000300              OUTBUF: .BLKW   300
030330  000300              INBUF:  .BLKW   300
031130  000000              PARITY: 0       ;USED FOR PARITY TEST 67
031132  000000              CACH:   0       ;USED FOR PARITY TEST 67
        000001                      .END
```

```
ADDCF   012204          2332    2341#
AROUND  001376           786     791#
AS    = 000100           714#    936   1489   1499   1521   1552   1565   1587   1630   2055   2113   2272   2599
                        2873    2913   3006   3013   3050   3071   3077   3543   3563   3569   3592   3596   3599
                        4232
ATA   = 100000           735#
AOB1    001166           749#
BA    = 000020           712#    906    964    970   1052   1056   1060   1082   1321   1325   1486   1518   1549
                        1584    1650   2061   2116   2183   2198   3047   3110   4237
BAI   = 000010           738#   1960   1973   1982   3097   3120   3154   3238
BAITST  010040          1957#
BEGIN   001204           589     607    770#   3628
BELL  = 000007           616#   3623   3727
BITBA   004434          1317#
BITCS2  004320          1293#
BITST   004246          1280#
BITWC   004364          1305#
BIT0  = 000001           625#    853    871   1265   1651   1701   1754   1833   1886   2087   2155   4002   4029
                        4331    4349
BIT1  = 000002           626#
BIT10 = 002000           635#
BIT11 = 004000           588     606    636#   781   1791
BIT12 = 010000           637#   1789   2923   2926   4038   4179
BIT13 = 020000           638#    809    835    857   2510   4192   4194   4198
BIT14 = 040000           575     639#  2444   2469   2493   2496   2500   2521   2546   2570   2573   2578
BIT15 = 100000           640#    812    837    846   1350   3538   4279
BIT2  = 000004           627#
BIT3  = 000010           628#   3507   3513   3575   4033
BIT4  = 000020           629#   3060   3101   3126   3161
BIT5  = 000040           630#
BIT6  = 000100           631#   3170
BIT7  = 000200           632#   2723
BIT8  = 000400           633#
BIT9  = 001000           634#   2331   2335
BLOCK   010272          2010#
BPORTT  001170           752#   1898*  2513   2515*  2523*  2528*  2530*  2544   2575*
CACH    031132          2374*   2411   4414#
CACHE   001174           754#   2373*  2413*
CHCKDV  001734           849     853#
CLRDK = 104414           994    1280   1326   1334   1359   1384   1430   1467   1495   1530   1561   1601   1640
                        1691    1735   1778   1823   1866   1907   1957   1972   1981   2010   2080   2123   2142
                        2202    2216   2238   2280   2285   2329   2396   2437   2483   2497   2514   2560   2574
                        2584    2626   2650   2663   2681   2688   2706   2712   2737   2748   2822   2842   2860
                        2877    2889   2932   2955   2967   2990   2999   3059   3081   3096   3119   3144   3153
                        3180    3192   3215   3227   3287   3344   3393   3418   3440   3468   3491   3929#  4032
                        4069    4156
CNTLU = 104422          3932#   4067   4346
CSTST   012134          2327#
CS1   = 000001           708#    901    959    999   1003   1007   1015   1285   1289   1344   1348   1474   1506
                        1537    1572   1627   1654   1656   1662   1698   1700   1706   1742   1744   1786   1788
                        1799    1830   1832   1838   1874   1876   1885   1923   1926   1963   1996   2039   2061
                        2098    2101   2116   2119   2122   2166   2167   2172   2183   2186   2198   2201   2476
                        2492    2553   2569   2593   2596   2608   2637   2671   2696   2727   2782   2848   2876
                        2945    2954   2980   2989   3024   3205   3214   3402   3408   3427   3457
CS2   = 000200           715#    893    955   1025   1035   1039   1044   1341   1353   1370   1395   1406   1418
                        2003    2617   2910   2917
```

```
CTN     027442          3849* 3866* 4374  4380#
DA    = 000004           710#  912  1127  1131  1135  1156  1483  1515  1546  1581  1616  1659  1662
                        1668  1703  1753  1756  1796  1805  1835  1888  1926  1929  1935  2122  2172
                        2643  2796  2851  3044  3143  3179  3316  3563  3569  3573  4051  4082  4086
                        4091  4095  4100  4104  4109  4113  4118  4122  4127  4131  4136  4140  4152
                        4155  4242
DAO   = 001000           736#
DAOTST  015660          2932#
DAOTT   016036          2967#
DB    = 000210           717#  4264
DCK   = 100000           737#
DCKTST  014530          2748#
DISPLA  001030           657#  3705* 3709* 3940* 3947* 3954* 3961* 3968* 3972* 3978* 3985* 3992* 4048*
                        4341*
DISPRE  000174           578#  4341
DKADR   015220          2842#
DLT   = 100000           730#  1416
DONCS   012322          2345   2365#
DONE    022126           865   3617#
DONEE   002102           854    865#
DONINT  021124          3454   3458#
DRCLR   006040          1601#
DRY   = 000200           731#  2022  2032
DS    = 000040           713#   897  1509  1555  1575  1593  1662  1668  1683  1703  1706  1753  1805
                        1835  1926  1935  1971  1987  2024  2028  2036  2039  2058  2066  2098  2101
                        2126  2129  2166  2169  2205  2208  2241  2266  2269  2284  2291  2363  2410
                        2476  2553  2611  2620  2646  2649  2656  2677  2680  2702  2705  2733  2736
                        2740  2793  2796  2873  2902  2921  2951  2958  2986  2993  3009  3038  3071
                        3080  3107  3140  3143  3147  3176  3179  3183  3186  3211  3218  3316  3453
                        3475  3479  3543  3573  3596  3599  4082  4086  4091  4095  4100  4104  4109
                        4113  4118  4122  4127  4131  4136  4140  4152  4155  4159  4169  4174  4252
DT    = 000240           719#  4259
DVNUM   001432           803    806#
DVTAB   022210          3497   3524  3632#
ER    = 000002           709#   918   976  1164  1168  1175  1181  1188  1477  1524  1540  1590  1619
                        1662  1703  1706  1753  1835  1926  1975  2098  2101  2166  2169  2237  2262
                        2284  2288  2363  2476  2553  2640  2646  2653  2674  2677  2699  2702  2730
                        2733  2790  2825  2870  2880  2948  2961  2983  3017  3029  3053  3084  3131
                        3166  3208  3280  3316  3320  3332  3336  3355  3358  3370  3374  3453  3475
                        3479  3573
ERINT   021126          3465#
ERR   = 040000           734#
ERRINT  021216          3467   3477#
ERRORS  001002           647#  3728*  3748
ERRR    012066          2312   2318#
ERTST   016202          2999#
EXGEN   027140          4319   4324#
EXREF   026030          4180   4182#
EXTRP   020556          3295   3371   3377  3382#
EXTTRP  020564          3290   3384#
EXTTST  020042          3287#
EXTT1   020364          3344#
EXT1    020566          3383   3385#
FILCHR  001014           651#  3653   3654
FINDM   025776          1793   4177#
FINTST  021232          3476   3481#
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FLOTDA  003436  1140#
FLOTWC  003276  1103#
FUNDO   016764  3119#
HALT    025314  4115#
HINUM   027144  4294   4296   4306   4320*  4326#
HISAV   027150  4294*  4328#
HLT   = 104000   613#   893   897   901   906   912   918   924   930   936   955   959   964
                 970   976   981   986   999  1003  1007  1015  1025  1031  1035  1039  1044
                1052  1056  1060  1071  1082  1090  1094  1098  1109  1119  1127  1131  1135
                1146  1156  1164  1168  1175  1181  1188  1198  1205  1213  1221  1241  1255
                1270  1285  1289  1301  1309  1313  1321  1325  1341  1344  1348  1353  1370
                1375  1380  1395  1403  1406  1418  1426  1450  1458  1474  1477  1480  1483
                1486  1489  1499  1506  1509  1512  1515  1518  1521  1524  1537  1540  1543
                1546  1549  1552  1555  1565  1572  1575  1578  1581  1584  1587  1590  1593
                1613  1616  1619  1624  1627  1630  1633  1647  1650  1654  1656  1659  1662
                1665  1668  1674  1680  1683  1698  1700  1703  1706  1709  1715  1721  1726
                1742  1744  1750  1753  1756  1759  1765  1786  1788  1796  1799  1802  1805
                1811  1817  1830  1832  1835  1838  1841  1847  1853  1859  1874  1876  1882
                1885  1888  1891  1897  1923  1926  1929  1932  1935  1941  1947  1963  1968
                1971  1975  1987  1993  1996  2003  2019  2024  2028  2036  2039  2051  2055
                2058  2061  2064  2066  2095  2098  2101  2107  2113  2116  2119  2122  2126
                2129  2163  2166  2169  2172  2180  2183  2186  2193  2198  2201  2205  2208
                2228  2234  2237  2241  2253  2259  2262  2266  2269  2272  2284  2288  2291
                2303  2320  2337  2360  2363  2407  2410  2466  2472  2476  2482  2489  2492
                2543  2549  2553  2559  2566  2569  2593  2596  2599  2605  2608  2611  2617
                2620  2637  2640  2643  2646  2649  2653  2656  2671  2674  2677  2680  2696
                2699  2702  2705  2727  2730  2733  2736  2740  2782  2790  2793  2796  2802
                2807  2821  2825  2848  2851  2870  2873  2876  2880  2902  2907  2910  2913
                2917  2921  2945  2948  2951  2954  2958  2961  2980  2983  2986  2989  2993
                3006  3009  3013  3017  3024  3029  3035  3038  3041  3044  3047  3050  3053
                3067  3071  3077  3080  3084  3090  3107  3110  3113  3131  3137  3140  3143
                3147  3166  3173  3176  3179  3183  3186  3205  3208  3211  3214  3218  3280
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                3573  3592  3596  3599  4051  4082  4086  4091  4095  4100  4104  4109  4113
                4118  4122  4127  4131  4136  4140  4152  4155  4159  4169  4174
HLTADR  001012   650#  3732*  3733*  3734  3735  3749
IAERR   015274  2860#
ICNT    001000   646#   777*  3613*  3683  3698  3700  3702*  3703*  3705  3708*  3709  3715  3744*
IE    = 000100   739#
ILFDN   011046  2083  2131#
ILFDNE  011416  2146  2210#
ILFTB2  027506  2143  4402#
ILF67   011420  2216#
ILLFUN  011050  2142#
ILLTAB  027444  2081  4384#
ILL51   010572  2078#
INBUF   030330  4412#
INCW    014742  2780#
INPUT   023546  3850  3885  3886  3909#
INTDON  021006  3428  3433#
INTR4   021010  3439#
INTR5   020704  3416#
INT112  021000  3419  3431#
INT114  021112  3441  3455#
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KIPAR0= 172340   687#   3297*
KIPAR1= 172342   688#   3298*
KIPAR2= 172344   689#   3299*  3345*
KIPAR7= 172356   690#   3296*
KIPDR0= 172300   691#   3300*
KIPDR1= 172302   692#   3301*
KIPDR2= 172304   693#   3302*
KIPDR7= 172316   694#   3303*
LA     = 000204   716#   2303   2320   4274
LAD      001010   649#    778*  1231*  1245*  1259*  3704*  3710   3712   3715
LASTSC   017332  3192#
LATDON   012132  2317   2321#
LATST    012010  2301#
LBT    = 002000   733#
LONUM    027142  4293   4295   4304   4316*  4325#
LOP1     004056  1231   1232#
LOP2     004126  1245   1246#
LOP3     004176  1259   1260#
LOSAV    027146  4293*  4327#
MAXREF   026062  4177   4188#
MAXRF1   026064  4186   4189#
MEMOUT   020572  3386#
MODDON   022076  3610#
MODNUM   021234  3491#
MPR0   = 172100   751#   2380
MR     = 000220   718#    924    981   1198   1205   1213   1221   1624   2019   2337   2363   4269
MULTII   001402   799#
N      = 000123   612#    794    798#   874    878#   937    941#   987    991#   1008   1009#  1017   1021#
                 1046   1047#  1062   1063#  1074   1075#  1083   1084#  1099   1100#  1113   1114#  1120
                 1121#  1136   1137#  1150   1151#  1157   1158#  1170   1171#  1176   1177#  1182   1183#
                 1189   1190#  1199   1200#  1206   1207#  1214   1215#  1222   1226#  1275   1279#  1291
                 1292#  1303   1304#  1315   1316#  1327   1331#  1354   1358#  1381   1382#  1427   1428#
                 1462   1466#  1490   1494#  1525   1529#  1556   1560#  1594   1598#  1635   1639#  1686
                 1690#  1727   1731#  1773   1777#  1818   1822#  1860   1864#  1902   1906#  1952   1956#
                 1976   1980#  2005   2009#  2068   2072#  2132   2136#  2211   2215#  2274   2278#  2296
                 2300#  2304   2305#  2322   2326#  2366   2370#  2428   2432#  2501   2505#  2579   2583#
                 2621   2625#  2658   2662#  2683   2687#  2707   2711#  2741   2745#  2837   2841#  2853
                 2857#  2884   2888#  2927   2931#  2962   2966#  2994   2998#  3054   3058#  3091   3095#
                 3115   3119#  3148   3152#  3187   3191#  3223   3227#  3282   3286#  3388   3392#  3411
                 3415#  3434   3438#  3460   3464#  3482   3486#  4056   4060#
NED    = 010000   728#   2915   2919
NEDDON   015566  2896   2923#
NEDTST   015410  2889#
NNDD     015650  2922   2924   2926#
NNOOP    005330  1495#
NNOP21   005646  1561#
NOOP     005204  1467#
NOOP21   005510  1530#
NOPAR    012606  2414   2421   2425#
NOWGO    002106   847    864    870#
NXM      007612  1898#  4201
NXMTSM   010144  1981#
OBUFSV   001102   661#    780*   870*  1469   1484   1501   1516   1532   1547   1567   1582   1642   1648
                 1676   1693   1717   1737   1761   1779   1781   1813   1825   1849   1854   1867   1869
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                    1893   1898   1899*  1913   1943   1958   1964   2012   2059   2084   2114   2147   2181
                    2194   2218   2225   2243   2249   2439   2455   2478   2513*  2516   2532   2555   2577*
                    2586   2627   2664   2689   2713   2759   2766   2783   2827   2844   2862   2942   2977
                    3019   3045   3099   3108   3122   3156   3202   3229   3244   3256   3262   3424   3447
                    3472   3521   3554   4000   4181*  4182   4185   4191*
OKT       027436    4357   4359   4361   4365   4375   4377#
ONCEE     001160     588*   606*   746#   779*   781    812*   837    846*   853    871*   2444   2469   2493
                    2496*  2500*  2510   2521   2546   2570   2573*  2578*  2923   2926*  4194   4198*  4279*
OOUT      010570    2025   2065   2067#
OR      = 000200     726#  1404
OUT       022122   3614#
OUTBUF    027530     780    870   1228   1230   1244   1258   1468*  1500*  1531*  1566*  1641*  1692*  1722
                    1736*  1899   1912*  2438*  2446*  2448*  2451*  2453*  2467   2498*  2525*  2577   2585*
                    2758*  2765*  2808   3018*  3098*  3121*  3155*  3228*  3243*  3520*  4028*  4040   4045
                    4070*  4071   4141*  4142   4160*  4161   4167   4191   4411#
PARITY    031130    2371   2397   2427*  4413#
PART      012324   2371#
PARTST    011732   2279#
PATST     016476   3059#
PATTST    017136   3153#
PCNT      001004     648#  3618*  3619*  3630
PGE     = 002000     727#  2613
PGETST    013562   2584#
PGTRAP    020666   3395   3405#
PIP     = 020000     732#
PRTP      012566   2378   2419#
PRTP1     012570   2392   2420#
PS      = 177776     614#   615    878*   942*  3397*  3421*  3422   3443*  3444   3466*  3534*  3606*  3612*
                   3998*
PSW     = 177776     615#
PTDONE    026734   4217   4253   4257   4275   4279#
QES       020606   3393#
QESDUN    020702   3403   3409#
QQ      = 000001     794#   874#   937#   987#  1008#  1017#  1046#  1062#  1074#  1083#  1099#  1113#  1120#
                    1136#  1150#  1157#  1170#  1176#  1182#  1189#  1199#  1206#  1214#  1222#  1275#  1291#
                    1303#  1315#  1327#  1354#  1381#  1427#  1462#  1490#  1525#  1556#  1594#  1635#  1686#
                    1727#  1773#  1818#  1860#  1902#  1952#  1976#  2005#  2068#  2132#  2211#  2274#  2296#
                    2304#  2322#  2366#  2428#  2501#  2579#  2621#  2658#  2683#  2707#  2741#  2837#  2853#
                    2884#  2927#  2962#  2994#  3054#  3091#  3115#  3148#  3187#  3223#  3282#  3388#  3411#
                    3434#  3460#  3482#  4056#
RANDOM    027000    1229   4293#
RAND1     027014   4295#   4323
RANEND    027152   4329#
RANNU     001150    742#
RANTS     004026   1227#
RDLIN   = 104412   3847   3928#
RDOCT   = 104410   3927#  4020   4023   4027   4372
RDTST     006462   1691#
RDTSTB    007240   1823#
RMRT1     013762   2626#
RMRT2     014140   2663#
RMRT3     014250   2688#
RMRT4     014360   2712#
RSAS      001122    672#   806    934   1487   1497   1519   1550   1563   1585   1628   2048   2050   2052*
                    2053   2110   2270   2597   2721*  2911   3001   3010*  3011   3048   3072   3586   3602*
                    3984*  3985   4235
```

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RSBA    001112   668#  881*  904   945*  962   1049* 1050  1053* 1054  1057* 1058  1067* 1068
                 1078* 1079* 1080  1263  1268  1317* 1319  1322* 1323  1469* 1484  1501* 1516
                 1532* 1547  1567* 1582  1642* 1648  1675  1693* 1716  1737* 1760  1781* 1812
                 1825* 1848  1869* 1892  1913* 1942  1958* 1965  1984* 2012* 2059  2084* 2114
                 2147* 2181  2196  2220* 2224  2245* 2250  2397* 2439* 2455* 2477  2516* 2532*
                 2554  2586* 2627* 2664* 2689* 2713* 2759* 2766* 2783* 2818  2827* 2844* 2862*
                 2942* 2977* 3019* 3045  3099* 3108  3122* 3156* 3202* 3229* 3244* 3262* 3308*
                 3324* 3348* 3364* 3424* 3447* 3472* 3521* 3553  3946* 3947  4000* 4040* 4045*
                 4071* 4142* 4161* 4240
RSBAB   001146   682#  1318*
RSCS1   001104   665#  880*  899   944*  957   996*  997   1000* 1001  1004* 1005  1011* 1012*
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                 1704  1739* 1740  1751  1783* 1784  1797  1827* 1828  1836  1871* 1872  1883
                 1924  1961* 1985* 1994  1997* 2021* 2037  2086* 2089  2092  2127  2154* 2157
                 2160  2203  2221* 2222  2246* 2247  2263* 2264  2399* 2400  2408  2441* 2442
                 2458* 2459  2474  2490  2518* 2519  2535* 2536  2551  2567  2588* 2589  2591*
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                 2864* 2865  2874  2908  2943* 2952  2978* 2987  3007  3015  3021* 3022  3025
                 3027  3078  3082  3102* 3103  3105  3124* 3127  3129  3145  3158* 3159  3162
                 3164  3181  3203* 3212  3239* 3240  3247* 3248  3272* 3273  3309* 3312  3314
                 3318  3326* 3328  3330  3334  3350* 3351  3353  3356  3365* 3366  3368  3372
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                 4148  4164* 4165  4220  4283
RSCS1B  001140   679#  1282* 2914*
RSCS2   001106   666#  800*  804*  815*  879*  886*  891   894*  943*  950*  952*  953   956*
                 1023  1026* 1027  1029  1032* 1033  1036* 1037  1040* 1041* 1042  1045* 1293*
                 1294* 1298  1336  1349  1365  1392  1404  1416  1607  1671  1712  1747  1791
                 1808  1844  1879  1938  1960* 1973  1982* 1990  1998  2102  2175  2188  2231
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                 2903  2915  2919  3030  3060* 3062  3085  3097* 3101* 3120* 3126* 3132  3154*
                 3161* 3167  3238* 3246* 3250* 3277  3528* 3530* 3536* 3549  3593* 3977* 3978
                 4033* 4204* 4205* 4228
RSCS2B  001142   680#  1295*
RSDA    001114   669#  882*  910   946*  968   1124* 1125  1128* 1129  1132* 1133  1142* 1143
                 1152* 1153* 1154  1249  1253  1481  1513  1544  1579  1603* 1614  1657  1701
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                 2457* 2534* 2635* 2641  2764* 2845* 2849  2863* 2899* 2918  2941* 2976* 3042
                 3193* 3242* 3261* 3323* 3363* 3470* 3523* 3561  3567  3571  3953* 3954  4036*
                 4072* 4079* 4083* 4092* 4101* 4110* 4119* 4128* 4137* 4143* 4162* 4245
RSDB    001126   674#  948*  1335  1360* 1361* 1372  1377  1387* 1400  1412* 1422  1433* 1439*
                 1447  1455  4267
RSDS    001116   670#  895   1507  1573  1666  1803  1933  2022  2026  2032  2034  2056  2099
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                 2991  3036  3138  3174  3209  3216  3594  3960* 3961  4080  4084  4089  4093
                 4098  4102  4107  4111  4116  4120  4125  4129  4134  4138  4150  4157  4172
                 4255
RSDT    001132   676#  816   820   824   828   830   4262
RSER    001120   671#  801*  883*  916   947*  974   1161* 1162  1165* 1166  1172* 1173  1178*
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RSLA    001124   673#  2301  2309  2313  2350  3972  4277
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RSMR    001130   675# 884* 922  951* 979  1193* 1194 1201* 1202* 1203 1208* 1209 1216*
                 1217 1605* 1620 2015 2331 2335  2348 3061  3068* 3991* 3992 4272
RSMRR   024056   602  3989#
RSREG   026232   3738 4209#
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RSWC    001110   667# 885*  928  949*  984  1087* 1088 1091* 1092 1095* 1096 1105* 1106
                 1115* 1116* 1117 1235 1239 1305* 1307 1310* 1311 1470* 1478 1502* 1510
                 1533* 1541  1568* 1576 1602* 1631 1643* 1645 1663 1694* 1707 1738* 1757
                 1782* 1800  1826* 1839 1870* 1889 1914* 1930 1959* 1983* 2013* 2062 2085*
                 2117  2148* 2184  2199 2217* 2242* 2398* 2440* 2456* 2517* 2533* 2587* 2606
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                 3232* 3234* 3237* 3245* 3265* 3269* 3271* 3307* 3325* 3349* 3362* 3423* 3446*
                 3471* 3522* 3544  3939* 3940  3999* 4037* 4073* 4144* 4163* 4250
RSWCB   001144   681# 1306*
RSWCWT  006712   1743#
RS04DT  001162   747# 818*  822*  826*  834*  2749 2754 2809 2813 2933 2938 2968 2973
                 3194 3199  3230  3235  3251  3263 3267 3559 3565
RW    = 000006   695# 3300  3301  3302  3303
SAVBAD  001100   660#
SAVEE   001172   753# 3516* 3600*
SC    = 100000   724#
SCOPE = 104400   797  877  940  990  1008 1020 1046 1062 1074 1083 1099 1113 1120
                 1136 1150 1157 1170 1176 1182 1189 1199 1206 1214 1225 1278 1291
                 1303 1315 1330 1357 1381 1427 1465 1493 1528 1559 1597 1638 1689
                 1730 1776 1821 1863 1905 1955 1979 2008 2071 2135 2214 2277 2299
                 2304 2325 2369 2431 2504 2582 2624 2661 2686 2710 2744 2840 2856
                 2887 2930 2965 2997 3057 3094 3118 3151 3190 3226 3285 3391 3414
                 3437 3463 3485 3610 3617 3923# 4059 4199 4200
SECT    017476   3227#
SEEC    026566   4231 4258#
SETPAT  016650   3096#
SHIFT   027032   4299# 4303
SILO    004716   1384#
SILOB   004506   1334#
SILOFL  005070   1430#
SRAS    024032   601  3982#
SRCS2   024006   600  3975#
SRSBA   023656   595  3944#
SRSCS1  024102   603  3996#
SRSDA   023702   596  3951#
SRSDS   023726   597  3958#
SRSER   023752   598  3965#
SRSLA   023776   599  3972# 3973
SRSWC   023632   594  3937#
SR0   = 177572   686# 2384* 3292 3304* 3382*
STRT    000230   582  588#
STTEST  001516   810  813#  851
SUSWR = 104420   784  3931# 4030
SWI     027270   4029* 4331 4349* 4352#
SWR     001026   656#  809  835  857  1789 3620 3681 3683 3685 3696 3725 3729 3739
                 3742 3939 3946 3953 3960 3967 3977 3984 3991 4001 4031 4034 4038
                 4053 4063 4068 4179 4192 4336 4340* 4342 4358
SWRCHG  024464   4044 4048#
SWREG   000176   579# 4063 4340 4342 4358 4369 4376*
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SW10  = 002000   567#  3620   3724   3725
SW11  = 004000   566#  3696
SW12  = 010000   565#  3621   3623
SW13  = 020000   564#  3729
SW14  = 040000   563#  3685
SW15  = 100000   562#
SW8   = 000400   570#  3680   3681
SW9   = 001000   569#  3742
TIMES   022560   872    873*   995*   2078   2079*  2279*  2327   2328*  2377*  3288   3289*  3417*  3492
                3493*  3611*  3700   3715#
TIMSV   001164   748#   872*   995    2078*  2279   2327*  2377   3288*  3417   3492*  3611
TKB     001022   654#  4362
TKKS    024376  4036#
TKS     001020   653#  4360
TKSEL   024160   783   4017#
TK1     024344  4031#  4054
TK2     024352  4032#  4055
TMEOUT  012320  2347   2363#
TPB     001024   655#  3654*  3659*
TPS     001016   652#  3655   3660
TRE   = 000000   723#  1345   1997   2612   3574
TRY     001412   801#   805
TRYNX   001720   814    833    848#   3614
TSTAGN  012404  2381#  2423
TSTNEM  010204  1988#
TSTVEC  021504  3518   3536#
TST1    001400   797#
TST10   003134  1062#
TST100  015216  2840#
TST101  015272  2856#
TST102  015406  2887#
TST103  015656  2930#
TST104  016034  2965#
TST105  016200  2997#
TST106  016474  3057#
TST107  016646  3094#
TST11   003166  1074#
TST110  016762  3118#
TST111  017134  3151#
TST112  017330  3190#
TST113  017474  3226#
TST114  020040  3285#
TST115  020604  3391#
TST116  020702  3414#
TST117  021006  3437#
TST12   003212  1083#
TST120  021124  3463#
TST121  021232  3485#
TST122  024516  4059#
TST13   003274  1099#
TST14   003326  1113#
TST15   003352  1120#
TST16   003434  1136#
TST17   003466  1150#
TST2    002136   877#
TST20   003512  1157#
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TST21   003554            1170#
TST22   003576            1176#
TST23   003620            1182#
TST24   003644            1189#
TST25   003702            1199#
TST26   003730            1206#
TST27   003766            1214#
TST3    002360             940#
TST30   004024            1225#
TST31   004244            1278#
TST32   004316            1291#
TST33   004362            1303#
TST34   004432            1315#
TST35   004504            1330#
TST36   004606            1357#
TST37   004714            1381#
TST4    002572             990#
TST40   005066            1427#
TST41   005202            1465#
TST42   005326            1493#
TST43   005506            1528#
TST44   005644            1559#
TST45   006036            1597#
TST46   006232            1638#
TST47   006460            1689#
TST5    002664            1008#
TST50   006646            1730#
TST51   007020            1776#
TST52   007236            1821#
TST53   007432            1863#
TST54   007626            1905#
TST55   010036            1955#
TST56   010142            1979#
TST57   010270            2008#
TST6    002712            1020#
TST60   010570            2071#
TST61   011046            2135#
TST62   011416            2214#
TST63   011730            2277#
TST64   012006            2299#
TST65   012022            2304#
TST66   012132            2325#
TST67   012322            2369#
TST7    003052            1046#
TST70   012624            2431#
TST71   013166            2504#
TST72   013560            2582#
TST73   013760            2624#
TST74   014136            2661#
TST75   014246            2686#
TST76   014356            2710#
TST77   014526            2744#
TTAGG   002362             942#
TTMOUT  010566            2031    2066#
TTVEC   021734            3577    3583#
TYPE  = 104402             790     811     839     845     861     862    2319    2925    3622    3727    3731    3737    3789
```

		3829	3875	3894	3899	3902	3905	3924#	4019	4022	4026	4062	4077	4087
		4096	4105	4114	4123	4132	4170	4196	4211	4214	4219	4223	4227	4234
		4239	4244	4249	4254	4261	4266	4271	4276	4366	4368	4371		
TYPEO = 104404		3736	3925#	4213	4216	4221	4225	4229	4236	4241	4246	4251	4256	4263
		4268	4273	4278	4370									
TYPES = 104406		843	860	3926#										
UNCMP 001156		745#	807*	813	832	848*	855*	1487	1497	1519	1550	1563	1585	1628
		2108	3002	3010	3048	3073								
UNITST 007630		1907#												
UNITSV 001154		744#	806*	813	832*	2892	3499							
UNNUM 001152		743#	808*	815	842	850*	856*	859	879	894	943	956	1045	1293
		1296	1338	1364	1391	1609	1669	1710	1745	1806	1842	1877	1909	1916
		1936	1988	1999	2040	2103	2176	2189	2229	2254	2404	2462	2484	2539
		2561	2600	2779	2798	3032	3064	3086	3134	3169	3275	3501	3509	3536
		3547	4021*	4068*	4205									
UP = 000000		696#	3300	3301	3302	3303								
WAITRY 026744		1655	1699	1743	1787	1831	1875	1922	1962	1986	2592	2636	2670	2695
		2847	2944	2979	3204	3426	3474	4282#						
WC = 000010		711#	930	986	1090	1094	1098	1119	1309	1313	1480	1512	1543	1578
		1633	1647	1665	1709	1759	1802	1841	1891	1932	2064	2119	2186	2201
		2608	3041	3113	3546	4051	4247							
WCE = 040000		729#												
WCEDNB 013522		2531	2573#											
WCEDNE 013136		2454	2496#											
WCEDON 013160		2449	2500#											
WCEDOS 013544		2512	2526	2577#										
WCETB 013220		2516#	2576											
WCETSB 013170		2510#												
WCETST 012626		2437#												
WCETT 012634		2439#	2499											
WORK 001176		766#	1194*	1195*	1196	1209*	1210*	1211	1217*	1218*	1219	1227*	1362*	1368*
		1620*	1621*	1622	1779*	1780*	1824*	1854*	1855	1867*	1868*	2014*	2017*	2040*
		2044	2046*	2144*	2153*	2173	2194*	2195*	2196	2218*	2219*	2220	2243*	2244*
		2245	2308*	2311*	2342*	2346*	2722*	2725*	2890*	2892	2895*	2918*	3253*	3255*
		3259*	3399*	3400*	3449*	3450*	3498*	3499	3505*	3585*	3586	3590*	3602	4024*
		4025*	4037	4282*	4285*	4286	4318*	4322*						
WORK1 001200		767#	2149*	2150*	2151	2352*	2354*	3494*	3507	3513*	3575	4034*	4035*	4036
WORK2 001202		768#	2751*	2753*	2756*	2757	2784	4031*	4053					
WRCKT 006650		1735#												
WRCKTB 007434		1866#												
WRTLCK 024520		585	4061#											
WRTST 006234		1640#												
WRTSTB 007022		1778#	4187											
WT 024436		4042#	4047											
WTDV 021502		3535#												
WTDV1 022052		3576	3601	3606#										
WTDV2 021732		3578	3581#	3604										
WTE 024446		4039	4045#											
WWP = 000004		750#	2382											
XXX 027260		4332	4349#											
ZERONE 004610		1359#												
$ENDAD 022172		573	3626#											
$END1 022202		3624	3628#											
. = 031134		571#	572#	574#	577#	581#	584#	587#	593#	605#	644#	659#	782	790
		811	839	862	863#	892	896	900	905	911	917	923	929	935
		954	958	963	969	975	980	985	998	1002	1006	1014	1024	1034

		1038	1043	1051	1055	1059	1070	1081	1089	1093	1097	1108	1118	1126
		1130	1134	1145	1155	1163	1167	1174	1180	1187	1197	1204	1212	1220
		1284	1288	1300	1308	1312	1320	1324	1340	1343	1347	1352	1374	1379
		1394	1405	1414	1417	1425	1435	1449	1452	1457	1473	1476	1479	1482
		1485	1488	1498	1505	1508	1511	1514	1517	1520	1523	1536	1539	1542
		1545	1548	1551	1554	1564	1571	1574	1577	1580	1583	1586	1589	1592
		1612	1615	1618	1623	1626	1629	1632	1646	1649	1653	1658	1661	1664
		1667	1673	1679	1682	1697	1702	1705	1708	1714	1720	1725	1741	1749
		1752	1755	1758	1764	1785	1795	1801	1804	1810	1816	1829	1834	1840
		1846	1852	1858	1873	1881	1887	1890	1896	1925	1928	1931	1934	1940
		1946	1967	1970	1974	1992	1995	2002	2027	2035	2038	2054	2057	2060
		2063	2094	2097	2100	2106	2112	2115	2118	2121	2125	2128	2162	2165
		2168	2171	2179	2182	2185	2192	2197	2200	2204	2207	2227	2233	2236
		2240	2252	2258	2261	2265	2268	2271	2283	2287	2290	2302	2319	2334
		2336	2359	2406	2409	2475	2481	2488	2491	2552	2558	2565	2568	2595
		2598	2604	2607	2610	2616	2619	2639	2642	2645	2648	2652	2655	2673
		2676	2679	2698	2701	2704	2729	2732	2735	2739	2789	2792	2795	2801
		2806	2820	2824	2850	2866	2869	2872	2875	2879	2901	2906	2909	2912
		2916	2920	2925	2947	2950	2953	2957	2960	2982	2985	2988	2992	3005
		3008	3012	3016	3023	3028	3034	3037	3040	3043	3046	3049	3052	3066
		3070	3076	3079	3083	3089	3106	3109	3112	3130	3136	3139	3142	3146
		3165	3172	3175	3178	3182	3185	3207	3210	3213	3217	3279	3313	3329
		3352	3367	3407	3451	3456	3478	3545	3551	3557	3572	3595	3598	3622
		3623#	3630	3632#	3656	3661	3715	3731	3732#	3737	3738#	3740	3748	3749
		3758	3778	3781	3786	3796#	3829	3833	3875	3889	3894	3895#	3899	3909#
		4019	4020#	4022	4026	4043	4062	4063#	4077	4078#	4081	4085	4087	4090
		4094	4096	4099	4103	4105	4108	4112	4114	4117	4121	4123	4126	4130
		4132	4135	4139	4151	4154	4158	4168	4170	4171#	4173	4196	4211	4214
		4215#	4219	4223	4224#	4227	4234	4235#	4239	4240#	4244	4245#	4249	4250#
		4254	4255#	4261	4262#	4266	4267#	4271	4272#	4276	4277#	4366	4367#	4368
		4371	4372#	4411#	4412#									
.CLRDK	026214	3929	4204#											
.CNTLU	027354	3932	4367#											
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.HLTCT	022720	3734*	3748#	4209	4230	4232	4237	4242	4247	4252	4258*	4259	4264	4269
		4274												
.ILLUP	023260	3805	3832#											
.KBDIN	027272	3930	4356#											
.KIT	022532	3686	3695	3701	3708#	3746								
.MSG	027440	4362*	4363*	4364	4373*	4376	4379#							
.OVER	022536	3684	3709#											
.POWER	023134	771	3805#	3827										
.POWUP	023200	3814	3817#											
.PR	023110	3755*	3757*	3759*	3760*	3765	3769	3779*	3780	3783*	3785	3789	3796#	
.PRF	023016	3767	3770	3775#										
.PRL	022774	3768#	3784											
.PTIT	022754	3756	3761#											
.PUVEC	023266	3805*	3806*	3814*	3836#									
.QQ. =	000024	3910#	3923	3924#	3925#	3926#	3927#	3928#	3929#	3930#	3931#	3932#	3933#	
.RDLIN	023424	3884#	3928											
.RDOCT	023272	3842#	3927											
.SAVR6	023264	3813*	3817	3835#										
.SCOPE	022366	3680#	3923											
.SUSWR	027152	3931	4331#											
.SVLAD	022512	3692	3697	3703#	3711									
.SWOPT=	167400	555#	562	563	564	565	566	567	568	569	570	571	3620	3621

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.TBIT   022206          3630#
.TRAP   023566           775    3917#
.TRP    023604          3920    3921#
.TYPE   022230          3643#   3924
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.TYPEO  022732          3757#   3925
.TYPES  022742          3759#   3926
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NEWTST       1#    555#    794    874    937    987   1008   1017   1046   1062   1074   1083   1099   1113   1120
          1136   1150   1157   1170   1176   1182   1189   1199   1206   1214   1222   1275   1291   1303   1315
          1327   1354   1381   1427   1462   1490   1525   1556   1594   1635   1686   1727   1773   1818   1860
          1902   1952   1976   2005   2068   2132   2211   2274   2296   2304   2322   2366   2428   2501   2579
          2621   2658   2683   2707   2741   2837   2853   2884   2927   2962   2994   3054   3091   3115   3148
          3187   3223   3282   3388   3411   3434   3460   3482   4056
ODT11        1#
ODT11X       1#
POP          1#    641#   3691   3694   3790   3821   3869
PRINT        1#    641#    790    811    839    862   2319   2925   3622   3731   3737   3829   3874   3894   3898
          4019   4022   4026   4062   4077   4087   4096   4105   4114   4123   4132   4170   4196   4211   4214
          4219   4223   4227   4234   4239   4244   4249   4254   4261   4266   4271   4276   4366   4368   4371
PUSH         1#    641#   3688   3761   3807   3844
SCOPE.       1#    794#    874#    937#    987#   1008#   1017#   1046#   1062#   1074#   1083#   1099#   1113#   1120#   1136#
          1150#   1157#   1170#   1176#   1182#   1189#   1199#   1206#   1214#   1222#   1275#   1291#   1303#   1315#   1327#
          1354#   1381#   1427#   1462#   1490#   1525#   1556#   1594#   1635#   1686#   1727#   1773#   1818#   1860#   1902#
          1952#   1976#   2005#   2068#   2132#   2211#   2274#   2296#   2304#   2322#   2366#   2428#   2501#   2579#   2621#
          2658#   2683#   2707#   2741#   2837#   2853#   2884#   2927#   2962#   2994#   3054#   3091#   3115#   3148#   3187#
          3223#   3282#   3388#   3411#   3434#   3460#   3482#   4056#
SET       3910#   3923   3924   3925   3926   3927   3928   3929   3930   3931   3932
TYPADR       1#
TYPBIT       1#    641#
TYPCHR       1#    641#
TYPDEC       1#    641#
TYPLIN       1#    641#
TYPOCS       1#    641#    841    859
TYPOCT       1#    641#   3735   4212   4215   4220   4224   4228   4235   4240   4245   4250   4255   4262   4267
          4272   4277   4369
TYPTXT       1#    641#    790    811    839    862   2318   2925   4019   4022   4026   4061   4077   4087   4096
          4105   4114   4123   4132   4170   4196   4211   4214   4218   4222   4226   4234   4239   4244   4249
          4254   4261   4266   4271   4276   4366   4367   4371
$CATCH       1#    555#    571
$CMTAG       1#    555#    644
$DONE        1#    555#   3615
$EQUAT       1#    555#    612
$HLT         1#    555#   3716
$KBDIN       1#    555#   4355
$KMMR        1#
$OCTAL       1#    555#   3749
$POWER       1#    555#   3797
$RAND2       1#
$RAND4       1#
$RDDEC       1#
$RDLIN       1#    555#   3877
$RDOCT       1#    555#   3837
$SCOPE       1#    555#   3673
$SET      3910#   3923   3924   3925   3926   3927   3928   3929   3930   3931   3932
$SETUP       1#    555#    770
$SMMR        1#
$SUSWR       1#    555#   4330
$SWDOC       1#    555#    559
$TRAP        1#    555#   3910
$TYPE        1#    555#   3633
$TYPEA       1#
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$TYPED      1#
$UMMR       1#


. ABS.  031134     000


 ERRORS DETECTED:  0

 CZRSBH.BIN,CZRSBH.LST/CRF/SOL/NL:TOC=CZRSBH.SML,CZRSBH.P11
 RUN-TIME: 29 46 4 SECONDS
 RUN-TIME RATIO: 178/81=2.1
 CORE USED:  22K  (43 PAGES)
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