RH11,RS03/4

BASIC FUNCTION DIAGNOSTIC

CZRSBG0

AH-9315G-MC

FICHE 1 OF 1

JAN 1979

digital

MADE IN USA

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IDENTIFICATION

PRODUCT CODE: AC-9314G-MC

PRODUCT NAME: CZRSBG0 RH11-RS03/LAC4 BASIC FUNCTION DIAGNOSTIC

DATE CREATED: DEC 1978

MAINTAINER: DIAGNOSTIC GROUP

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DESCRIPTION

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.

. DESCRIPTION

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 OBJFSV 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

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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 ''DR'' TO SET AND THEN CHECK OUTPUT OF SILO. IF DR 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 THPOUGH 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

IF IT INCREMENTED.

33. TEST NON-EXISTENT MEMORY ERROR BIT IN RSCS2

SET BITS A16 AND A17 IN RSCS1 FOR AN 18 BIT ADDRESS. MOV 173000 INTO RSBA. MOV -1000 INTO RSWC AND DO A WRITE FUNCTION. THE NEM BIT SHOULD SET AND SHOULD CAUSE TRE TO SET. CLEAR THESE BITS BY LOADING A 1 INTO TRE.

34. TEST FOR ZERO'S IN A PARTIALLY FILLED SECTOR

FIRST WRITE A COMPLETE SECTOR WITH ALL ONES. THEN DO A ONE WORD WRITE. THE REMAINING 63 WORDS SHOULD BE WRITTEN AS ZERO'S. NOW DO A WRITE CHECK TO COMPARE FOR THESE ZERO'S.

35. PRIORITY INTERRUPT TEST

HERE THE PROGRAM ENABLES THE INTERRUPT AND DOES A ONE WORD WRITE FUNCTION. THE PROGRAM SHOULD NOT TRAP UNTIL THE PROCESSOR IS DROPPED TO PRIORITY 4.

36. DYNAMIC FUNCTION TEST

WHILE ONE DRIVE IS READING, THE UNIT # IN RSCS2 IS MODIFIED. IF THERE IS ANOTHER DRIVE ON THE SYSTEM, A DRIVE SEARCH IS PERFORMED ON IT. THIS IS ALL DONE WHILE THE FIRST DRIVE IS STILL READING.

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                                .TITLE  CZRSB-G RH11-RS03LA-RS03-RS04 BASIC FUNCTION DIAGNOSTIC
                                ;COPYRIGHT 1973,1974,1975,1976,1977 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                                ;PROGRAM BY STANLEY HARACKIEWICZ


                                ;          SWITCH                    USE
                                ;          ------          --------------------
                        100000          SW15=   100000  ;HALT ON ERROR
                        040000          SW14=   40000   ;LOOP ON TEST
                        020000          SW13=   20000   ;INHIBIT ERROR TYPEOUTS
                        010000          SW12=   10000   ;INHIBIT OBUFSV FROM CHANGING FOR -B- PORT ONLY
                        004000          SW11=   4000    ;INHIBIT ITERATIONS
                        002000          SW10-   2000    ;0 - BELL ON PASS COMPLETE
                                                        ;1 - BELL ON ERROR
                        001000          SW9-    1000    ;LOOP ON ERROR
                        000400          SW8     400     ;LOOP ON TEST IN SW<7:0>
                        000000  .-      0               ;TRAP CATCHER FROM 0 - 776
                        000046  .-      46              ;HOOKS FOR ACT 11
000046  022116          $ENDAD
                        000052  .-      52
000052  040000          BIT14
                        000174  .-      174             ;SOFTWARE SWITCH REGISTER LOCATION
000174  000000          DISPREG::0
```

```
                                SWREG:  0

                        000200          .=      200
000200  000137  000230                  JMP     @#STRT

                        000220          .=      220
000220  000137  024444                  JMP     @#WRTLCK        ;WRITE LOCK TEST

                        000230          .=      230
000230  042737  004000  001160  STRT:   BIC     #BIT11,ONCEE    ;CLEAR TKSEL TEST FLAG
000236  000137  001202                  JMP     @#BEGIN         ;STARTING ADDRESS IS BEGIN

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

                        000250          .       250
000250  000137  023556                  JMP     @#SRSWC         ;WORD COUNT REG
000254  000137  023602                  JMP     @#SRSBA         ;BUS ADDR REG
000260  000137  023626                  JMP     @#SRSDA         ;DISK ADDR REG
000264  000137  023652                  JMP     @#SRSDS         ;DRIVE STATUS REG
000270  000137  023676                  JMP     @#SRSER         ;ERROR REG
000274  000137  023722                  JMP     @#SRSLA         ;LOOK AHEAD REG
000300  000137  023732                  JMP     @#SRCS2         ;CS2 REG
000304  000137  023756                  JMP     @#SRAS          ;ATTENTION SUMMARY REG
000310  000137  024002                  JMP     @#RSMRR         ;MAINTENANCE REG
000314  000137  024026                  JMP     @#SRSCS1        ;CS1 REG

                        000320          .       320
000320  052737  004000  001160          BIS     #BIT11,ONCEE    ;SET TKSEL TEST FLAG
000326  000137  001202                  JMP     @#BEGIN         ;ENABLES OPERATOR TO DO A
                                                                ;WRITE OR READ TO A DESIRED ADDR
                                                                ;OPTIONAL WC, DA, AND UNIT #
```

```
637
638          000001                    N=      1               ;INITALIZE FOR NEWTST
639          104000                    HLT-    EMT             ;SET HLT TO EMT FOR ERROR TYPEOUTS
640          177776                    PS=     177776          ;PROCESSOR STATUS
641          177776                    PSW=    PS              ;PROCESSOR STATUS WORD
642          000007                    BELL-   7               ;BELL
643          000000                    R0=     %0              ;R0 - DEFINE REGISTERS
644          000001                    R1-     %1              ;R1
645          000002                    R2=     %2              ;R2
646          000003                    R3-     %3              ;R3
647          000004                    R4      %4              ;R4
648          000005                    R5=     %5              ;R5
649          000006                    SP=     %6              ;R6 - STACK POINTER
650          000007                    PC=     %7              ;R7 - PROGRAM COUNTER
651          000001                    BIT0=   1               ;BIT EQUATES
652          000002                    BIT1=   2
653          000004                    BIT2=   4
654          000010                    BIT3=   10
655          000020                    BIT4=   20
656          000040                    BIT5-   40
657          000100                    BIT6=   100
658          000200                    BIT7=   200
659          000400                    BIT8=   400
660          001000                    BIT9=   1000
661          002000                    BIT10-  2000
662          004000                    BIT11=  4000
663          010000                    BIT12=  10000
664          020000                    BIT13-  20000
665          040000                    BIT14   40000
666          100000                    BIT15-  100000
667          000001          GOOD      %1                      ;FOR GOOD DATA
668          000000          BAD=      %0                      ;FOR BAD DATA
669
```

```
                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
```

```
                                                                I 2
724                             ;BIT ASSIGNMENTS FOR ERROR TYPEOUTS
725                             ;THE RS REGISTERS ARE DIVIDED INTO 3 GROUPS.
726                             ;CS1,CS2 AND ER ARE IN THE FIRST GROUP.THIS GROUP IS ALWAYS
727                             ;TYPED WITH EITHER OF THE OTHER GROUPS. AS,BA,DA, WC AND DS
728                             ;ARE IN THE SECOND GROUP. DT,DB,MR, AND LA ARE IN THE 3RD
729                             ;GROUP.YOU CAN NOT INTERMIX GROUP 2 OR 3. THEY HAVE
730                             ;TO BE TYPED SEPERATELY.
731                             ;EXAMPLE:   HLT !CS1,AS,BA
732                             ;           HLT !CS1.DT.DB
733
734     000001                          CS1=1           ;CONTROL AND STATUS 1
735     000002                          ER=2            ;CONTROL AND STATUS 2
736     000004                          DA=4            ;DESIRED ADD
737     000010                          WC=10           ;WORD COUNT
738     000020                          BA=20           ;BUS ADDRESS
739     000040                          DS=40           ;DRIVE STATUS
740     000100                          AS=100          ;ATTENTION SUMMARY
741     000200                          CS2=200         ;CONTROL AND STATUS REG
742     000204                          LA=204          ;LOOK AHEAD
743     000210                          DB=210          ;DATA BUFFER
744     000220                          MR=220          ;MAINTENANCE
745     000240                          DT=240          ;DRIVE TYPE
746
747                             ;BIT ASSIGNMENTS FOR THE REGISTER BITS
748
749     040000                          TRE=40000       ;TRANSFER ERROR CS1
750     100000                          SC=100000       ;SPECIAL CONDITIONS CS1
751     000100                          IR 100          ;INPUT READY CS2
752     000200                          OR=200          ;OUTPUT READY CS2
753     002000                          PGE=2000        ;PROGRAM ERROR-CS2
754     010000                          NED=10000       ;NON-EXISTENT DRIVE CS2
755     040000                          WCE=40000       ;WRITE CHECK ERROR-CS2
756     100000                          DLT=100000      ;DATA LATE ERROR CS2
757     000200                          DRY=200         ;DRIVE READY DS
758     020000                          PIP=20000       ;POSITIONING IN PROGRESS DS
759     002000                          LBT=2000        ;LAST BLOCK TRANSFER-DS
760     040000                          ERR=40000       ;ERROR DS
761     100000                          ATA=100000      ;ATTENTION ACTIVE-DS
762     001000                          DAO=1000        ;DISK OVERFLOW ERROR-ER
763     100000                          DCK=100000      ;DATA CHECK ERROR-ER
764     000010                          BAI=10          ;BUS ADDR INCREMENT INHIBIT
765     000100                          IE 100          ;INTERRUPT ENABLE CS1
```

```
                                        ;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                          A0B1:   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
                                        
                                        ;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)
001174  000000                          WORK:   0
001176  000000                          WORK1:  0
001200  000000                          WORK2:  0
                                        
001202  012706  000500                  BEGIN:  MOV     #500,SP         ;SET STACK TO  *** 500 ***
001206  012737  023060  000024                  MOV     #.POWER,@#24    ;SET UP PF VECTOR
001214  012737  000340  000026                  MOV     #340,@#26       ;LOCK OUT THE WORLD
001222  012737  022506  000030                  MOV     #.HLT,@#30      ;SET EMT VECTOR
001230  012737  000340  000032                  MOV     #340,@#32       ;LOCK UP
001236  012737  023512  000034                  MOV     #.TRAP,@#34     ;SET TRAP VECTOR
001244  012737  000340  000036                  MOV     #340,@#36       ;LOCK UP
001252  005037  001000                          CLR     ICNT            ;INIT ICNT
001256  005037  001010                          CLR     LAD             ;INIT LAD
001262  042737  143777  001160                  BIC     #143777,ONCEE   ;CLEAR ONCEE
001270  012737  027454  001102                  MOV     #OUTBUF,OBUFSv  ;SAVE LOC OF OUTBUFFER
001276  032737  004000  001160                  BIT     #BIT11,ONCEE    ;DO TKSEL TEST?
001304  001402                                  BEQ     .+6             ;NO
001306  000137  024104                          JMP     @#TKSEL         ;YES
001312  104420                                  SUSWR                   ;SIZE FOR HDWR SWR
001314  005227  177777                          INC #-1                 ; SO TITLE PRINTOUT 1ST PASS ONLY
001320  001032                                  BNE AROUND              ; THRU FOR PASSES >1
                                        ;*****************************************************************
                                        ; ROUTINE TO PRINT  DIAGNOSTICS TITLE
                                        ;*****************************************************************
001322  104402  001326                          TYPE    ,.+2            ;.ASCIZ ''CZRSB-G   RH11-RS03,RS03LA,RS04   DIAGNOSTIC ''<
001406  000240                  AROUND: NOP                             ; FALL THRU
```

```
                                        ;NOW TEST FOR DRIVES
                                        ;*************************************************************************
                                        ;TEST 1          TEST FOR DRIVES
                                        ;*************************************************************************
001410  104400                          TST1:   SCOPE

001412  012701  000010          MULTII: MOV     #8.,R1          ;PUT 8 INTO R1 FOR COUNT
001416  005077  177464                  CLR     @RSCS2          ;SET DEVICE TO ZERO
001422  012777  000007  177470  TRY:    MOV     #7,@RSER        ;CAUSE AN ERROR +SETS BIT IN RSAS REG
001430  005301                          DEC     R1              ;DO A MAXIMUM OF 8 TIMES
001432  001403                          BEQ     DVNUM           ;TESTED FOR ALL DRIVES GET OUT
001434  005277  177446                  INC     @RSCS2          ;INCREMENT DRIVE UNIT
001440  000770                          BR      TRY             ;REPEAT FOR NEXT DRIVE
001442  017737  177454  001154  DVNUM:  MOV     @RSAS,UNITSV    ;SAVE
001450  012737  000401  001156          MOV     #401,UNCMP      ;SETUP TO CMP WITH UNITSV
001456  012737  000000  001152          MOV     #0,UNNUM        ;PUT 0 INTO UNIT NO.
001464  032777  020000  177334          BIT     #BIT13,@SWR     ;INHIBIT TYPE OUT?
001472  001015                          BNE     STTEST          ;YES
001474  104402  001500                  TYPE    ,.+2            ;.ASCIZ <15><12>'TESTING UNIT ''
001520  042737  100000  001160          BIC     #BIT15,ONCEE    ;CLEAR ERROR FLAG
001526  033737  001156  001154  STTEST: BIT     UNCMP,UNITSV    ;IS THIS DRIVE ON THE SYSTEM
001534  001475                          BEQ     TRYNX           ;NO
001536  013777  001152  177342          MOV     UNNUM,@RSCS2    ;YES PUT UNIT # INTO CS2
001544  022777  000004  177360          CMP     #4,@RSDT        ;IS THIS A RS03LA?
001552  001004                          BNE     7$              ;NO
001554  012737  000004  001162          MOV     #4,RS04DT       ;SETUP DRIVE TYPE FOR A LA DISK
001562  000435                          BR      1$              ;GET OUT
001564  022777  000000  177340  7$:     CMP     #0,@RSDT        ;IS THIS A RS03?
001572  001003                          BNE     2$              ;NO
001574  005037  001162                  CLR     RS04DT          ;YES
001600  000426                          BR      1$              ;GET OUT
001602  022777  000001  177322  2$:     CMP     #1,@RSDT        ;IS THIS A RS03 4US?
001610  001003                          BNE     3$              ;NO
001612  005037  001162                  CLR     RS04DT          ;RS03
001616  000417                          BR      1$              ;GET OUT
001620  022777  000002  177304  3$:     CMP     #2,@RSDT        ;IS THIS A RS04?
001626  001410                          BEQ     6$              ;YES
001630  022777  000003  177274          CMP     #3,@RSDT        ;IS IT A RS04?
001636  001404                          BEQ     6$              ;YES
001640  043737  001156  001154          BIC     UNCMP,UNITSV    ;CLEAR UNWANTED ATA BIT
001646  000430                          BR      TRYNX           ;GET A NEW NUMBER
001650  052737  177777  001162  6$:     BIS     #-1,RS04DT      ;YES RS04
001656  032777  020000  177142  1$:     BIT     #BIT13,@SWR     ;INHIBIT TYPE OUT?
001664  001020                          BNE     4$              ;YES
001666  032737  100000  001160          BIT     #BIT15,ONCEE    ;ANY ERRORS?
001674  001404                          BEQ     5$              ;NO
001676  104402  001702                  TYPE    ,.+2            ;.ASCIZ <15><12><12>
                                        ;*************************************************************************4
001706                          5$:
001706  013746  001152                  MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
001712  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
                                        ;*********************************************************
001714  104402  000040                  TYPE    ,40             ;TYPE SPACE
001720  042737  100000  001160          BIC     #BIT15,ONCEE    ;CLEAR ERROR FLAG
001726  000473                  4$:     BR      NOGO            ;NOW TEST
```

```
                                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

002304  005777  176602                TST     @RSBA           ;IS BA REG. CLEARED
002310  001401                        BEQ     .+4             ;YES
002312  104020                        HLT     !BA             ;SHOULD BE 0

                                ;TEST DISK ADDRESS REGISTER

002314  005777  176574                TST     @RSDA           ;IS DA CLEARED
002320  001401                        BEQ     .+4             ;YES
002322  104004                        HLT     !DA             ;SHOULD BE 0

                                ;TEST ERROR REG RSER

002324  005777  176570                TST     @RSER           ;DID RSER CLEAR?
002330  001401                        BEQ     .+4             ;YES
002332  104002                        HLT     !ER             ;BITS(157015) SHOULD BE CLEARED

                                ;TEST RS MAINTENANCE REGISTER

002334  032777  000077  176566        BIT     #77,@RSMR       ;DID THESE BITS GET CLEARED
002342  001401                        BEQ     .+4             ;YES
002344  104220                        HLT     !MR             ;BITS(77) SHOULD BE 0

                                ;TEST WC REG IT SHOULD NOT CHANGE

002346  022777  177777  176534        CMP     #177777,@RSWC   ;DID IT CHANGE?
002354  001401                        BEQ     .+4             ;NO
002356  104010                        HLT     !WC             ;RESET SHOULD NOT MODIFY RSWC

                                ;TEST RSAS

002360  005777  176536                TST     @RSAS           ;IS REG CLEAR
002364  001401                        BEQ     .+4             ;YES
002366  104100                        HLT     !AS             ;NO
```

```
                                ;*****************************************************************************
                                ;TEST 3          TEST CLEAR BIT IN CS2 ON ALL THE R/W BITS
                                ;*****************************************************************************
002370  104400                  TST3:   SCOPE

002372  012737  000340  177776  TTAGG:  MOV     #340,@#PS       ;LOCK OUT INTERRUPTS
002400  013777  001152  176500          MOV     UNNUM,@RSCS2    ;GET UNIT #
002406  012777  043576  176470          MOV     #43576,@RSCS1   ;SET ALL
002414  012777  177777  176470          MOV     #177777,@RSBA   ;POSSIBLE
002422  012777  177777  176464          MOV     #177777,@RSDA   ;REGISTERS
002430  012777  177777  176462          MOV     #177777,@RSER
002436  012777  177777  176462          MOV     #177777,@RSDB
002444  012777  177777  176436          MOV     #177777,@RSWC
002452  012777  020417  176426          MOV     #20417,@RSCS2
002460  012777  000071  176442          MOV     #71,@RSMR
002466  012777  000040  176412          MOV     #40,@RSCS2      ;CLEAR ALL BITS
002474  022777  000100  176404          CMP     #100,@RSCS2     ;DID THE RIGHT BITS CLEAR?
002502  001401                          BEQ     .+4             ;YES
002504  104200                          HLT     !CS2            ;(417) SHOULD BE CLEARED IN CS2
002506  013777  001152  176372          MOV     UNNUM,@RSCS2    ;GET DRIVE NUMBER
002514  032777  173577  176362          BIT     #173577,@RSCS1  ;DID ALL BITS GET CLEARED
002522  001401                          BEQ     .+4             ;YES
002524  104001                          HLT     !CS1            ;NO, ALL BITS SHOULD BE 0
                                ;TEST BUS ADDRESS REGISTER

002526  005777  176360                  TST     @RSBA           ;IS BA REG. CLEARED
002532  001401                          BEQ     .+4             ;YES
002534  104020                          HLT     !BA             ;SHOULD BE 0

                                ;TEST DISK ADDRESS REGISTER

002536  005777  176352                  TST     @RSDA           ;IS DA CLEARED
002542  001401                          BEQ     .+4             ;YES
002544  104020                          HLT     !BA             ;SHOULD BE 0

                                ;TEST ERROR REG RSER

002546  005777  176346                  TST     @RSER           ;DID THESE BITS GET CLEARED
002552  001401                          BEQ     .+4             ;YES
002554  104002                          HLT     .ER             ;BITS(157015) SHOULD BE CLEARED

                                ;TEST RS MAINTENANCE REGISTER
002556  032777  000077  176344          BIT     #77,@RSMR       ;DID THESE BITS GET CLEARED
002564  001401                          BEQ     .+4             ;YES
002566  104220                          HLT     !MR             ;BITS(77) SHOULD BE 0

                                ;TEST WC REG. IT SHOULD NOT CHANGE
002570  022777  177777  176312          CMP     #177777,@RSWC   ;DID WC CHANGE
002576  001401                          BEQ     .+4             ;NO
002600  104010                          HLT     .WC             ;WHY DID IT CHANGE?
```

```
1012                                    ;*****************************************************************************
1013                                    ;TEST 4          SET AND CLEAR ALL REGISTERS
1014                                    ;*****************************************************************************
1015  002602  104400                    TST4:   SCOPE
1016                                    ;CAN WE SET THE FUNCTION BITS IN THE RSCS1 REG.
1017                                    ;BITS 7,6,5,4,3,2&1
1018
1019  002604  104414                            CLRDK                           ;CLEAR ALL RS REG
1020  002606  013737  001164  022504            MOV     TIMSV,TIMES             ;GET TIME
1021  002614  012777  003576  176262            MOV     #3576,@RSCS1            ;SET DISK FUNCTION BITS
1022  002622  022777  007776  176254            CMP     #7776,@RSCS1            ;ARE THESE BITS SET?
1023  002630  001401                            BEQ     .+4                     ;NO
1024  002632  104001                            HLT     .CS1                    ;SHOULD = 7776
1025  002634  012777  002524  176242            MOV     #2524,@RSCS1            ;SET THESE BITS
1026  002642  022777  006724  176234            CMP     #6724,@RSCS1            ;DID THEY SET
1027  002650  001401                            BEQ     .+4                     ;YES
1028  002652  104001                            HLT     .CS1                    ;SHOULD BE 6724
1029  002654  012777  001052  176222            MOV     #1052,@RSCS1            ;SET THESE BITS
1030  002662  022777  005252  176214            CMP     #5252,@RSCS1            ;ARE THEY -?
1031  002670  001401                            BEQ     .+4                     ;YES
1032  002672  104001                            HLT     !CS1                    ;SHOULD = 5252
1033  002674  104400                    TST5:   SCOPE
1034                                    ;CLEAR THE FUNCTION BITS
1035
1036  002676  012777  043576  176200            MOV     #43576,@RSCS1           ;SET DISK FUNCTION BITS
1037  002704  005077  176174                    CLR     @RSCS1
1038  002710  022777  004200  176166            CMP     #4200,@RSCS1            ;IS THE READY BIT SET
1039  002716  001401                            BEQ     .+4                     ;YES
1040  002720  104001                            HLT     !CS1                    ;RSCS1 SHOULD   4200
1041
1042                                    ;*****************************************************************************
1043                                    ;TEST 6          TEST RSCS2
1044                                    ;*****************************************************************************
1045  002722  104400                    TST6:   SCOPE
1046
1047  002724  000005                            RESET                           ;CLEAR WORLD
1048  002726  022777  000100  176152            CMP     #100,@RSCS2             ;DID THEY CLEAR?
1049  002734  001401                            BEQ     .+4                     ;YES
1050  002736  104200                            HLT     .CS2                    ;NO
1051  002740  012777  021037  176140            MOV     #21037,@RSCS2           ;SET BITS 21017
1052  002746  022777  021137  176132            CMP     #21137,@RSCS2           ;DID THESE BITS GET SET
1053  002754  001405                            BEQ     1$                      ;YES
1054  002756  017700  176124                    MOV     @RSCS2,BAD
1055  002762  012701  021137                    MOV     #21137,GOOD             ;WHAT CS2 SHOULD =
1056  002766  104000                            HLT                             ;CS2 = BAD GOOD = CORRECT ANS
```

```
1057  002770  012777  020025  176110  1$:     MOV     #20025,@RSCS2   ;SET THESE BITS
1058  002776  022777  020125  176102          CMP     #20125,@RSCS2   ;DID THESE BITS GET SET
1059  003004  001401                          BEQ     .+4             ;YES
1060  003006  104200                          HLT     !CS2            ;NO,CS2 SHOULD = 20125
1061  003010  012777  000012  176070          MOV     #12,@RSCS2      ;LOAD THESE BITS
1062  003016  022777  000112  176062          CMP     #112,@RSCS2     ;DID THESE BITS GET SET IN CS2
1063  003024  001401                          BEQ     .+4             ;YES
1064  003026  104200                          HLT     !CS2            ;BAD = CS2 GOOD - CORRECT ANS
1065  003030  012777  177777  176050          MOV     #-1,@RSCS2      ;SET BITS
1066  003036  005077  176044                  CLR     @RSCS2          ;CLEAR THEM
1067  003042  022777  000100  176036          CMP     #100,@RSCS2     ;DID CLEAR WORK
1068  003050  001401                          BEQ     .+4             ;YES
1069  003052  104200                          HLT     !CS2            ;R/W BITS DID NOT CLEAR
1070  003054  013777  001152  176024          MOV     UNNUM,@RSCS2    ;GET UNIT #
1071  003062  104400                  TST7:   SCOPE
1072                                  ;CAN WE SET ALL THE RSBA BITS
1073
1074  003064  012777  177777  176020          MOV     #177777,@RSBA   ;SET THE BITS
1075  003072  022777  177776  176012          CMP     #177776,@RSBA   ;DID THEY SET
1076  003100  001401                          BEQ     .+4             ;YES
1077  003102  104020                          HLT     .BA             ;BITS 17776 SHOULD BE SET
1078  003104  012777  125252  176000          MOV     #125252,@RSBA   ;SET THESE BITS
1079  003112  022777  125252  175772          CMP     #125252,@RSBA   ;ARE THEY =
1080  003120  001401                          BEQ     .+4             ;YES
1081  003122  104020                          HLT     .BA             ;SHOULD BE 125252
1082  003124  012777  052524  175760          MOV     #52524,@RSBA    ;SET THESE BITS
1083  003132  022777  052524  175752          CMP     #52524,@RSBA    ;ARE THEY -
1084  003140  001401                          BEQ     .+4             ;YES
1085  003142  104020                          HLT     !BA             ;SHOULD BE 52524
1086
1087  003144  104400                  TST10:  SCOPE
1088                                  ;FLOAT A 1 THROUGH RSBA
1089
1090  003146  012701  000002          FLOTBA: MOV     #2,GOOD         ;GET A 2
1091  003152  000241                          CLC                     ;CLEAR CARRY
1092  003154  010177  175732          1$:     MOV     GOOD,@RSBA      ;FLOAT NUMBER
1093  003160  017700  175726                  MOV     @RSBA,BAD       ;GET BA
1094  003164  020100                          CMP     GOOD,BAD        ;COMPARE BA
1095  003166  001401                          BEQ     .+4             ;BA CORRECT
1096  003170  104000                          HLT                     ;BAD=BA GOOD=CORRECT ANS
1097  003172  006101                          ROL     GOOD            ;ROTATE NUMBER
1098  003174  103367                          BCC     1$              ;LOOP TILL DONE
```

```
1099  003176  104400                   TST11:  SCOPE
1100
1101                                   ;CLEAR THE RSBA REGISTER
1102
1103  003200  012777  177777  175704           MOV     #177777,@RSBA   ;SET RSBA EQUAL TO ALL ONES
1104  003206  005077  175700                   CLR     @RSBA
1105  003212  005777  175674                   TST     @RSBA           ;TEST FOR BIT0 SET IN RSBA (READ ONLY BIT)
1106  003216  001401                           BEQ     .+4             ;YES
1107  003220  104020                           HLT     !BA             ;NO
1108  003222  104400                   TST12:  SCOPE
1109
1110                                   ;CAN WE SET ALL BITS IN RSWC REGISTER
1111
1112  003224  012777  177777  175656           MOV     #177777,@RSWC   ;SET WC BITS   .
1113  003232  022777  177777  175650           CMP     #177777,@RSWC   ;ARE ALL BITS SET
1114  003240  001401                           BEQ     .+4             ;YES
1115  003242  104010                           HLT     .WC             ;NO
1116  003244  012777  125252  175636           MOV     #125252,@RSWC   ;SET THESE BITS
1117  003252  022777  125252  175630           CMP     #125252,@RSWC   ;ARE THEY =
1118  003260  001401                           BEQ     .+4             ;YES
1119  003262  104010                           HLT     !WC             ;SHOULD BE 125252
1120  003264  012777  052525  175616           MOV     #52525,@RSWC    ;SET THESE BITS
1121  003272  022777  052525  175610           CMP     #52525,@RSWC    ;ARE THEY =
1122  003300  001401                           BEQ     .+4             ;YES
1123  003302  104010                           HLT     .WC             ;SHOULD BE 152525
1124  003304  104400                   TST13:  SCOPE
1125
1126                                   ;FLOAT A 1 THROUGH RSWC
1127
1128  003306  012701  000001           FLOTWC: MOV     #1,GOOD         ;GET A 1
1129  003312  000241                           CLC                     ;CLEAR CARRY
1130  003314  010177  175570           1$:     MOV     GOOD,@RSWC      ;FLOAT NUMBER
1131  003320  017700  175564                   MOV     @RSWC,BAD       ;GET WC
1132  003324  020100                           CMP     GOOD,BAD        ;COMPARE WC
1133  003326  001401                           BEQ     .+4             ;WC CORRECT
1134  003330  104000                           HLT                     ;BAD=WC GOOD=CORRECT ANS
1135  003332  006101                           ROL     GOOD            ;ROTATE NUMBER
1136  003334  103367                           BCC     1$              ;LOOP TILL DONE
```

```
1137                                    ;CLEAR THE WORD COUNT REGISTER
1138  003336  104400                    TST14:  SCOPE
1139
1140  003340  012777  177777  175542            MOV     #177777,@RSWC   ;SET RSWC REGISTER EQUAL TO ALL ONES
1141  003346  005077  175536                    CLR     @RSWC
1142  003352  005777  175532                    TST     @RSWC           ;DID ALL BITS GET CLEARED
1143  003356  001401                            BEQ     .+4             ;YES
1144  003360  104010                            HLT     !WC             ;NO
1145  003362  104400                    TST15:  SCOPE
1146
1147                                    ;CAN WE SET ALL THE BITS IN THE RSDA REGISTER.
1148
1149  003364  012777  177777  175522            MOV     #177777,@RSDA   ;SET ALL BITS
1150  003372  022777  177777  175514            CMP     #177777,@RSDA   ;ARE THE BITS SET
1151  003400  001401                            BEQ     .+4             ;YES
1152  003402  104004                            HLT     .DA             ;NO
1153  003404  012777  125252  175502            MOV     #125252,@RSDA   ;SET THESE BITS
1154  003412  022777  125252  175474            CMP     #125252,@RSDA   ;ARE THEY =
1155  003420  001401                            BEQ     .+4             ;YES
1156  003422  104004                            HLT     .DA             ;SHOULD BE 125252
1157  003424  012777  052525  175462            MOV     #52525,@RSDA    ;SET THESE BITS
1158  003432  022777  052525  175454            CMP     #52525,@RSDA    ;ARE THEY =
1159  003440  001401                            BEQ     .+4             ;YES
1160  003442  104004                            HLT     .DA             ;SHOULD BE 52525
1161  003444  104400                    TST16:  SCOPE
1162
1163                                    ;FLOAT A 1 THROUGH RSDA
1164
1165  003446  012701  000001            FLOTDA: MOV     #1,GOOD         ;GET A 1
1166  003452  000241                            CLC                     ;CLEAR CARRY
1167  003454  010177  175434            1$:     MOV     GOOD,@RSDA      ;FLOAT NUMBER
1168  003460  017700  175430                    MOV     @RSDA,BAD       ;GET DA
1169  003464  020100                            CMP     GOOD,BAD        ;COMPARE DA
1170  003466  001401                            BEQ     .+4             ;DA CORRECT
1171  003470  104000                            HLT                     ;BAD-DA GOOD=CORRECT ANS
1172  003472  006101                            ROL     GOOD            ;ROTATE NUMBER
1173  003474  103367                            BCC     1$              ;LOOP TILL DONE
```

```
1174
1175  003476  104400                   ;CAN WE CLEAR THE RSDA REG.
                                TST17:  SCOPE
1176
1177  003500  012777  177777  175406           MOV     #177777,@RSDA   ;SET RSDA TO ALL ONES
1178  003506  005077  175402                   CLR     @RSDA
1179  003512  005777  175376                   TST     @RSDA           ;TEST FOR ZERO RSDA
1180  003516  001401                           BEQ     .+4             ;YES
1181  003520  104004                           HLT     !DA             ;ANS SHOULD BE 0
1182  003522  104400                   TST20:  SCOPE
1183
1184                                   ;SET AND CLEAR THE RSER REG.
1185
1186  003524  012777  177777  175366           MOV     #177777,@RSER   ;SET THESE BITS
1187  003532  022777  177017  175360           CMP     #177017,@RSER   ;DID THEY SET
1188  003540  001401                           BEQ     .+4             ;YES
1189  003542  104002                           HLT     !ER             ;RSER SHOULD = 157017
1190  003544  112777  000001  175346           MOVB    #1,@RSER        ;A MOVB INST
1191  003552  022777  000001  175340           CMP     #1,@RSER        ;SHOULD MODIFY COMPLETE WD
1192  003560  001401                           BEQ     .+4             ;OK
1193  003562  104002                           HLT     !ER
1194
1195  003564  104400                   TST21:  SCOPE
1196
1197  003566  012777  052005  175324           MOV     #52005,@RSER    ;SET THESE BITS
1198  003574  022777  052005  175316           CMP     #52005,@RSER    ;DID THEY SET
1199  003602  001401                           BEQ     .+4             ;YES
1200  003604  104002                           HLT     !ER             ;ER SHOULD = 52005
1201  003606  104400                   TST22:  SCOPE
1202
1203  003610  012777  125012  175302           MOV     #125012,@RSER   ;SET THESE BITS
1204  003616  022777  125012  175274           CMP     #125012,@RSER   ;DID THEY SET
1205  003624  001401                           BEQ     .+4             ;YES
1206  003626  104002                           HLT     !ER             ;ER SHOULD = 105012
```

```
1207  003630  104400                   TST23:  SCOPE
1208
1209  003632  012777  177017  175260           MOV     #177017,@RSER   ;SET THESE BITS
1210  003640  005077  175254                   CLR     @RSER           ;CLEAR THEM
1211  003644  005777  175250                   TST     @RSER           ;DID THEY CLEAR
1212  003650  001401                           BEQ     .+4             ;YES
1213  003652  104002                           HLT     .ER             ;SHOULD = 0
1214  003654  104400                   TST24:  SCOPE
1215
1216                                   ;SET AND CLEAR RSMR
1217
1218  003656  012777  000070  175244           MOV     #70,@RSMR       ;SET THESE BITS
1219  003664  017737  175240  001174           MOV     @RSMR,WORK      ;PUT INTO WORKABLE REG
1220  003672  042737  177700  001174           BIC     #177700,WORK    ;CLEAR JUNK
1221  003700  022737  000070  001174           CMP     #70,WORK        ;DID THEY SET
1222  003706  001401                           BEQ     .+4             ;YES
1223  003710  104220                           HLT     .MR             ;SHOULD   70
1224  003712  104400                   TST25:  SCOPE
1225
1226  003714  012777  000070  175206           MOV     #70,@RSMR       ;SET BITS
1227  003722  005077  175202                   CLR     @RSMR           ;CLEAR THEM
1228  003726  032777  000077  175174           BIT     #77,@RSMR       ;DID THEY CLEAR
1229  003734  001401                           BEQ     .+4             ;YES
1230  003736  104220                           HLT     .MR             ;BITS (77) SHOULD - 0
1231  003740  104400                   TST26:  SCOPE
1232
1233  003742  012777  000050  175160           MOV     #50,@RSMR       ;SET BITS
1234  003750  017737  175154  001174           MOV     @RSMR,WORK      ;PUT IN WORKABLE REG
1235  003756  042737  177700  001174           BIC     #177700,WORK    ;CLEAR JUNK
1236  003764  022737  000050  001174           CMP     #50,WORK        ;DID THESE BITS SET
1237  003772  001401                           BEQ     .+4             ;YES
1238  003774  104220                           HLT     !MR             ;BITS (50) SHOULD BE SET
1239  003776  104400                   TST27:  SCOPE
1240
1241  004000  012777  000020  175122           MOV     #20,@RSMR       ;SET BITS
1242  004006  017737  175116  001174           MOV     @RSMR,WORK      ;PUT INTO WORKABLE REG
1243  004014  042737  177700  001174           BIC     #177700,WORK    ;CLEAR JUNK
1244  004022  022737  000020  001174           CMP     #20,WORK        ;DID THEY SET
1245  004030  001401                           BEQ     .+4             ;YES
1246  004032  104220                           HLT     .MR             ;MR SHOULD AT LEAST HAVE A (21)
```

```
                        ;*****************************************************************************
                        ;TEST 30                    LOAD RANDOM NUMBERS INTO RSWC, RSDA AND RSBA
                        ;*****************************************************************************
004034  104400          TST30:  SCOPE

004036  012737  001000  001174  RANTS:  MOV     #1000,WORK      ;MAKE TABLE 1000 WDS LONG
004044  012701  027454          MOV     #OUTBUF,R1      ;GET SRARTING LOC OF TABLE
004050  004537  026724          JSR     R5,RANDOM       ;GENERATE #
004054  012704  027454          MOV     #OUTBUF,R4      ;SETUP FOR COMPARE
004060  012737  004066  001010  MOV     #LOP1,LAD       ;SETUP LOOP ADDR
004066  012703  001000  LOP1:   MOV     #1000,R3        ;LOAD TEST COUNTER
004072  005303          4$:     DEC     R3              ;DONE WITH COMPARE?
004074  001413                  BEQ     1$              ;YES
004076  013705  001110          MOV     RSWC,R5         ;GET WC ADDRESS
004102  011415                  MOV     (R4),(R5)       ;LOAD WC
004104  021524                  CMP     (R5),(R4)+      ;IS IT CORRECT?
004106  001771                  BEQ     4$              ;YES
004110  017700  174774          MOV     @RSWC,BAD       ;GET BAD WC
004114  014401                  MOV     -(R4),GOOD      ;GET GOOD ANS
004116  104000                  HLT                     ;TYPE THEM OUT
004120  005724                  TST     (R4)+           ;UPDATE RANDOM NUMBER
004122  000763                  BR      4$              ;CONT
004124  012704  027454  1$:     MOV     #OUTBUF,R4      ;GET STARTING LOC OF TABLE
004130  012737  004136  001010  MOV     #LOP2,LAD       ;SETUP LOOP ADDR
004136  012703  001000  LOP2:   MOV     #1000,R3        ;SETUP TEST COUNTER
004142  005303          3$:     DEC     R3              ;DONE YET?
004144  001413                  BEQ     1$              ;YES
004146  013705  001114          MOV     RSDA,R5         ;LOAD DA ADDRESS INTO R5
004152  011415                  MOV     (R4),(R5)       ;LOAD DA
004154  021524                  CMP     (R5),(R4)+      ;IS IT CORRECT?
004156  001771                  BEQ     3$              ;YES
004160  017700  174730          MOV     @RSDA,BAD       ;GET BAD DATA
004164  014401                  MOV     -(R4),GOOD      ;GET GOOD DATA
004166  104000                  HLT                     ;TYPE IT OUT
004170  005724                  TST     (R4)+           ;UPDATE RANDOM NUMBER
004172  000763                  BR      3$              ;CONTINUE
004174  012704  027454  1$:     MOV     #OUTBUF,R4      ;GET STARTING LOC OF TABLE
004200  012737  004206  0010C0  MOV     #LOP3,LAD       ;SETUP LOOP ADDR
004206  012703  001000  LOP3:   MOV     #1000,R3        ;SETUP TEST COUNTER
004212  005303          3$:     DEC     R3              ;DONE YET?
004214  001416                  BEQ     2$              ;YES
004216  013705  001112          MOV     RSBA,R5         ;LOAD ADDRESS OF BA INTO R5
004222  011415                  MOV     (R4),(R5)       ;LOAD BA
004224  042714  000001          BIC     #BIT0,(R4)      ;CLEAR BIT 0
004230  021514                  CMP     (R5),(R4)       ;IS IT CORRECT?
004232  001767                  BEQ     3$              ;YES
004234  017700  174652          MOV     @RSBA,BAD       ;GET BAD DATA
004240  011401                  MOV     (R4),GOOD       ;GET GOOD DATA
004242  104000                  HLT                     ;TYPE IT OUT
004244  000400                  BR      1$              ;GET OUT
004246  005724          1$:     TST     (R4)+           ;GET NEW NUMBER
004250  000760                  BR      3$              ;CONTINUE
004252  000240          2$:     NOP
```

```
1300                                    ;*****************************************************************************
1301                                    ;TEST 31                TEST ODD BYTE INSTRUCTIONS ON CS1, CS2, WC AND BA
1302                                    ;*****************************************************************************
1303  004254  104400                   TST31:  SCOPE
1304
1305  004256  104414                   BITST:  CLRDK                           ;CLEAR ALL RS REG
1306  004260  012777  003566  174616           MOV     #3566,@RSCS1           ;LOAD CS1
1307  004266  112777  000005  174644           MOVB    #5,@RSCS1B             ;LOAD BIT
1308  004274  022777  006766  174602           CMP     #6766,@RSCS1           ;DID IT LOAD?
1309  004302  001401                          BEQ     .+4                    ;YES
1310  004304  104001                          HLT     !CS1
1311  004306  112777  000032  174570           MOVB    #32,@RSCS1
1312  004314  022777  006632  174562           CMP     #6632,@RSCS1
1313  004322  001401                          BEQ     .+4
1314  004324  104001                          HLT     .CS1                   ;CS1 SHOULD = 6632
1315
1316  004326  104400                   TST32:  SCOPE
1317
1318  004330  013777  001152  174550  BITCS2: MOV     UNNUM,@RSCS2           ;LOAD UNIT NUMBER
1319  004336  052777  177400  174542           BIS     #177400,@RSCS2         ;LOAD ALL BITS
1320  004344  105077  174572                   CLRB    @RSCS2B                ;CLR UPPER BYTE
1321  004350  013701  001152                   MOV     UNNUM,GOOD             ;GET UNIT NO.
1322  004354  052701  000100                   BIS     #100,GOOD              ;SET OR BIT
1323  004360  017700  174522                   MOV     @RSCS2,BAD             ;GET CS2
1324  004364  020001                          CMP     BAD,GOOD               ;IS CS2 CORRECT?
1325  004366  001401                          BEQ     .+4                    ;YES
1326  004370  104000                          HLT                            ;LOAD BYTE DID NOT WORK
1327
1328  004372  104400                   TST33:  SCOPE
1329
1330  004374  012777  025252  174506  BITWC:  MOV     #25252,@RSWC           ;LOAD WC
1331  004402  112777  000377  174534           MOVB    #377,@RSWCB            ;LOAD BIT
1332  004410  022777  177652  174472           CMP     #177652,@RSWC          ;DID IT LOAD?
1333  004416  001401                          BEQ     .+4                    ;YES
1334  004420  104010                          HLT     !WC                    ;NO WC SHOULD =177652
1335  004422  112777  000123  174460           MOVB    #123,@RSWC
1336  004430  022777  177523  174452           CMP     #177523,@RSWC
1337  004436  001401                          BEQ     .+4
1338  004440  104010                          HLT     !WC                    ;WC SHOULD = 177523
1339
1340  004442  104400                   TST34:  SCOPE
1341
1342  004444  012777  025252  174440  BITBA:  MOV     #25252,@RSBA           ;LOAB DA
1343  004452  112777  000377  174466           MOVB    #377,@RSBAB            ;LOAD BIT
1344  004460  022777  177652  174424           CMP     #177652,@RSBA          ;DID IT LOAD?
1345  004466  001401                          BEQ     .+4                    ;YES
1346  004470  104020                          HLT     .BA                    ;DA SHOULD =177652
1347  004472  112777  000125  174412           MOVB    #125,@RSBA
1348  004500  022777  177524  174404           CMP     #177524,@RSBA
1349  004506  001401                          BEQ     .+4
1350  004510  104020                          HLT     !BA                    ;BA SHOULD = 177525
1351  004512  104414                          CLRDK                          ;CLEAR ALL RS REG
```

```
1352                                    ;*************************************************************************
1353                                    ;TEST 35                    TEST DATA LATE IN CS2
1354                                    ;*************************************************************************
1355  004514  104400                    TST35:  SCOPE
1356
1357                                    ;DO A READ FROM SILO: SHOULD GET DLT + TRE ERROR BECAUSE SILO IS EMPTY
1358
1359  004516  104414                    SILOB:  CLRDK                           ;CLEAR ALL RS REG
1360  004520  017700  174402                    MOV     @RSDB,BAD               ;READ FROM EMPTY SILO
1361  004524  017700  174356                    MOV     @RSCS2,BAD              ;GET CS2
1362  004530  012701  100100                    MOV     #100100,GOOD            ;GET CORRECT ANS
1363  004534  053701  001152                    BIS     UNNUM,GOOD              ;FOR CS2
1364  004540  020001                            CMP     BAD,GOOD                ;IS CS2 CORRECT?
1365  004542  001401                            BEQ     .+4                     ;YES
1366  004544  104200                            HLT     !CS2                    ;SHOULD HAVE DLT ERROR
1367  004546  022777  144200  174330            CMP     #144200,@RSCS1          ;DID SC AND TRE SET?
1368  004554  001401                            BEQ     .+4                     ;YES
1369  004556  104001                            HLT     .CS1                    ;SC AND TRE SHOULD BE SET
1370  004560  012777  040000  174316            MOV     #TRE,@RSCS1             ;CLEARS ERROR BIT
1371  004566  032777  140000  174310            BIT     #140000,@RSCS1          ;DID SC + TRE CLEAR
1372  004574  001401                            BEQ     .+4                     ;YES
1373  004576  104001                            HLT     !CS1                    ;TRE AND SC SHOULD BE 0
1374  004600  017700  174302                    MOV     @RSCS2,BAD              ;GET CS2
1375  004604  042701  100000                    BIC     #BIT15,GOOD             ;GET CORRECT ANS
1376  004610  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
1377  004612  001401                            BEQ     .+4                     ;YES
1378  004614  104200                            HLT     .CS2                    ;DLT SHOULD BE 0
1379                                    ;*************************************************************************
1380                                    ;TEST 36                    LOAD RSDB WITH ALL ONES AND ALL ZEROS
1381                                    ;*************************************************************************
1382  004616  104400                    TST36:  SCOPE
1383
1384  004620  104414                    ZERONE: CLRDK                           ;CLEAR ALL RS REG
1385  004622  005077  174300                    CLR     @RSDB                   ;LOAD DB WITH ALL 0
1386  004626  012777  177777  174272            MOV     #177777,@RSDB           ;LOAD DB WITH ALL ONES
1387  004634  012737  002000  001174            MOV     #2000,WORK              ;TIME OUT ROUTINE
1388  004642  012701  000300                    MOV     #300,GOOD               ;GET CORRECT FOR CS2
1389  004646  053701  001152                    BIS     UNNUM,GOOD
1390  004652  017700  174230            2$:     MOV     @RSCS2,BAD              ;GET CS2
1391  004656  020100                            CMP     GOOD,BAD                ;IS IT CORRECT?
1392  004660  001404                            BEQ     3$                      ;YES
1393  004662  005337  001174                    DEC     WORK                    ;TO WAIT FOR OR
1394  004666  001371                            BNE     2$                      ;TO SET
1395  004670  104200                            HLT     !CS2                    ;OR SHOULD BE SET
1396  004672  005001                    3$:     CLR     GOOD
1397  004674  017700  174226                    MOV     @RSDB,BAD               ;LOAD BAD WITH DB
1398  004700  020100                            CMP     GOOD,BAD                ;IS BAD CORRECT
1399  004702  001401                            BEQ     .+4                     ;YES
1400  004704  104000                            HLT                             ;COULD NOT FLOAT 0 THROUGH DB
1401  004706  012701  177777                    MOV     #-1,GOOD                ;LOAD GOOD WITH ANS
1402  004712  017700  174210                    MOV     @RSDB,BAD               ;GET DATA FROM DB
1403  004716  020100                            CMP     GOOD,BAD                ;IS DB CORRECT
1404  004720  001401                            BEQ     .+4                     ;YES
1405  004722  104000                            HLT                             ;BAD SHOULD = 177777
```

```
1406  004724  104400                  TST37:  SCOPE
1407                                  ;TEST FOR 66 LOCATIONS IN SILO PUT COUNT IN EVERY LOCATION
1408
1409  004726  104414                  SILO:   CLRDK                   ;CLEAR ALL RS REG
1410  004730  005001                          CLR     R1              ;CLEAR COUNTER
1411  004732  005201                  1$:     INC     R1              ;INCREMENT COUNTER
1412  004734  010177  174166                  MOV     R1,@RSDB        ;LOAD SILO
1413  004740  022701  000102                  CMP     #66.,R1         ;LAST LOC. YET?
1414  004744  001372                          BNE     1$              ;NO LOOP AGAIN
1415  004746  012701  000200                  MOV     #200,GOOD       ;GET CORRECT ANS FOR CS2
1416  004752  053701  001152                  BIS     UNNUM,GOOD
1417  004756  017700  174124                  MOV     @RSCS2,BAD      ;GET CS2
1418  004762  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
1419  004764  001401                          BEQ     .+4             ;YES
1420  004766  104200                          HLT     !CS2            ;OR SHOULD BE 1
1421  004770  005001                          CLR     GOOD            ;CLEAR LOCATION COUNTER
1422  004772  005201                  2$:     INC     GOOD            ;ADD 1 TO IT
1423  004774  022701  000103                  CMP     #67.,GOOD       ;LAST LOC YET?
1424  005000  001405                          BEQ     3$              ;YES
1425  005002  017700  174120                  MOV     @RSDB,BAD       ;GET LOC FROM DB
1426  005006  020100                          CMP     GOOD,BAD        ;DO LOCATIONS MATCH?
1427  005010  001770                          BEQ     2$              ;YES
1428  005012  104000                          HLT                     ;CAN NOT MATCH 66 LOCATIONS
1429  005014  032777  000200  174064  3$:     BIT     #OR,@RSCS2      ;IS OR 0
1430  005022  001401                          BEQ     .+4             ;YES
1431  005024  104200                          HLT     !CS2            ;OR SHOULD BE 0
1432
1433                                  ;NOW PUT 67 WORDS INTO SILO AND CHECK FOR DLT ERROR
1434
1435  005026  005001                          CLR     R1              ;CLEAR COUNTER
1436  005030  005201                  4$:     INC     R1              ;ADD 1 TO COUNT
1437  005032  010177  174070                  MOV     R1,@RSDB        ;PUT INTO COUNTER
1438  005036  022701  000103                  CMP     #67.,R1         ;DONE YET?
1439  005042  001401                          BEQ     .+4             ;YES
1440  005044  000771                          BR      4$              ;NO DO AGAIN
1441  005046  032777  100000  174032          BIT     #DLT,@RSCS2     ;DID DATA LATE SET?
1442  005054  001001                          BNE     .+4             ;YES
1443  005056  104200                          HLT     .CS2            ;DLT DID NOT SET
1444
1445                                  ;DOES SILO CHANGE WITH 67TH WORD: IT SHOULD NOT
1446
1447  005060  017700  174042                  MOV     @RSDB,BAD       ;GET 1ST WD FORM SILO
1448  005064  012701  000001                  MOV     #1,GOOD         ;CORRECT ANS OF SILO
1449  005070  020100                          CMP     GOOD,BAD        ;IS SILO GOOD
1450  005072  001401                          BEQ     .+4             ;YES
1451  005074  104000                          HLT                     ;SILO SHOULD NOT HAVE MOVED
1452  005076  104400                  TST40:  SCOPE
```

```
1453                                    ;FLOAT A 1 AND A 0 THROUGH THE SILO
1454
1455  005100  104414                    SILOFL: CLRDK                   ;CLEAR ALL RS REG
1456  005102  000241                            CLC                     ;CLEAR CARRY TO FLOAT A 0
1457  005104  012701  000001                    MOV     #1,GOOD         ;GET UP DATA FOR INPUT TO SILO
1458  005110  010177  174012            1$:     MOV     GOOD,@RSDB      ;LOAD DB
1459  005114  006101                            ROL     GOOD            ;SHIFT BIT
1460  005116  103401                            BCS     .+4             ;DONE YET SHIFTING?
1461  005120  000773                            BR      1$              ;NO
1462  005122  012701  177776                    MOV     #-2,GOOD        ;SET ALL ONES
1463  005126  000261                            SEC                     ;SET CARRY TO ROL
1464  005130  010177  173772            3$:     MOV     GOOD,@RSDB      ;LOAD SILO
1465  005134  006101                            ROL     GOOD            ;SHILT 0
1466  005136  103774                            BCS     3$              ;LOOP TILL DONE
1467
1468                                    ;NOW TEST OUTPUT
1469
1470  005140  000241                            CLC                     ;CLEAR CARRY
1471  005142  012701  000001                    MOV     #1,GOOD         ;CORRECT ANS
1472  005146  017700  173754            2$:     MOV     @RSDB,BAD       ;GET DATA FROM DB
1473  005152  020100                            CMP     GOOD,BAD        ;IS DB DATA GOOD?
1474  005154  001401                            BEQ     .+4             ;YES
1475  005156  104000                            HLT                     ;DB COULD NOT BUBBLE CORRECTLY
1476  005160  006101                            ROL     GOOD            ;SETUP FOR NEXT ANS
1477  005162  103401                            BCS     .+4             ;DONE YET?
1478  005164  000770                            BR      2$              ;NO
1479  005166  012701  177776                    MOV     #-2,GOOD        ;SETUP FOR ANS
1480  005172  017700  173730            4$:     MOV     @RSDB,BAD       ;GET DATA FROM DB
1481  005176  020100                            CMP     GOOD,BAD        ;IS IT CORRECT?
1482  005200  001401                            BEQ     .+4             ;YES
1483  005202  104000                            HLT                     ;DB WRONG
1484  005204  000261                            SEC                     ;SET CARRY TO ROL
1485  005206  006101                            ROL     GOOD            ;SETUP FOR NEXT ANS
1486  005210  103770                            BCS     4$              ;LOOP TILL DONE
```

```
1487                                    ;*****************************************************************************
1488                                    ;TEST 41                    TEST NO-OP FUNCTION
1489                                    ;*****************************************************************************
1490   005212  104400                   TST41:  SCOPE
1491
1492   005214  104414                   NOOP:   CLRDK                           ;CLEAR ALL RS REG
1493   005216  012737  177777  027454           MOV     #177777,OUTBUF        ;DATA TO BE XFERED
1494   005224  013777  001102  173660           MOV     @#OBUFSV,@RSBA        ;SET UP CURRENT ADDRESS
1495   005232  012777  177777  173650           MOV     #-1,@RSWC             ;LOAD WC WITH -1
1496   005240  012777  000001  173636           MOV     #1,@RSCS1             ;DO NO-OP FUNCTION
1497   005246  032777  000001  173630           BIT     #1,@RSCS1             ;DID GO BIT CLEAR
1498   005254  001401                           BEQ     .+4                   ;YES
1499   005256  104001                           HLT     .CS1                  ;GO BIT SHOULD BE CLEARED
1500   005260  005777  173634                   TST     @RSER                 ;DID ANY ERRORS OCCURR?
1501   005264  001401                           BEQ     .+4                   ;NO
1502   005266  104002                           HLT     !ER                   ;ALL ERROR BITS SHOULD BE 0
1503   005270  022777  177777  173612           CMP     #-1,@RSWC             ;DID WC MOVE?
1504   005276  001401                           BEQ     .+4                   ;NO
1505   005300  104010                           HLT     .WC                   ;WC SHOULD - 1777777
1506   005302  005777  173606                   TST     @RSDA                 ;DID DA MOV
1507   005306  001401                           BEQ     .+4                   ;NO
1508   005310  104004                           HLT     .DA                   ;DA SHOULD -0
1509   005312  023777  001102  173572           CMP     @#OBUFSV,@RSBA        ;DID BA MOVE
1510   005320  001401                           BEQ     .+4                   ;NO
1511   005322  104020                           HLT     .BA                   ;BA MOVED
1512   005324  033777  001156  173570           BIT     UNCMP,@RSAS           ;AS SHOULD NOT SET ON
1513   005332  001401                           BEQ     .+4                   ;A NO-OP FUNCTION
1514   005334  104100                           HLT     .AS                   ;AS SET WHY?
```

```
1515                                    ;*************************************************************************
1516                                    ;TEST 42                TEST NO-OP FUNCTION WITH ERROR BITS SET
1517                                    ;*************************************************************************
1518  005336  104400                    TST42:  SCOPE
1519
1520  005340  104414                    NNOOP:  CLRDK                           ;CLEAR ALL RS REG
1521  005342  012777  000007  173550            MOV     #7,@RSER               ;LOAD ER
1522  005350  033777  001156  173544            BIT     UNCMP,@RSAS            ;IS ATA BIT SET?
1523  005356  001001                            BNE     .+4                    ;YES
1524  005360  104100                            HLT     !AS                    ;AS BIT SHOULD BE SET
1525  005362  012737  177777  027454            MOV     #177777,OUTBUF         ;DATA TO BE XFERED
1526  005370  013777  001102  173514            MOV     @#OBUFSV,@RSBA         ;SET UP CURRENT ADDRESS
1527  005376  012777  177777  173504            MOV     #-1,@RSWC              ;LOAD WC WITH -1
1528  005404  012777  000001  173472            MOV     #1,@RSCS1              ;DO NO-OP FUNCTION
1529  005412  032777  000001  173464            BIT     #1,@RSCS1              ;DID GO BIT CLEAR
1530  005420  001401                            BEQ     .+4                    ;YES
1531  005422  104001                            HLT     !CS1                   ;GO BIT SHOULD BE CLEARED
1532  005424  022777  150600  173464            CMP     #150600,@RSDS          ;DID ERR BITS SET?
1533  005432  001401                            BEQ     .+4                    ;NO
1534  005434  104040                            HLT     .DS                    ;ERR BIT SHOULD BE 0
1535  005436  022777  177777  173444            CMP     #-1,@RSWC              ;DID WC MOVE?
1536  005444  001401                            BEQ     .+4                    ;NO
1537  005446  104010                            HLT     !WC                    ;WC SHOULD = 1777777
1538  005450  005777  173440                    TST     @RSDA                  ;DID DA MOV
1539  005454  001401                            BEQ     .+4                    ;NO
1540  005456  104004                            HLT     .DA                    ;DA SHOULD =0
1541  005460  023777  001102  173424            CMP     @#OBUFSV,@RSBA         ;DID BA MOVE
1542  005466  001401                            BEQ     .+4                    ;NO
1543  005470  104020                            HLT     .BA                    ;BA MOVED
1544  005472  033777  001156  173422            BIT     UNCMP,@RSAS            ;AS SHOULD BE SET
1545  005500  001001                            BNE     .+4                    ;IS IT?
1546  005502  104100                            HLT     .AS                    ;NO
1547  005504  022777  000007  173406            CMP     #7,@RSER               ;DID ER CHANGE?
1548  005512  001401                            BEQ     .+4                    ;NO
1549  005514  104002                            HLT     .ER                    ;ER SHOULD NOT CHANGE
```

```
                                ;*****************************************************************************
                                ;TEST 43                    TEST NO-OP FUNCTION CODE 21
                                ;*****************************************************************************
005516  104400                  TST43:  SCOPE

005520  104414                  NOOP21: CLRDK                           ;CLEAR ALL RS REG
005522  012737  177777  027454          MOV     #177777,OUTBUF          ;DATA TO BE XFERED
005530  013777  001102  173354          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
005536  012777  177777  173344          MOV     #-1,@RSWC               ;LOAD WC WITH -1
005544  012777  000021  173332          MOV     #21,@RSCS1              ;DO NO-OP FUNCTION
005552  032777  000001  173324          BIT     #1,@RSCS1               ;DID GO BIT CLEAR
005560  001401                          BEQ     .+4                     ;YES
005562  104001                          HLT     .CS1                    ;GO BIT SHOULD BE CLEARED
005564  005777  173330                  TST     @RSER                   ;DID ANY ERRORS OCCURR?
005570  001401                          BEQ     .+4                     ;NO
005572  104002                          HLT     .ER                     ;ALL ERROR BITS SHOULD BE 0
005574  022777  177777  173306          CMP     #-1,@RSWC               ;DID WC MOVE?
005602  001401                          BEQ     .+4                     ;NO
005604  104010                          HLT     .WC                     ;WC SHOULD = 1777777
005606  005777  173302                  TST     @RSDA                   ;DID DA MOV
005612  001401                          BEQ     .+4                     ;NO
005614  104004                          HLT     !DA                     ;DA SHOULD -0
005616  023777  001102  173266          CMP     @#OBUFSV,@RSBA          ;DID BA MOVE
005624  001401                          BEQ     .+4                     ;NO
005626  104020                          HLT     .BA                     ;BA MOVED
005630  033777  001156  173264          BIT     UNCMP,@RSAS             ;AS SHOULD NOT SET ON
005636  001401                          BEQ     .+4                     ;A NO-OP FUNCTION
005640  104100                          HLT     .AS                     ;AS SET WHY?
005642  022777  004220  173234          CMP     #4220,@RSCS1            ;IS CS1 CORRECT?
005650  001401                          BEQ     .+4                     ;YES
005652  104040                          HLT     .DS                     ;CS1 SHOULD   4220
```

```
1581                                    ;*****************************************************************************
1582                                    ;TEST 44                    TEST NO-OP FUNCTION CODE 21 WITH ERROR BITS SET
1583                                    ;*****************************************************************************
1584  005654  104400                    TST44:  SCOPE
1585
1586  005656  104414                    NNOP21: CLRDK                           ;CLEAR ALL RS REG
1587  005660  012777  000007  173232            MOV     #7,@RSER                ;LOAD ER
1588  005666  033777  001156  173226            BIT     UNCMP,@RSAS             ;IS ATA BIT SET?
1589  005674  001001                            BNE     .+4                     ;YES
1590  005676  104100                            HLT     !AS                     ;AS BIT SHOULD BE SET
1591  005700  012737  177777  027454            MOV     #177777,OUTBUF          ;DATA TO BE XFERED
1592  005706  013777  001102  173176            MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
1593  005714  012777  177777  173166            MOV     #-1,@RSWC               ;LOAD WC WITH -1
1594  005722  012777  000021  173154            MOV     #21,@RSCS1              ;DO NO-OP FUNCTION
1595  005730  032777  000001  173146            BIT     #1,@RSCS1               ;DID GO BIT CLEAR
1596  005736  001401                            BEQ     .+4                     ;YES
1597  005740  104001                            HLT     !CS1                    ;GO BIT SHOULD BE CLEARED
1598  005742  022777  150600  173146            CMP     #150600,@RSDS           ;DID ERR BITS SET?
1599  005750  001401                            BEQ     .+4                     ;NO
1600  005752  104040                            HLT     .DS                     ;ERR BIT SHOULD BE 0
1601  005754  022777  177777  173126            CMP     #-1,@RSWC               ;DID WC MOVE?
1602  005762  001401                            BEQ     .+4                     ;NO
1603  005764  104010                            HLT     !WC                     ;WC SHOULD = 1777777
1604  005766  005777  173122                    TST     @RSDA                   ;DID DA MOV
1605  005772  001401                            BEQ     .+4                     ;NO
1606  005774  104004                            HLT     .DA                     ;DA SHOULD =0
1607  005776  023777  001102  173106            CMP     @#OBUFSV,@RSBA          ;DID BA MOVE
1608  006004  001401                            BEQ     .+4                     ;NO
1609  006006  104020                            HLT     !BA                     ;BA MOVED
1610  006010  033777  001156  173104            BIT     UNCMP,@RSAS             ;AS SHOULD BE SET
1611  006016  001001                            BNE     .+4                     ;IS IT?
1612  006020  104100                            HLT     .AS                     ;NO
1613  006022  022777  000007  173070            CMP     #7,@RSER                ;DID ER CHANGE?
1614  006030  001401                            BEQ     .+4                     ;NO
1615  006032  104002                            HLT     .ER                     ;ER SHOULD NOT CHANGE
1616  006034  022777  104220  173042            CMP     #104220,@RSCS1          ;IS CS1 CORRECT?
1617  006042  001401                            BEQ     .+4                     ;YES
1618  006044  104040                            HLT     !DS                     ;CS1 SHOULD = 104220
```

```
                                        ;*************************************************************************
                                        ;TEST 45                  TEST DRIVE CLEAR FUNCTION WITH ERRORS SET
                                        ;*************************************************************************
006046  104400                  TST45:  SCOPE
                                ;FIRST SET ALL R/W BITS IN DISK REG
                                ;DO DRIVE CLEAR-ALL R/W BITS SHOULD BE CLEARED

006050  104414                  DRCLR:  CLRDK                           ;CLEAR ALL RS REG
006052  012777  177777  173030          MOV     #177777,@RSWC           ;LOAD RSWC
006060  012777  177777  173026          MOV     #177777,@RSDA           ;SET ALL POSSIBLE
006066  012777  177017  173024          MOV     #177017,@RSER           ;BITS IN DISK REG
006074  012777  000070  173026          MOV     #70,@RSMR               ;SET THESE BITS
006102  012777  000011  172774          MOV     #11,@RSCS1              ;SET DRIVE CLEAR
006110  017700  172772                  MOV     @RSCS2,BAD              ;GET CS2 DATA
006114  042700  177640                  BIC     #177640,BAD             ;CLEAR JUNK
006120  013701  001152                  MOV     UNNUM,GOOD              ;GET DRIVE UNIT
006124  052701  000100                  BIS     #100,GOOD               ;SET IR BIT
006130  020100                          CMP     GOOD,BAD                ;IS UNIT # THE SAME
006132  001401                          BEQ     .+4                     ;YES
006134  104000                          HLT                             ;UNIT # IN CS2 GOT MODIFIED
006136  005777  172752                  TST     @RSDA                   ;DID DA CLEAR
006142  001401                          BEQ     .+4                     ;YES
006144  104004                          HLT     !DA                     ;DA SHOULD BE 0
006146  005777  172746                  TST     @RSER                   ;DID ER CLEAR
006152  001401                          BEQ     .+4                     ;YES
006154  104002                          HLT     .ER                     ;ER SHOULD BE CLEARED
006156  017737  172746  001174          MOV     @RSMR,WORK              ;GET MR REG
006164  042737  177707  001174          BIC     #177707,WORK            ;CLEAR JUNK
006172  022737  000070  001174          CMP     #70,WORK                ;IS 70 STILL SET IN MR?
006200  001401                          BEQ     .+4                     ;YES
006202  104220                          HLT     !MR                     ;BITS 70 SHOULD NOT CLEAR
006204  022777  004210  172672          CMP     #4210,@RSCS1            ;DID THESE BITS CLEAR?
006212  001401                          BEQ     .+4                     ;YES
006214  104001                          HLT     .CS1                    ;CS1 SHOULD =4210
006216  033777  001156  172676          BIT     UNCMP,@RSAS             ;AS SHOULD NOT SET
006224  001401                          BEQ     .+4                     ;ON A DRIVE CLEAR FUN
006226  104100                          HLT     .AS                     ;WHY DID AS SET?
006230  022777  177777  172652          CMP     #177777,@RSWC           ;DID RSWC CHANGE?
006236  001401                          BEQ     .+4                     ;NO
006240  104010                          HLT     .WC
```

```
                                    ;DO ONE WORD WRITE
                                    ;*************************************************************************
                                    ;TEST 46                EXECUTE THE ONE WORD WRITE
                                    ;*************************************************************************
006242  104400                      TST46:  SCOPE

006244  104414                      WRTST:  CLRDK                           ;CLEAR ALL RS REG
006246  012737  177777  027454              MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
006254  013777  001102  172630              MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
006262  012777  177777  172620              MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
006270  012777  000060  172606      1$:     MOV     #60,@RSCS1              ;SET FUNCTION WITH NO GO BIT
006276  022777  177777  172604              CMP     #-1,@RSWC               ;DID WC MOVE?
006304  001401                              BEQ     .+4                     ;NO
006306  104010                              HLT     .WC                     ;WC MOVED
006310  023777  001102  172574              CMP     @#OBUFSV,@RSBA          ;DID RSBA MOVE?
006316  001401                              BEQ     .+4                     ;NO
006320  104020                              HLT     .BA                     ;BA MOVED
006322  052777  000001  172554              BIS     #BIT0,@RSCS1            ;SET GO BIT
006330  105777  172550              2$:     TSTB    @RSCS1                  ;TEST FOR RDY=0
006334  100001                              BPL     .+4                     ;RDY=0
006336  104001                              HLT     .CS1                    ;RDY SHOULD = 0
006340  004737  026670                      JSR     PC,WAITRY               ;WAIT FOR READY
006344  104001                              HLT     !CS1                    ;SHOULD = 260 RDY NEVER CAME UP
006346  022777  000001  172540              CMP     #1,@RSDA                ;IS RSDA CORRECT
006354  001401                              BEQ     .+4                     ;RSDA OK
006356  104004                              HLT     !DA                     ;SHOULD = 1 SHOULD INCREMENT
006360  022777  004260  172516      3$:     CMP     #4260,@RSCS1            ;IS ERROR FLAG SET?
006366  001401                              BEQ     .+4                     ;NO. X-FER OK
006370  104047                              HLT     !CS1!ER!DS.DA           ;ERROR DURING X-FER
006372  005777  172512              4$:     TST     @RSWC                   ;FETCH WORD COUNT
006376  001401                              BEQ     .+4                     ;WORD COUNT DID OVERFLOW
006400  104010                              HLT     !WC                     ;SHOULD = 0 FAILED TO INCREMENT
006402  022777  010600  172506              CMP     #10600,@RSDS            ;IS RSDS OK?
006410  001401                              BEQ     .+4                     ;YES
006412  104044                              HLT     .DS.DA                  ;NO
006414  013701  001152                      MOV     UNNUM,GOOD              ;GET UNIT #
006420  052701  000100                      BIS     #100,GOOD               ;SET IR BIT
006424  017700  172456                      MOV     @RSCS2,BAD              ;GET CS2
006430  020100                              CMP     GOOD,BAD                ;IS CS2 CORRECT?
006432  001401                              BEQ     .+4                     ;YES
006434  104000                              HLT                             ;BAD = CS2 GOOD IS CORRECT ANS
006436  017700  172450                      MOV     @RSBA,BAD               ;GET BA DATA
006442  013701  001102                      MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
006446  062701  000002                      ADD     #2,GOOD                 ;UPDATE OUTBUFFER
006452  020100                              CMP     GOOD,BAD                ;IS RSBA CORRECT
006454  001401                              BEQ     .+4                     ;YES
006456  104000                              HLT                             ;BA FAILED TO INCREMENT
006460  005777  172434                      TST     @RSER                   ;DID ANY ERRORS SET?
006464  001401                              BEQ     .+4                     ;NO
006466  104040                              HLT     .DS
```

```
1709                                    ;TEST READ FUNCTION
1710
1711                                    ;*****************************************************************************
1712                                    ;TEST 47                EXECUTE THE ONE WORD READ
1713                                    ;*****************************************************************************
1714  006470  104400                    TST47:  SCOPE
1715
1716  006472  104414                    RDTST:  CLRDK                           ;CLEAR ALL RS REG
1717  006474  005037  027454                    CLR     OUTBUF                  ;CLR TO READ INTO
1718  006500  013777  001102  172404            MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
1719  006506  012777  177777  172374            MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
1720  006514  012777  000071  172362  1$:       MOV     #71,@RSCS1              ;GO READ
1721  006522  105777  172356          2$:       TSTB    @RSCS1                  ;TEST FOR BUSY=1
1722  006526  100001                            BPL     .+4                     ;BUSY SET
1723  006530  104001                            HLT     !CS1                    ;BUSY NOT SET
1724  006532  004737  026670                    JSR     PC,WAITRY               ;WAIT FOR READY
1725  006536  104001                            HLT     .CS1                    ;TIMEOUT RDY DID NOT SET
1726  006540  022777  000001  172346            CMP     #BIT0,@RSDA             ;WAS RSDA INCREMENTED BY 1
1727  006546  001401                            BEQ     .+4                     ;RSDA OK
1728  006550  104046                            HLT     .DA.ER.DS               ;RSDA SHOULD CONTAIN A 1
1729  006552  022777  004270  172324  3$:       CMP     #4270,@RSCS1            ;IS ERROR FLAG SET?
1730  006560  001401                            BEQ     .+4                     ;NO! X-FER OK
1731  006562  104043                            HLT     !CS1!ER.DS              ;RSCS1 SHOULD - 270
1732  006564  005777  172320          4$:       TST     @RSWC                   ;TEST WC
1733  006570  001401                            BEQ     .+4                     ;WORD COUNT DID OVERFLOW
1734  006572  104010                            HLT     !WC                     ;SHOULD = 0
1735  006574  013701  001152                    MOV     UNNUM,GOOD              ;GET CORRECT
1736  006600  052701  000100                    BIS     #100,GOOD               ;ANS OF CS2
1737  006604  017700  172276                    MOV     @RSCS2,BAD              ;GET CS2
1738  006610  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
1739  006612  001401                            BEQ     .+4                     ;YES
1740  006614  104000                            HLT                             ;GOOD = CORRECT ANS FOR CS2
1741  006616  017700  172270                    MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
1742  006622  013701  001102                    MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
1743  006626  062701  000002                    ADD     #2,GOOD                 ;UPDATE IT
1744  006632  020001                            CMP     BAD,GOOD                ;IS RSBA CORRECT
1745  006634  001401                            BEQ     .+4                     ;YES FXECUTE CONTINUE
1746  006636  104000                            HLT                             ;RSBA FAILED TO INCREMENT
1747  006640  013700  027454                    MOV     OUTBUF,BAD              ;GET DATA READ FROM DISK
1748  006644  012701  177777                    MOV     #-1,GOOD                ;GET CORRECT ANS
1749  006650  020100                            CMP     GOOD,BAD                ;IS OUTBUF CORRECT
1750  006652  001401                            BEQ     .+4                     ;YES
1751  006654  104000                            HLT                             ;GOOD=CORRECT ANS BAD-DATA READ FROM DISK
```

```
                                ;*****************************************************************************
                                ;TEST 50                        TEST WRITE CHECK
                                ;*****************************************************************************
006656  104400                  TST50:  SCOPE
                                ;DO A ONE WORD WRITE CHECK
                                ;* * *EXECUTE THE ONE WORD WRITE CHECK* * *
006660  104414                  WRCKT:  CLRDK                           ;CLEAR ALL RS REG
006662  012737  177777  027454          MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
006670  013777  001102  172214          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
006676  012777  177777  172204          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
006704  012777  000051  172172  1$:     MOV     #51,@RSCS1              ;GO WRITE CHECK
006712  105777  172166          2$:     TSTB    @RSCS1                  ;TEST FOR READY
006716  100001                          BPL     .+4                     ;NOT READY
006720  104001                          HLT     .CS1                    ;BUSY FAILED TO SET
006722  004737  026670          RSWCWT: JSR     PC,WAITRY               ;WAIT FOR READY
006726  104001                          HLT     !CS1                    ;BUSY FAILED TO CLEAR
006730  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
006734  052701  000100                  BIS     #100,GOOD               ;SET BIT IR
006740  017700  172142                  MOV     @RSCS2,BAD              ;GET CS2
006744  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
006746  001401                          BEQ     .+4                     ;YES
006750  104000                          HLT                             ;GOOD - CORRECT ANS FOR CS2
006752  022777  004250  172124  2$:     CMP     #4250,@RSCS1            ;ANY ERRORS?
006760  001401                          BEQ     .+4                     ;X-FER OK
006762  104046                          HLT     .DA.ER.DS               ;ERROR DUR X-FER
006764  022777  000001  172122  3$:     CMP     #BIT0,@RSDA             ;WAS DAR INCREMENTED BY 1
006772  001401                          BEQ     .+4                     ;RSDA OK
006774  104004                          HLT     .DA                     ;DAR SHOULD = 1
006776  005777  172106                  TST     @RSWC                   ;TEST FOR OVERFLOW
007002  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
007004  104010                          HLT     .WC                     ;SHOULD = 0
007006  017700  172100                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
007012  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
007016  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
007022  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
007024  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
007026  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
                                        ;*************************************************************************
007030  104400                        TST51:  SCOPE

007032  104414                        WRTSTB: CLRDK                           ;CLEAR ALL RS REG
007034  013737  001102  001174                MOV     @#OBUFSV,WORK   ;GET LOC OF RSBA TO LOAD
007042  012777  177777  172124                MOV     #177777,@WORK   ;DATA TO BE X-FERED
007050  013777  001102  172034                MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
007056  012777  177777  172024                MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
007064  012777  002061  172012                MOV     #2061,@RSCS1    ;TEST B PORT
007072  105777  172006                2$:     TSTB    @RSCS1          ;TEST FOR RDY=0
007076  100001                              BPL     .+4             ;RDY=0
007100  104001                              HLT     .CS1            ;RDY SHOULD = 0
007102  004737  026670                      JSR     PC,WAITRY       ;WAIT FOR READY
007106  104001                              HLT     .CS1            ;SHOULD = 260 RDY NEVER CAME UP
007110  032777  010000  171710              BIT     #BIT12,@SWR     ;INHIBIT ADDRESS?
007116  001006                              BNE     3$              ;YES
007120  032777  004000  171760              BIT     #BIT11,@RSCS2   ;DID NEM SET?
007126  001402                              BEQ     3$              ;NO
007130  000137  025722                      JMP     FINDM           ;GO FIND MEMORY ON PORT B
007134  022777  000001  171752  3$:         CMP     #1,@RSDA        ;IS RSDA CORRECT
007142  001401                              BEQ     .+4             ;RSDA OK
007144  104004                              HLT     .DA             ;SHOULD = 1 SHOULD INCREMENT
007146  022777  006260  171730              CMP     #6260,@RSCS1    ;IS CS1 CORRECT?
007154  001401                              BEQ     4$              ;YES
007156  104001                              HLT     .CS1
007160  005777  171724                4$:     TST     @RSWC           ;FETCH WORD COUNT
007164  001401                              BEQ     .+4             ;WORD COUNT DID OVERFLOW
007166  104010                              HLT     .WC             ;SHOULD = 0 FAILED TO INCREMENT
007170  022777  010600  171720              CMP     #10600,@RSDS    ;IS RSDS OK?
007176  001401                              BEQ     .+4             ;YES
007200  104044                              HLT     .DS!DA          ;NO
007202  013701  001152                      MOV     UNNUM,GOOD      ;GET UNIT #
007206  052701  000100                      BIS     #100,GOOD       ;SET IR BIT
007212  017700  171670                      MOV     @RSCS2,BAD      ;GET CS2
007216  020100                              CMP     GOOD,BAD        ;IS CS2 CORRECT?
007220  001401                              BEQ     .+4             ;YES
007222  104000                              HLT                     ;BAD = CS2 GOOD IS CORRECT AN
007224  017700  171662                      MOV     @RSBA,BAD       ;GET BA DATA
007230  013701  001102                      MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
007234  062701  000002                      ADD     #2,GOOD         ;UPDATE OUTBUFFER
007240  020100                              CMP     GOOD,BAD        ;IS RSBA CORRECT
007242  001401                              BEQ     .+4             ;YES
007244  104000                              HLT                     ;BA FAILED TO INCREMENT
```

```
                                ;*****************************************************************************
                                ;TEST 52                    EXECUTE THE ONE WORD READ ON -B- PORT
                                ;*****************************************************************************
007246  104400                  TST52:  SCOPE

007250  104414                  RDTSTB: CLRDK                           ;CLEAR ALL RS REG
007252  005037  001174                  CLR     WORK                    ;CLR TO READ INTO
007256  013777  001102  171626          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
007264  012777  177777  171616          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
007272  012777  002071  171604          MOV     #2071,@RSCS1            ;B PORT
007300  105777  171600          2$:     TSTB    @RSCS1                  ;TEST FOR BUSY=1
007304  100001                          BPL     .+4                     ;BUSY SET
007306  104001                          HLT     !CS1                    ;BUSY NOT SET
007310  004737  026670                  JSR     PC,WAITRY               ;WAIT FOR READY
007314  104001                          HLT     .CS1                    ;TIMEOUT RDY DID NOT SET
007316  022777  000001  171570          CMP     #BIT0,@RSDA             ;WAS RSDA INCREMENTED BY 1
007324  001401                          BEQ     .+4                     ;RSDA OK
007326  104046                          HLT     .DATER.DS               ;RSDA SHOULD CONTAIN A 1
007330  022777  006270  171546          CMP     #6270,@RSCS1            ;TST B PORT
007336  001401                          BEQ     4$                      ;OK
007340  104001                          HLT     .CS1                    ;CS1 SHOULD - 6270
007342  005777  171542          4$:     TST     @RSWC                   ;TEST WC
007346  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
007350  104010                          HLT     .WC                     ;SHOULD - 0
007352  013701  001152                  MOV     UNNUM,GOOD              ;GET CORRECT
007356  052701  000100                  BIS     #100,GOOD               ;ANS OF CS2
007362  017700  171520                  MOV     @RSCS2,BAD              ;GET CS2
007366  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
007370  001401                          BEQ     .+4                     ;YES
007372  104000                          HLT                             ;GOOD = CORRECT ANS FOR CS2
007374  017700  171512                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
007400  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
007404  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
007410  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
007412  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
007414  104000                          HLT                             ;RSBA FAILED TO INCREMENT
007416  013737  001102  001174          MOV     @#OBUFSV,WORK           ;GET DATA READ FROM DISK
007424  017700  171544                  MOV     @WORK,BAD
007430  012701  177777                  MOV     #-1,GOOD                ;GET CORRECT ANS
007434  020100                          CMP     GOOD,BAD                ;IS OUTBUF CORRECT
007436  001401                          BEQ     .+4                     ;YES
007440  104000                          HLT                             ;GOOD-CORRECT ANS BAD=DATA READ FROM DISK
```

```
                                ;*****************************************************************************
                                ;TEST 53                    TEST WRITE CHECK ON -B- PORT
                                ;*****************************************************************************
007442  104400                  TST53:  SCOPE

007444  104414                  WRCKTB: CLRDK                           ;CLEAR ALL RS REG
007446  013737  001102  001174          MOV     @#OBUFSV,WORK           ;GET LOC FOR
007454  012777  177777  171512          MOV     #177777,@WORK           ;DATA TO BE X-FERED
007462  013777  001102  171422          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
007470  012777  177777  171412          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
007476  012777  002051  171400          MOV     #2051,@RSCS1            ;B PORT
007504  105777  171374          2$:     TSTB    @RSCS1                  ;TEST FOR READY
007510  100001                          BPL     .+4                     ;NOT READY
007512  104001                          HLT     !CS1                    ;BUSY FAILED TO SET
007514  004737  026670                  JSR     PC,WAITRY               ;WAIT FOR READY
007520  104001                          HLT      CS1                    ;BUSY FAILED TO CLEAR
007522  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
007526  052701  000100                  BIS     #100,GOOD               ;SET BIT IR
007532  017700  171350                  MOV     @RSCS2,BAD              ;GET CS2
007536  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
007540  001401                          BEQ     .+4                     ;YES
007542  104000                          HLT                             ;GOOD = CORRECT ANS FOR CS2
007544  022777  006250  171332          CMP     #6250,@RSCS1            ;IS CS1 CORRECT?
007552  001401                          BEQ     3$                      ;YES
007554  10400                           HLT     .CS1                    ;CS1 SHOULD = 6250
007556  022777  000001  171330  3$:     CMP     #BIT0,@RSDA             ;WAS DAR INCREMENTED BY 1
007564  001401                          BEQ     .+4                     ;RSDA OK
007566  104004                          HLT     .DA                     ;DAR SHOULD = 1
007570  005777  171314                  TST     @RSWC                   ;TEST FOR OVERFLOW
007574  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
007576  1040'0                          HLT     !WC                     ;SHOULD = 0
007600  017700  171306                  MOV     @RSBA,BAD               ;FETCH CURRENT ADDRESS
007604  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
007610  062701  000002                  ADD     #2,GOOD                 ;UPDATE IT
007614  020001                          CMP     BAD,GOOD                ;IS RSBA CORRECT
007616  001401                          BEQ     .+4                     ;YES EXECUTE CONTINUE
007620  104000                          HLT                             ;RSBA FAILED TO INCREMENT
```

```
1923  007622  013737  001102  001170  NXM:    MOV     OBUFSV,BPORTT   ;SAVE -B- PORT BUFFER
1924  007630  012737  027454  001102          MOV     #OUTBUF,OBUFSV  ;RESTORE OBUFSV
1925
1926                                  ;DESELECT THEN SELECT UNIT NUMBER IN RSCS2 CHECK TIMING
1927                                  ;*************************************************************************
1928                                  ;TEST 54                DESELECT THEN SELECT UNIT NUMBER TIMING TEST
1929                                  ;*************************************************************************
1930  007636  104400                  TST54:  SCOPE
1931
1932  007640  104414                  UNITST: CLRDK                           ;CLEAR ALL RS REG
1933  007642  005004                          CLR     R4                      ;CLEAR R4
1934  007644  020437  001152                  CMP     R4,UNNUM                ;IS THIS CORRECT UNIT #?
1935  007650  001001                          BNE     3$                      ;NO THEN USE IT
1936  007652  005204                          INC     R4                      ;GET WRONG DRIVE
1937  007654  012737  177777  027454  3$:     MOV     #177777,OUTBUF          ;DATA TO BE X-FERED
1938  007662  013777  001102  171222          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
1939  007670  012777  177777  171212          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
1940  007676  012703  000061                  MOV     #61,R3                  ;GET WRITE FUNCTION
1941  007702  013705  001152                  MOV     UNNUM,R5                ;GET CORRECT UNIT #
1942  007706  012701  172040                  MOV     #172040,R1              ;GET CS1 REG
1943  007712  010461  000010                  MOV     R4,10(R1)               ;LOAD WRONG UNIT # INTO CS2
1944  007716  000240                          NOP                             ;WAIT FOR DRIVE TO SETTLE
1945  007720  010561  000010                  MOV     R5,10(R1)               ;LOAD CORRECT UNIT #
1946  007724  010311                  1$:     MOV     R3,(R1)                 ;LOAD FUNCTION IN CS1
1947  007726  004737  026670                  JSR     PC,WAITRY               ;WAIT FOR READY
1948  007732  104001                          HLT     .CS1                    ;SHOULD = 260 RDY NEVER CAME UP
1949  007734  022777  004260  171142          CMP     #4260,@RSCS1            ;IS ERROR FLAG SET?
1950  007742  001401                          BEQ     .+4                     ;NO. X-FER OK
1951  007744  104047                          HLT     !CS1.ER!DS.DA           ;ERROR DURING X-FER
1952  007746  022777  000001  171140          CMP     #1,@RSDA                ;IS RSDA CORRECT
1953  007754  001401                          BEQ     .+4                     ;RSDA OK
1954  007756  104004                          HLT     !DA                     ;SHOULD = 1 SHOULD INCREMENT
1955  007760  005777  171124                  TST     @RSWC                   ;FETCH WORD COUNT
1956  007764  001401                          BEQ     .+4                     ;WORD COUNT DID OVERFLOW
1957  007766  104010                          HLT     !WC                     ;SHOULD - 0 FAILED TO INCREMENT
1958  007770  022777  010600  171120          CMP     #10600,@RSDS            ;IS RSDS OK?
1959  007776  001401                          BEQ     .+4                     ;YES
1960  010000  104044                          HLT     .DS!DA                  ;NO
1961  010002  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT #
1962  010006  052701  000100                  BIS     #100,GOOD               ;SET IR BIT
1963  010012  017700  171070                  MOV     @RSCS2,BAD              ;GET CS2
1964  010016  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
1965  010020  001401                          BEQ     .+4                     ;YES
1966  010022  104000                          HLT                             ;BAD = CS2 GOOD IS CORRECT ANS
1967  010024  017700  171062                  MOV     @RSBA,BAD               ;GET BA DATA
1968  010030  013701  001102                  MOV     @#OBUFSV,GOOD           ;WHAT RSBA SHOULD EQUAL
1969  010034  062701  000002                  ADD     #2,GOOD                 ;UPDATE OUTBUFFER
1970  010040  020100                          CMP     GOOD,BAD                ;IS RSBA CORRECT
1971  010042  001401                          BEQ     .+4                     ;YES
1972  010044  104000                          HLT                             ;BA FAILED TO INCREMENT
```

TST54 DESELECT THEN SELECT UNIT NUMBER TIMING TEST SEQ 0050

```
1973                                    ;TEST CURRENT ADDRESS INHIBT-BAI IN RSCS2
1974                                    ;DO A ONE WORD WRITE AND SEE
1975                                    ;IF RSBA INCREMENTED AFTER THE X-FER
1976
1977                                    ;*************************************************************************
1978                                    ;TEST 55                TEST BAI IN RSCS2
1979                                    ;*************************************************************************
1980  010046  104400                    TST55:  SCOPE
1981
1982  010050  104414                    BAITST: CLRDK                           ;CLEAR ALL RS REG
1983  010052  013777  001102  171032            MOV     @#OBUFSV,@RSBA        ;SET UP CURRENT ADDR
1984  010060  012777  177777  171022            MOV     #-1,@RSWC             ;SET WORD COUNT TO -1
1985  010066  052777  000010  171012            BIS     #BAI,@RSCS2           ;SET BAI BIT
1986  010074  012777  000061  171002            MOV     #61,@RSCS1            ;WRITE
1987  010102  004737  026670                    JSR     PC,WAITRY             ;WAIT FOR READY
1988  010106  104001                            HLT     .CS1                  ;RDY DID NOT SET
1989  010110  013701  001102             $:     MOV     @#OBUFSV,GOOD         ;WHAT RSBA SHOULD BE
1990  010114  017700  170772                    MOV     @RSBA,BAD             ;WHAT RSBA IS
1991  010120  020100                            CMP     GOOD,BAD              ;COMPARE
1992  010122  001401                            BEQ     .+4                   ;YES
1993  010124  104000                            HLT                           ;BAD=OUTBUF GOOD - CORRECT ANS
1994  010126  005777  170766                    TST     @RSER                 ;ANY ERRORS?
1995  010132  001401                            BEQ     .+4                   ;NO
1996  010134  104040                            HLT     .DS                   ;YES
1997  010136  104414                            CLRDK                         ;CLEAR ALL RS REG
1998  010140  032777  000010  170740            BIT     #BAI,@RSCS2           ;DID BAI CLEAR?
1999  010146  001401                            BEQ     .+4                   ;YES
2000  010150  104002                            HLT     .ER                   ;BAI DID NOT SET
```

```
2001                                    ;*************************************************************************
2002                                    ;TEST 56                TEST NON-EXISTENT MEMORY ERROR BIT IN CS2
2003                                    ;*************************************************************************
2004  010152  104400                    TST56:  SCOPE
2005
2006  010154  104414                    NXMTSM: CLRDK                           ;CLEAR ALL RS REG
2007  010156  052777  000010  170722            BIS     #BAI,@RSCS2             ;SET BAI BIT
2008  010164  012777  177600  170716            MOV     #-200,@RSWC             ;SET UP WORD COUNT
2009  010172  012777  173000  170712            MOV     #173000,@RSBA           ;SET UP CURRENT ADDRESS
2010  010200  012777  001471  170676            MOV     #1471,@RSCS1            ;READ AND LOAD A16 +A17 FOR 18 BIT ADDRESS
2011  010206  004737  026670                    JSR     PC,WAITRY               ;WAIT FOR READY
2012  010212  104040                            HLT     !DS                     ;READY NEVER CAME UP
2013  010214  013701  001152            TSTNEM: MOV     UNNUM,GOOD              ;GET UNIT NO.
2014  010220  052701  004310                    BIS     #4310,GOOD              ;SET BAI+OR BITS
2015  010224  017700  170656                    MOV     @RSCS2,BAD              ;GET CS2
2016  010230  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
2017  010232  001401                            BEQ     .+4                     ;YES
2018  010234  104000                            HLT                             ;BAD=CS2 GOOD=CORRECT ANS FOR CS2
2019  010236  022777  145670  170640            CMP     #145670,@RSCS1          ;DID TRE SET?
2020  010244  001401                            BEQ     .+4                     ;YES
2021  010246  104001                            HLT     .CS1                    ;TRE SHOULD SET BECAUSE OF NEM
2022  010250  012777  040000  170626            MOV     #TRE,@RSCS1             ;CLEAR TRE
2023  010256  017700  170624                    MOV     @RSCS2,BAD              ;GET CS2
2024  010262  013701  001152                    MOV     UNNUM,GOOD              ;GET DRIVE
2025  010266  052701  000310                    BIS     #310,GOOD               ;SET IR
2026  010272  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
2027  010274  001401                            BEQ     .+4                     ;YES
2028  010276  104200                            HLT     !CS2                    ;CS2=BAD GOOD IS CORRECT ANS FOR CS2
2029
2030                                    ;*************************************************************************
2031                                    ;TEST 57                TEST BLOCK SEARCH FUNCTION, PIP AND DRY BIT AND ADDR. CONF BIT
2032                                    ;*************************************************************************
2033  010300  104400                    TST57:  SCOPE
2034
2035  010302  104414                    BLOCK:  CLRDK                           ;CLEAR ALL RS REG
2036  010304  012777  000032  170602            MOV     #32,@RSDA               ;DO A SEARCH FOR SECTOR 32
2037  010312  013777  001102  170572            MOV     @#OBUFSV,@RSBA          ;LOAD REGS. TO MAKE
2038  010320  012777  177777  170562            MOV     #-1,@RSWC               ;SURE THEY DO NOT CHANGE
2039  010326  005037  001174                    CLR     WORK                    ;SETUP FOR TIMEOUT ROUTINE
2040  010332  032777  001000  170570  4$:       BIT     #1000,@RSMR             ;WAIT FOR DISK TO
2041  010340  001004                            BNE     3$                      ;REACH SECTOR 32
2042  010342  005337  001174                    DEC     WORK                    ;TIME OUT
2043  010346  001371                            BNE     4$                      ;ROUTINE
2044  010350  104220                            HLT      MR                     ;COULD NOT FIND SECTOR 32
```

```
2045  010352  005077  170536          3$:     CLR     @RSDA           ;NOW SEARCH FOR 0
2046  010356  012777  00003  170520           MOV     #31,@RSCS1      ;DO A BLOCK SEARCH FUNCTION
2047  010364  032777  000200  170524          BIT     #DRY,@RSDS      ;IS DRY CLEARED?
2048  010372  001402                          BEQ     1$              ;YES
2049  010374  104040                          HLT     !DS             ;DRY SHOULD BE CLEARED DURING A BLOCK SEARCH
2050  010376  000500                          BR      OOUT            ;GET OUT BECAUSE OF TIMING
2051  010400  032777  020000  170510  1$:     BIT     #20000,@RSDS    ;IS PIP SET?
2052  010406  001001                          BNE     .+4             ;YES
2053  010410  104040                          HLT     .DS             ;PIP SHOULD BE SET
2054  010412  012701  020000                  MOV     #20000,GOOD     ;SETUP FOR TIMEOUT ROUTINE
2055  010416  005301                  2$:     DEC     GOOD            ;DO TIMEOUT
2056  010420  001466                          BEQ     TTMOUT          ;TIMED OUT
2057  010422  032777  000200  170466          BIT     #DRY,@RSDS      ;DID DRY SET?
2058  010430  001772                          BEQ     2$              ;NO
2059  010432  022777  110600  170456          CMP     #110600,@RSDS   ;DID PIP CLEAR?
2060  010440  001401                          BEQ     .+4             ;YES
2061  010442  104040                          HLT     !DS             ;PIP BIT DID NOT CLEAR
2062  010444  022777  104230  170432          CMP     #104230,@RSCS1  ;DID SC SET?
2063  010452  001401                          BEQ     .+4             ;YES
2064  010454  104041                          HLT     !CS1!DS         ;SC DID NOT SET
2065  010456  013737  001152  001174          MOV     UNNUM,WORK      ;GET CORRECT AS BIT
2066  010464  005001                          CLR     GOOD            ;IN RSAS REG
2067  010466  000261                          SEC                     ;THAT SHOULD
2068  010470  006101                  5$:     ROL     GOOD            ;BE SET
2069  010472  005737  001174                  TST     WORK
2070  010476  001403                          BEQ     6$
2071  010500  005337  001174                  DEC     WORK
2072  010504  000771                          BR      5$
2073  010506  020177  170410          6$:     CMP     GOOD,@RSAS      ;IS RSAS CORRECT?
2074  010512  001403                          BEQ     7$              ;YES
2075  010514  017700  170402                  MOV     @RSAS,BAD       ;NO
2076  010520  104000                          HLT
2077  010522  010177  170374          7$:     MOV     GOOD,@RSAS      ;CLEAR AS REG
2078  010526  005777  170370                  TST     @RSAS           ;DID IT CLEAR?
2079  010532  001401                          BEQ     .+4             ;YES
2080  010534  104100                          HLT     .AS             ;NO
2081  010536  022777  010600  170352          CMP     #10600,@RSDS    ;DID ATA CLEAR?
2082  010544  001401                          BEQ     .+4             ;YES
2083  010546  104040                          HLT     .DS             ;NO
2084  010550  023777  001102  170334          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE?
2085  010556  001401                          BEQ     .+4             ;NO
2086  010560  104021                          HLT     !CS1.BA         ;BA MOVED WHY?
2087  010562  022777  177777  170320          CMP     #-1,@RSWC       ;DID WC MOVE?
2088  010570  001401                          BEQ     .+4             ;NO
2089  010572  104010                          HLT     !WC             ;WC MOVED WHY?
2090  010574  000401                          BR      OOUT            ;DONE GET OUT
2091  010576  104040          TTMOUT: HLT     .DS             ;DYR NEVER CAME UP
2092  010600                  OOUT:                           ;DONE
```

```
                                        ;*************************************************************************
                                        ;TEST 60                ILLEGAL FUNCTION CODE TEST CODE 3 TO 51
                                        ;*************************************************************************
010600  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

010602  013737  022504  001164  ILL51:  MOV     TIMES,TIMSV     ;SAVE LOOP COUNT
010610  012737  000010  022504          MOV     #10,TIMES       ;LOOP TEN TIMES
010616  104414                        CLRDK                   ;CLEAR ALL RS REG
010620  012703  027370          1$:     MOV     #ILLTAB,R3      ;GET STARTING ADD OF TABLE
010624  012300                  3$:     MOV     (R3)+,BAD       ;GET ILL FUN
010626  001513                        BEQ     ILFDN           ;DONE GET OUT
010630  013777  001102  170254        MOV     @#OBUFSV,@RSBA  ;SET UP REGS.
010636  012777  177777  170244        MOV     #-1,@RSWC       ;TO CHECK FOR CHANGE
010644  010077  170234          2$:     MOV     BAD,@RSCS1      ;DO ILLEGAL FUNCTION
010650  042700  000001                BIC     #BIT0,BAD       ;CLEAR GO BIT
010654  010001                        MOV     BAD,GOOD        ;MOV ILLEGAL FUN INTO GOOD
010656  105777  170222          6$:     TSTB    @RSCS1          ;RDY SET?
010662  100375                        BPL     6$              ;NO
010664  052701  104200                BIS     #104200,GOOD    ;SET ERROR BITS
010670  017700  170210          4$:     MOV     @RSCS1,BAD      ;PUT CS1 INTO BAD
010674  020100                        CMP     GOOD,BAD        ;IS CS1 CORRECT?
010676  001401                        BEQ     .+4             ;YES
010700  104000                        HLT                     ;GOOD IS WHAT CS1 SHOULD =BAD=CS1
010702  022777  000001  170210        CMP     #1,@RSER        ;DID ILF SET?
010710  001401                        BEQ     .+4             ;YES
010712  104043                        HLT     !CS1!ER!DS      ;ILF DID NOT SET
010714  022777  150600  170174        CMP     #150600,@RSDS   ;IS DS GOOD?
010722  001401                        BEQ     .+4             ;YES
010724  104043                        HLT     .CS1!ER.DS      ;ERR DID NOT SET
010726  017700  170154                MOV     @RSCS2,BAD      ;GET CS2
010732  013701  001152                MOV     UNNUM,GOOD      ;GET UNIT #
010736  052701  000100                BIS     #100,GOOD       ;SET IR BIT
010742  020100                        CMP     GOOD,BAD        ;IS CS2 CORRECT?
010744  001401                        BEQ     .+4             ;YES
010746  104000                        HLT                     ;GOOD = CORRECT ANS FOR CS2
010750  013701  001156                MOV     UNCMP,GOOD      ;GET CORRECT DRIVE
010754  042701  177400                BIC     #177400,GOOD    ;CLEAR UNWANTED BITS
010760  017700  170136                MOV     @RSAS,BAD       ;GET RSAS REG
010764  020001                        CMP     BAD,GOOD        ;DID CORRECT UNIT ANSWER?
010766  001401                        BEQ     .+4             ;YES
010770  104100                        HLT     .AS             ;NO WRONG DRIVE ANSWERED
```

```
2139  010772  023777  001102  170112          CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
2140  011000  001401                          BEQ     .+4             ;NO
2141  011002  104021                          HLT     !CS1!BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2142  011004  022777  177777  170076          CMP     #-1,@RSWC       ;DID WC MOVE?
2143  011012  001401                          BEQ     .+4             ;NO
2144  011014  104011                          HLT     !CS1!WC         ;WC MOVED
2145  011016  005777  170072                  TST     @RSDA           ;DID DA MOVE
2146  011022  001401                          BEQ     .+4             ;NO
2147  011024  104005                          HLT     !CS1!DA         ;DA MOVED
2148  011026  104414                          CLRDK                   ;CLEAR ALL ERRORS
2149  011030  005777  170064                  TST     @RSER           ;DID ERRORS CLEAR
2150  011034  001401                          BEQ     .+4             ;YES
2151  011036  104040                          HLT     .DS             ;ILF DID NOT CLEAR
2152  011040  022777  004200  170036          CMP     #4200,@RSCS1    ;DID ERRORS IN CS1 CLEAR
2153  011046  001401                          BEQ     .+4             ;YES
2154  011050  104040                          HLT     !DS
2155  011052  000137  010624                  JMP     3$              ;CONTINUE UNTIL DONE
2156  011056                          ILFDN:                          ;DONE WITH ILLEGAL FUNCTION TEST
2157                                  ;*****************************************************************************
2158                                  ;TEST 61                ILLEGAL FUNCTION CODE TEST CODE 53 TO 77
2159                                  ;*****************************************************************************
2160  011056  104400                  TST61:  SCOPE
2161
2162                                  ;TEST ILF BIT IN RSER AND ERR BIT IN RSDS
2163                                  ;ALSO CHECKS TO SEE IF WC,BA, OR DA GOT MODIFIED
2164                                  ;IF WISHING TO LOOP ON ONE FUNCTION ONLY, LOAD
2165                                  ;FUNCTION INTO LOCATION ILFTB2: AND 0 IN FOLLOWING LOCATION
2166
2167  011060  104414                  ILLFUN: CLRDK                   ;CLEAR ALL RS REG
2168  011062  012703  027432          1$:     MOV     #ILFTB2,R3      ;GET TABLE OF ILL FUNS.
2169  011066  005037  001174          3$:     CLR     WORK            ;CLEAR WORK
2170  011072  012300                          MOV     (R3)+,BAD       ;GET ILL FUN
2171  011074  001554                          BEQ     ILFDNE          ;DONE GET OUT
2172  011076  013777  001102  170006          MOV     @#OBUFSV,@RSBA  ;SET UP REGS.
2173  011104  012777  177777  167776          MOV     #-1,@RSWC       ;TO CHECK FOR CHANGE
2174  011112  010037  001176                  MOV     BAD,WORK1       ;SHOULD WE TEST
2175  011116  042737  177707  001176          BIC     #177707,WORK1   ;BA AND WC
2176  011124  022737  000060  001176          CMP     #60,WORK1       ;TO INC
2177  011132  001003                          BNE     2$              ;NO
2178  011134  012737  000007  001174          MOV     #7,WORK         ;YES
2179  011142  010077  167736          2$:     MOV     BAD,@RSCS1      ;DO ILLEGAL FUNCTION
2180  011146  042700  000001          10$:    BIC     #BIT0,BAD       ;CLEAR GO BIT
2181  011152  010001                          MOV     BAD,GOOD        ;MOV ILLEGAL FUN INTO GOOD
```

```
2182  011154  105777  167724          6$:     TSTB    @RSCS1          ;RDY SET?
2183  011160  100375                  BPL     6$              ;NO
2184  011162  052701  144200          BIS     #144200,GOOD    ;SET ERROR BITS
2185  011166  017700  167712          MOV     @RSCS1,BAD      ;PUT CS1 INTO BAD
2186  011172  020100                  CMP     GOOD,BAD        ;IS CS1 CORRECT?
2187  011174  001401                  BEQ     .+4             ;YES
2188  011176  104000                  HLT                     ;GOOD IS WHAT CS1 SHOULD =BAD=CS1
2189  011200  022777  000001  167712  CMP     #1,@RSER        ;DID ILF SET?
2190  011206  001401                  BEQ     .+4             ;YES
2191  011210  104043                  HLT     !CS1!ER!DS      ;ILF DID NOT SET
2192  011212  022777  150600  167676  CMP     #150600,@RSDS   ;IS DS GOOD?
2193  011220  001401                  BEQ     .+4             ;YES
2194  011222  104043                  HLT     .CS1!ER.DS      ;ERR DID NOT SET
2195  011224  005777  167664          TST     @RSDA           ;DID DA MOVE?
2196  011230  001401                  BEQ     .+4             ;NO
2197  011232  104005                  HLT     !CS1!DA         ;DA MOVED
2198  011234  005737  001174          TST     WORK            ;IS THIS AN ILL WRITE FUN?
2199  011240  001025                  BNE     11$             ;YES
2200  011242  017700  167640          MOV     @RSCS2,BAD      ;GET CS2
2201  011246  013701  001152          MOV     UNNUM,GOOD      ;GET UNIT #
2202  011252  052701  001100          BIS     #1100,GOOD      ;SET IR BIT
2203  011256  020100                  CMP     GOOD,BAD        ;IS CS2 CORRECT?
2204  011260  001401                  BEQ     .+4             ;YES
2205  011262  104000                  HLT                     ;GOOD = CORRECT ANS FOR CS2
2206  011264  023777  001102  167620  CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
2207  011272  001401                  BEQ     .+4             ;NO
2208  011274  104021                  HLT     .CS1.BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2209  011276  022777  177777  167604  CMP     #-1,@RSWC       ;DID WC MOVE?
2210  011304  001401                  BEQ     .+4             ;NO
2211  011306  104011                  HLT     !CS1.WC         ;WC MOVED
2212  011310  000137  011376          JMP     4$              ;CONTINUE UNTIL DONE
2213  011314  017700  167566          MOV     @RSCS2,BAD      ;GET CS2
2214  011320  013701  001152          MOV     UNNUM,GOOD      ;GET UNIT #
2215  011324  052701  001300          BIS     #1300,GOOD      ;SET IR BIT
2216  011330  020100                  CMP     GOOD,BAD        ;IS CS2 CORRECT?
2217  011332  001401                  BEQ     .+4             ;YES
2218  011334  104000                  HLT                     ;GOOD = CORRECT ANS FOR CS2
2219  011336  013737  001102  001174  MOV     @#OBUFSV,WORK   ;GET BUFFER ADDR.
2220  011344  062737  000002  001174  ADD     #2,WORK         ;UPDATE IT
2221  011352  023777  001174  167532  CMP     WORK,@RSBA      ;DID BA MOVE
2222  011360  001401                  BEQ     .+4             ;YES
2223  011362  104021                  HLT     .CS1.BA         ;BA MOVED ON AN ILLEGAL FUNCTION
2224  011364  022777  000000  167516  CMP     #0,@RSWC        ;DID WC MOVE?
2225  011372  001401                  BEQ     .+4             ;NO
2226  011374  104011                  HLT     .CS1.WC         ;WC MOVED
2227  011376  104414          4$:     CLRDK                   ;CLEAR ALL ERRORS
2228  011400  022777  004200  167476  CMP     #4200,@RSCS1    ;DID ERRORS CLEAR
2229  011406  001401                  BEQ     .+4             ;YES
2230  011410  104040                  HLT     .DS             ;NO
2231  011412  005777  167502          TST     @RSER           ;DID ERROR CLEAR
2232  011416  001401                  BEQ     .+4             ;NO
2233  011420  104040                  HLT     .DS             ;YES
2234  011422  000137  011066          JMP     3$              ;CONTINUE UNTIL DONE
2235  011426                  ILFDNE:                         ;DONE WITH ILLEGAL FUNCTION TEST
```

```
                                        ;*****************************************************************************
                                        ;TEST 62                TEST ILLEGAL FUNCTION CODE 67
                                        ;*****************************************************************************
011426  104400                  TST62:  SCOPE
011430  104414                  ILF67:  CLRDK                           ;CLEAR ALL RS REG
011432  012777  177777  167450          MOV     #-1,@RSWC               ;SET WC TO -1
011440  013737  001102  001174          MOV     @#OBUFSV,WORK           ;GET OUTBUF ADD.
011446  062737  000002  001174          ADD     #2,WORK                 ;FOR TEST
011454  013777  001174  167430          MOV     WORK,@RSBA              ;LOAD ADDR.
011462  012777  000067  167414          MOV     #67,@RSCS1              ;DO FUNCTION 67
011470  105777  167410          1$:     TSTB    @RSCS1                  ;DONE YET?
011474  100375                          BPL     1$                      ;NO
011476  017700  167410                  MOV     @RSBA,BAD               ;GET BA REG
011502  013701  001102                  MOV     @#OBUFSV,GOOD           ;GET CORRECT ANS FOR RSBA
011506  020100                          CMP     GOOD,BAD                ;IS RSBA CORRECT?
011510  001401                          BEQ     .+4                     ;YES
011512  104000                          HLT                             ;BAD=RSBA GOOD=CORRECT ANS.
011514  013701  001152                  MOV     UNNUM,GOOD              ;GET UNIT NUMBER
011520  052701  001300                  BIS     #1300,GOOD              ;SET IR AND OR BITS
011524  017700  167356                  MOV     @RSCS2,BAD              ;GET CS2
011530  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
011532  001401                          BEQ     .+4                     ;YES
011534  104000                          HLT                             ;BAD=CS2 GOOD=CORRECT ANS
011536  022777  000001  167354          CMP     #1,@RSER                ;IS RSER CORRECT?
011544  001401                          BEQ     .+4                     ;YES
011546  104002                          HLT     .ER                     ;ER IS WRONG
011550  104414                          CLRDK                           ;CLEAR ALL RS REG
011552  005777  167342                  TST     @RSER                   ;DID ERROR CLEAR
011556  001401                          BEQ     .+4                     ;YES
011560  104040                          HLT     .DS                     ;NO
011562  012777  177700  167320          MOV     #-100,@RSWC             ;SET WC TO -100
011570  013737  001102  001174          MOV     @#OBUFSV,WORK           ;GET OUTBUF ADD.
011576  062737  000200  001174          ADD     #200,WORK               ;FOR TEST
011604  013777  001174  167300          MOV     WORK,@RSBA              ;LOAD ADDR
011612  012777  000067  167264          MOV     #67,@RSCS1              ;DO FUNCTION 67
011620  105777  167260          2$:     TSTB    @RSCS1                  ;DONE YET?
011624  100375                          BPL     2$                      ;NO
```

```
2274  011626  013701  001102          3$:     MOV     @#OBUFSV,GOOD   ;GET CORRECT ANS.
2275  011632  017700  167254                  MOV     @RSBA,BAD       ;GET BA REG
2276  011636  020100                          CMP     GOOD,BAD        ;IS RSBA CORRECT?
2277  011640  001401                          BEQ     .+4             ;YES
2278  011642  104000                          HLT                     ;BAD=RSBA GOOD=CORRECT ANS.
2279  011644  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT NUMBER
2280  011650  052701  001300                  BIS     #1300,GOOD      ;SET IR AND OR BITS
2281  011654  017700  167226                  MOV     @RSCS2,BAD      ;GET CS2
2282  011660  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2283  011662  001401                          BEQ     .+4             ;YES
2284  011664  104000                          HLT                     ;BAD=CS2 GOOD=CORRECT ANS
2285  011666  022777  000001  167224          CMP     #1,@RSER        ;IS RSER CORRECT?
2286  011674  001401                          BEQ     .+4             ;YES
2287  011676  104002                          HLT     .ER             ;ER IS WRONG
2288  011700  012777  040011  167176          MOV     #40011,@RSCS1   ;CLEAR ERRORS
2289  011706  022777  004210  167170          CMP     #4210,@RSCS1    ;DID THEY CLEAR IN CS1
2290  011714  001401                          BEQ     .+4             ;YES
2291  011716  104040                          HLT     !DS             ;NO
2292  011720  005777  167174                  TST     @RSER           ;DID RSER CLEAR
2293  011724  001401                          BEQ     .+4             ;YES
2294  011726  104040                          HLT     !DS             ;NO
2295  011730  005777  167166                  TST     @RSAS           ;DID RSAS CLEAR
2296  011734  001401                          BEQ     .+4             ;YES
2297  011736  104100                          HLT     .AS             ;NO
2298
2299                                  ;*************************************************************************
2300                                  ;TEST 63                TEST PAR IN RSER
2301                                  ;*************************************************************************
2302  011740  104400                  TST63:  SCOPE
2303
2304  011742  013737  001164  022504  PARTST: MOV     TIMSV,TIMES     ;RESTORE LOOP #
2305  011750  104414                          CLRDK                   ;CLEAR ALL RS REG
2306  011752  012777  000010  167140  1$:     MOV     #10,@RSER       ;SET PAR
2307  011760  022777  150600  167130          CMP     #150600,@RSDS   ;DID ERR,ATA AND DRY SET?
2308  011766  001401                          BEQ     .+4             ;YES
2309  011770  104042                          HLT     .DS.ER          ;ER SHOULD SET IF PAR SETS IN RSER
2310  011772  104414                          CLRDK                   ;CLEAR ALL RS REG
2311  011774  005777  167120                  TST     @RSER           ;DID PAR CLEAR?
2312  012000  001401                          BEQ     .+4             ;YES
2313  012002  104002                          HLT     .ER             ;PAR DID NOT CLEAR BY CLEAR  BIT
2314  012004  022777  010600  167104          CMP     #10600,@RSDS    ;DID ERROR BITS CLEAR
2315  012012  001401                          BEQ     .+4             ;YES
2316  012014  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
                                        ;*************************************************************************
012016  104400                  TST64:  SCOPE

012020  032777  170000  167076  LATST:  BIT     #170000,@RSLA   ;ARE BITS 12 TO 15 CLEARED?
012026  001401                          BEQ     .+4             ;YES
012030  104204                          HLT     !LA             ;BITS 12 TO 15 SHOULD BE CLEARED
012032  104400                  TST65:  SCOPE

                                        ;NOW TEST MOVEMENT IN SF BITS

012034  012737  171005  001174          MOV     #171005,WORK    ;SET UP FOR TIME OUT ROUTIME
012042  017701  167056                  MOV     @RSLA,GOOD      ;GET READING FROM LA
012046  042701  007700                  BIC     #7700,GOOD      ;GET RID OF CS BITS
012052  005337  001174          1$:     DEC     WORK            ;WAIT FOR DISK
012056  001407                          BEQ     ERRR            ;TYPE ERROR
012060  017700  167040                  MOV     @RSLA,BAD       ;READ LA
012064  042700  007700                  BIC     #7700,BAD       ;CLEAR CS BITS
012070  020100                          CMP     GOOD,BAD        ;DID SF BITS CHANGE?
012072  001767                          BEQ     1$              ;WAIT FOR TIME OUT
012074  000422                          BR      LATDON          ;LA OK CONT
012076                          ERRR:
012076  104402  012102                  TYPE    ,.+2            ;.ASCIZ <15><12>"SECTOR FRACTIONS NOT MOVING"
012140  104204                          HLT     !LA             ;TYPE LOOK AHEAD REG
012142                          LATDON:                         ;DONE CONT.
```

```
                                ;*************************************************************************
                                ;TEST 66                 CHECK CS BITS TO INCREMENT AND  ADDRESS CONFIRM BIT IN MR
                                ;*************************************************************************
012142  104400                  TST66:  SCOPE

012144  013737  022504  001164  CSTST:  MOV     TIMES,TIMSV     ;SAVE LOOP CT
012152  012737  000010  022504          MOV     #10,TIMES       ;LOOP 10 TIMES
012160  104414                        CLRDK                   ;CLEAR ALL RS REG.
012162  012701  001000                MOV     #1000,GOOD      ;LOAD COUNTER
012166  032777  001000  166734        BIT     #BIT9,@RSMR     ;IS ADD CONFIRM BIT 0?
012174  001407                        BEQ     ADDCF           ;YES CONTINUE
012176  005301                        DEC     GOOD            ;WAIT FOR
012200  001376                        BNE     .-2             ;DISK TO MOVE
012202  032777  001000  166720        BIT     #BIT9,@RSMR     ;IS AADD. CON. BIT BIT 0?
012210  001401                        BEQ     .+4             ;YES
012212  104220                        HLT     .MR             ;ADD. CONF. BIT ALWAYS A 1

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

012214  012777  177777  166672  ADDCF:  MOV     #-1,@RSDA       ;INIT RSDA
012222  012737  177777  001174  1$:     MOV     #-1,WORK        ;SETUP TIMEOUT COUNTER
012230  005277  166660                  INC     @RSDA           ;GET NEXT SECTOR
012234  022777  010000  166652          CMP     #10000,@RSDA    ;DONE ALL YET?
012242  001433                        BEQ     DONCS           ;YES
012244  005337  001174          2$:     DEC     WORK            ;DO TIMEOUT ROUTINE
012250  001427                        BEQ     TMEOUT          ;ADD. CON. NEVER CAME UP
012252  032777  001000  166650        BIT     #1000,@RSMR     ;DID ADD CONFIRM BIT SET?
012260  001771                        BEQ     2$              ;YES
012262  017700  166636                MOV     @RSLA,BAD       ;GET LA
012266  042700  000077                BIC     #77,BAD         ;CLEAR SF BITS
012272  012737  000006  001176        MOV     #6,WORK1        ;SET UP COUNTER
012300  006000                3$:     ROR     BAD             ;MOV SA BITS RIGHT
012302  005337  001176                DEC     WORK1           ;DO 6 TIMES
012306  001374                        BNE     3$              ;DONE YET?
012310  017701  166600                MOV     @RSDA,GOOD      ;GET DA
012314  042701  177700                BIC     #177700,GOOD    ;CLEAR JUNK
012320  020100                        CMP     GOOD,BAD        ;ARE SA BITS - IN DA AND LA REG.?
012322  001401                        BEQ     .+4             ;OK
012324  104000                        HLT                     ;GOOD =DA BAD   LA
012326  000735                        BR      1$              ;NO WAIT

012330  104262                TMEOUT: HLT     MR.ER.DS        ;ADDRESS CONFIRM BIT NEVER SET COULD BE BAD OR
                                                                ;BAD LA OR BAD COMPARE BETWEEN LA AND DA
012332                          DONCS:                          ;TEST DONE CONTINUE
```

```
                                ;*****************************************************************************
                                ;TEST 67                    PARITY TEST
                                ;*****************************************************************************
012332  104400                  TST67:  SCOPE

012334  012701  031054          PART:   MOV     #PARITY , R1    ;GET TEST LOCATION
012340  013737  001164  022504          MOV     TIMSV,TIMES     ;RESTORE LOOP COUNTER
012346  012737  012512  000004          MOV     #PRTP,@#4       ;SETUP TIME OUT VECTOR
012354  012737  000340  000006          MOV     #340,@#6
012362  012702  172100                  MOV     #MPR0,R2        ;GET PAR REG
012366  005712                  TSTAGN: TST     (R2)            ;DOES IT EXIST
012370  012712  000004                  MOV     #WWP,@R2        ;YES SET WRITE WRONG PARITY
012374  011111                  1$:     MOV     @R1,@R1         ;WRITE WRONG PARITY
012376  005711                          TST     @R1             ;READ IT
012400  005712                          TST     @R2             ;DID PARITY ERROR SET?
012402  100402                          BMI     2$              ;YES
012404  005012                          CLR     @R2             ;CLEAR PARITY REG
012406  000442                          BR      PRTP1           ;GET NEXT PARITY REG
012410  042712  100005          2$:     BIC     #100005,@R2     ;TURN OFF WWP,ENABLE BAD PARITY, ACTION ENABLE
012414  005712                          TST     @R2     ;PARITY ERROR?
012416  001445                          BEQ     NOPAR   ;IF NO BR.

012420  104414                          CLRDK                   ;CLEAR ALL RS REG
012422  012777  031054  166462          MOV     #PARITY,@RSBA   ;SET UP CURRENT ADDRESS
012430  012777  177777  166452          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
012436  012777  000061  166440          MOV     #61,@RSCS1      ;GO WRITE
012444  105777  166434          3$:     TSTB    @RSCS1          ;DONE YET?
012450  100375                          BPL     3$              ;NO WAIT
012452  017700  166430                  MOV     @RSCS2,BAD      ;GET CS2
012456  012701  020100                  MOV     #20100,GOOD
012462  053701  001152                  BIS     UNNUM,GOOD      ;GET CORRECT AND FOR CS2
012466  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
012470  001401                          BEQ     .+4             ;YES
012472  104000                          HLT                     ;CS2 SHOULD = GOOD
012474  022777  144260  166402          CMP     #144260,@RSCS1  ;IS CS1 CORRECT?
012502  001401                          BEQ     .+4             ;YES
012504  104040                          HLT     .DS
012506  000137  012532                  JMP     NOPAR           ;GET OUT

                                ;TRAPOUT ROUTINE

012512  022626                  PRTP:   CMP     (6)+,(6)+       ;CLEAR STACK
012514  022702  172136          PRTP1:  CMP     #172136,R2      ;DONE YET?
012520  001404                          BEQ     NOPAR           ;YES NO PAR REG
012522  062702  000002                  ADD     #2,R2           ;NO TRY AGAIN
012526  000137  012366                  JMP     TSTAGN          ;RETRY

012532  012737  000006  000004  NOPAR:  MOV     #6,@#4
012540  005037  000006                  CLR     @#6
012544  005037  031054                  CLR     PARITY          ;WRITE GOOD PARITY
                                ;*****************************************************************************
                                ;TEST 70                    TEST WRITE CHECK ERROR
                                ;*****************************************************************************
012550  104400                  TST70:  SCOPE

                                ;WRITE A WORD OF 0 AND FLOAT A 1 THROUGH IT TO CAUSE WCE
```

```
                                        ;SET BIT14 IN ONCEE AND WRITE A WD OF -1 AND FLOAT 0
                                        ;TO CAUSE WCE
                                        
012552  104414                  WCETST: CLRDK                           ;CLEAR ALL RS REG
012554  005037  027454                  CLR     OUTBUF                  ;WRITE A WD OF 0
012560  013777  001102  166324  WCETT:  MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
012566  012777  177777  166314          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
012574  012777  000061  166302          MOV     #61,@RSCS1              ;GO WRITE
012602  105777  166276          3$:     TSTB    @RSCS1                  ;DONE YET?
012606  100375                          BPL     3$                      ;NO WAIT
012610  032737  040000  001160          BIT     #BIT14,ONCEE            ;WRITE A 1 OR 0?
012616  001410                          BEQ     2$                      ;WRITE A 0
012620  012737  177777  027454          MOV     #-1,OUTBUF              ;WRITE A 1
012626  000241                          CLC                             ;CLEAR CARRY
012630  006137  027454          6$:     ROL     OUTBUF                  ;FLOAT A 0 THROUGH BAD WD
012634  103123                          BCC     WCEDON                  ;DONE GET OUT
012636  000406                          BR      5$                      ;CHECK WCE
012640  005037  027454          2$:     CLR     OUTBUF                  ;WRITE A 0
012644  000261                          SEC                             ;SET CARRY
012646  006137  027454          1$:     ROL     OUTBUF                  ;FLOAT A 1
012652  103503                          BCS     WCEDNE                  ;GET OUT WHEN DONE
012654  013777  001102  166230  5$:     MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
012662  012777  177777  166220          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
012670  005077  166220                  CLR     @RSDA
012674  012777  000051  166202          MOV     #51,@RSCS1              ;GO WRITE CHECK
012702  105777  166176          4$:     TSTB    @RSCS1                  ;READY YET?
012706  100375                          BPL     4$                      ;NO WAIT
012710  017700  166172                  MOV     @RSCS2,BAD              ;GET CS2
012714  013701  001152                  MOV     UNNUM,GOOD              ;SET UNIT #
012720  052701  040300                  BIS     #40300,GOOD             ;SET BITS
012724  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
012726  001413                          BEQ     7$                      ;YES
012730  104000                          HLT                             ;BAD=CS2 GOOD=CORRECT ANS
012732  013700  027454                  MOV     OUTBUF,BAD              ;GET BAD WD THAT SHOULD CAUSE WCE
012736  005001                          CLR     GOOD                    ;GET GOOD WD IF WRITING 0
012740  032737  040000  001160          BIT     #BIT14,ONCEE            ;ARE WE WRITING 1 OR 0
012746  001402                          BEQ     8$                      ;0
012750  012701  177777                  MOV     #-1,GOOD                ;GET GOOD WD FOR 1
012754  104000                  8$:     HLT                             ;GOOD = CORRECT WD WRITTEN
                                        ;BAD - INCORRECT WD THAT WCE DID NOT CATCH
```

```
2487  012756  022777  144250  166120  7$:     CMP     #144250,@RSCS1  ;DID TRE SET?
2488  012764  001401                          BEQ     .+4             ;YES
2489  012766  104043                          HLT     !CS1!ER.DS      ;TRE SHOULD SET IF WCE SETS
2490  012770  017700  166116                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
2491  012774  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
2492  013000  062701  000002                  ADD     #2,GOOD         ;UPDATE IT
2493  013004  020000                          CMP     BAD,GOOD        ;IS RSBA CORRECT
2494  013006  001400                          BEQ     .+4             ;YES EXECUTE CONTINUE
2495  013010  104000                          HLT                     ;RSBA FAILED TO INCREMENT
2496  013012  104414                          CLRDK                   ;CLEAR ALL RS REG
2497  013014  013701  001152                  MOV     UNNUM,GOOD      ;PUT DRIVE IN GOOD
2498  013020  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
2499  013024  017700  166056                  MOV     @RSCS2,BAD      ;GET CS2
2500  013030  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT
2501  013032  001401                          BEQ     .+4             ;YES
2502  013034  104000                          HLT                     ;BAD =CS2 GOOD IS CORRECT ANS
2503  013036  022777  004200  166040          CMP     #4200,@RSCS1    ;DID TRE CLEAR?
2504  013044  001401                          BEQ     .+4             ;YES
2505  013046  104001                          HLT     .CS1            ;TRE DID NOT CLEAR WITH CLEAR
2506  013050  032737  040000  001160          BIT     #BIT14,ONCEE    ;FLOATION A 1 OR 0?
2507  013056  001673                          BEQ     1$              ;FLOAT 1
2508  013060  000663                          BR      6$              ;FLOAT 0
2509  013062  052737  040000  001160  WCEDNE: BIS     #BIT14,ONCEE    ;SET BIT14
2510  013070  104414                          CLRDK
2511  013072  012737  177777  027454          MOV     #-1,OUTBUFF
2512  013100  000137  012560                  JMP     WCETT           ;NOW WRITE -1 IN OUTBUF
2513  013104  042737  040000  001160  WCEDON: BIC     #BIT14,ONCEF    ;CLEAR TEST FLAG
```

```
                                        ;*****************************************************************************
                                        ;TEST 71                    TEST WRITE CHECK ERROR ON -B- PORT
                                        ;*****************************************************************************
013112  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

013114  032737  020000  001160  WCETSB: BIT     #BIT13,ONCEE    ;-B- PORT?
013122  001402                          BEQ     1$              ;YES
013124  000137  013470                  JMP     WCEDOS          ;NO GET OUT
013130  013737  001170  001102  1$:     MOV     BPORTT,OBUFSV   ;GET -B- PORT BUFFER
013136  104414                          CLRDK                   ;CLEAR ALL RS REG
013140  005077  166024                  CLR     @BPORTT         ;WRITE A WD OF 0
013144  013777  001102  165740  WCETB:  MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
013152  012777  177777  165730          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
013160  012777  002061  165716          MOV     #2061,@RSCS1    ;GO WRITE
013166  105777  165712          3$:     TSTB    @RSCS1          ;DONE YET?
013172  100375                          BPL     3$              ;NO WAIT
013174  032737  040000  001160          BIT     #BIT14,ONCEE    ;WRITE A 1 OR 0?
013202  001410                          BEQ     2$              ;WRITE A 0
013204  012777  177777  165756          MOV     #-1,@BPORTT     ;WRITE A 1
013212  000241                          CLC                     ;CLEAR CARRY
013214  006137  027454          6$:     ROL     OUTBUF          ;FLOAT A 0 THROUGH BAD WD
013220  103123                          BCC     WCEDOS          ;DONE GET OUT
013222  000406                          BR      5$              ;CHECK WCE
013224  005077  165740          2$:     CLR     @BPORTT         ;WRITE A 0
013230  000261                          SEC                     ;SET CARRY
013232  006177  165732          1$:     ROL     @BPORTT         ;FLOAT A 1
013236  103503                          BCS     WCEDNB          ;GET OUT WHEN DONE
013240  013777  001102  165644  5$:     MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
013246  012777  177777  165634          MOV     #-1,@RSWC       ;SET WORD COUNT TO -1
013254  005077  165634                  CLR     @RSDA
013260  012777  002051  165616          MOV     #2051,@RSCS1    ;GO WRITE CHECK
013266  105777  165612          4$:     TSTB    @RSCS1          ;READY YET?
013272  100375                          BPL     4$              ;NO WAIT
013274  017700  165606                  MOV     @RSCS2,BAD      ;GET CS2
013300  013701  001152                  MOV     UNNUM,GOOD      ;SET UNIT #
013304  052701  040300                  BIS     #40300,GOOD     ;SET BITS
013310  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
013312  001413                          BEQ     7$              ;YES
013314  104000                          HLT                     ;CS2=BAD GOOD=CORRECT ANS
013316  017700  165646                  MOV     @BPORTT,BAD     ;GET BAD WD THAT SHOULD CAUSE WCE
013322  005001                          CLR     GOOD            ;GET GOOD WD IF WRITING 0
013324  032737  040000  001160          BIT     #BIT14,ONCEE    ;ARE WE WRITING 1 OR 0
013332  001402                          BEQ     8$              ;0
013334  012701  177777                  MOV     #-1,GOOD        ;GET GOOD WD FOR 1
013340  104000                  8$:     HLT                     ;GOOD - CORRECT WD WRITTEN
                                                                ;BAD   INCORRECT WD THAT WCE DID NOT CATCH
```

```
 2564  013342  022777  146250  165534  7$:     CMP     #146250,@RSCS1  ;DID TRE SET?
 2565  013350  001401                          BEQ     .+4             ;YES
 2566  013352  104043                          HLT     !CS1!ER!DS      ;TRE SHOULD SET IF WCE SETS
 2567  013354  017700  165532                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
 2568  013360  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
 2569  013364  062701  000002                  ADD     #2,GOOD         ;UPDATE IT
 2570  013370  020001                          CMP     BAD,GOOD        ;IS RSBA CORRECT
 2571  013372  001401                          BEQ     .+4             ;YES EXECUTE CONTINUE
 2572  013374  104000                          HLT                     ;RSBA FAILED TO INCREMENT
 2573  013376  104414                          CLRDK                   ;CLEAR ALL RS REG
 2574  013400  013701  001152                  MOV     UNNUM,GOOD      ;PUT DRIVE IN GOOD
 2575  013404  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
 2576  013410  017700  165472                  MOV     @RSCS2,BAD      ;GET CS2
 2577  013414  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT
 2578  013416  001401                          BEQ     .+4             ;YES
 2579  013420  104000                          HLT                     ;BAD =CS2 GOOD IS CORRECT ANS
 2580  013422  022777  004200  165454          CMP     #4200,@RSCS1    ;DID TRE CLEAR?
 2581  013430  001401                          BEQ     .+4             ;YES
 2582  013432  104001                          HLT     !CS1            ;TRE DID NOT CLEAR WITH CLEAR
 2583  013434  032737  040000  001160          BIT     #BIT14,ONCEE    ;FLOATION A 1 OR 0?
 2584  013442  001673                          BEQ     1$              ;FLOAT 1
 2585  013444  000663                          BR      6$              ;FLOAT 0
 2586  013446  052737  040000  001160  WCEDNB: BIS     #BIT14,ONCEE    ;SET BIT14
 2587  013454  104414                          CLRDK
 2588  013456  012777  177777  165504          MOV     #-1,@BPORTT
 2589  013464  000137  013144                  JMP     WCETB           ;NOW WRITE -1 IN OUTBUF
 2590  013470  012737  027454  001102  WCEDOS: MOV     #OUTBUF,OBUFSV  ;RESTORE OBUFSV
 2591  013476  042737  040000  001160          BIC     #BIT14,ONCEE    ;CLEAR TEST FLAG
```

```
2592                                    ;*****************************************************************************
2593                                    ;TEST 72                TEST PROGRAM ERROR BIT IN RSCS2
2594                                    ;*****************************************************************************
2595  013504  104400                    TST72:  SCOPE
2596
2597  013506  104414                    PGETST: CLRDK                           ;CLEAR ALL RS REG
2598  013510  012737  177777  027454            MOV     #177777,OUTBUF        ;DATA TO BE X-FERED
2599  013516  013777  001102  165366            MOV     @#OBUFSV,@RSBA        ;SET UP CURRENT ADDRESS
2600  013524  012777  177000  165356            MOV     #177000,@RSWC         ;SET WORD COUNT
2601  013532  012777  000061  165344            MOV     #61,@RSCS1            ;GO WRITE
2602  013540  105777  165340          2$:       TSTB    @RSCS1                ;IS RDY CLEARED YET?
2603  013544  100775                            BMI     2$                    ;NO WAIT
2604  013546  012777  000071  165330            MOV     #71,@RSCS1            ;GO READ
2605  013554  004737  026670                    JSR     PC,WAITRY             ;WAIT FOR READY
2606  013560  104001                            HLT     !CS1                  ;RDY NEVER CAME UP
2607  013562  022777  144260  165314            CMP     #144260,@RSCS1        ;IS CS1 CORRECT?
2608  013570  001401                            BEQ     .+4                   ;YES
2609  013572  104001                            HLT     .CS1                  ;TRE SHOULD SET BY SETTING PGE
2610  013574  005777  165322                    TST     @RSAS                 ;AS SHOULD = 0
2611  013600  001401                            BEQ     .+4                   ;YES
2612  013602  104100                            HLT     .AS                   ;RSAS SHOULD = 0
2613  013604  013701  001152                    MOV     UNNUM,GOOD            ;GET UNIT #
2614  013610  052701  002300                    BIS     #2300,GOOD            ;SET PGE, IR, AND OR
2615  013614  017700  165266                    MOV     @RSCS2,BAD            ;GET CS2
2616  013620  020100                            CMP     GOOD,BAD              ;IS IT CORRECT?
2617  013622  001401                            BEQ     .+4                   ;YES
2618  013624  104000                            HLT                           ;BAD = CS2
2619  013626  005777  165256                    TST     @RSWC                 ;SHOULD NOT BE 0
2620  013632  001001                            BNE     .+4                   ;BECAUSE PGE SHOULD ABORT
2621  013634  104011                            HLT     !WC.CS1               ;CURRENT OPERATION
2622  013636  005777  165256                    TST     @RSER                 ;DID ANY ERRORS SET?
2623  013642  001401                            BEQ     .+4                   ;NO
2624  013644  104040                            HLT     !DS                   ;RMR SHOULD BE SET
2625  013646  052777  040000  165230            BIS     #TRE,@RSCS1           ;CLEAR ERRORS
2626  013654  042701  002000                    BIC     #PGE,GOOD             ;CLEAR PGE ERROR
2627  013660  017700  165222                    MOV     @RSCS2,BAD            ;GET CS2
2628  013664  020100                            CMP     GOOD,BAD              ;IS CS2 CORRECT?
2629  013666  001401                            BEQ     .+4                   ;YES
2630  013670  104200                            HLT     !CS2                  ;PGE DID NOT CLEAR BY CLEARING TRE BAD = CS2
2631  013672  022777  004260  165204            CMP     #4260,@RSCS1          ;DID SC CLEAR
2632  013700  001401                            BEQ     .+4                   ;YES
2633  013702  104040                            HLT     .DS                   ;DID NOT CLEAR BY CLEARING TRE
```

```
                                ;*****************************************************************************
                                ;TEST 73                 TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSDA
                                ;*****************************************************************************
013704  104400                 TST73:  SCOPE

013706  104414                 RMRT1:  CLRDK                           ;CLEAR ALL RS REG
013710  013777  001102  165174         MOV     @#OBUFSV,@RSBA         ;SET UP CURRENT ADDRESS
013716  012777  177700  165164         MOV     #177700,@RSWC          ;SET WORD COUNT
013724  012703  172060                 MOV     #172060,R3             ;GET RSLA REG
013730  011304                 1$:     MOV     @R3,R4                 ;WAIT FOR
013732  042704  000017                 BIC     #17,R4                 ;THE MIDDLE
013736  022704  000020                 CMP     #20,R4                 ;OF SECTOR 0
013742  001372                         BNE     1$                     ;BEFORE DOING A SEARCH
013744  012777  000031  165132         MOV     #31,@RSCS1             ;SEARCH
013752  012777  007777  165134         MOV     #7777,@RSDA            ;CAUSE ERROR
013760  004737  026670                 JSR     PC,WAITRY              ;WAIT FOR READY
013764  104001                         HLT      CS1                   ;RDY NEVER CAME UP
013766  022777  000004  165124         CMP     #4,@RSER               ;DID RMR SET?
013774  001401                         BEQ     .+4                    ;YES
013776  104002                         HLT     !ER                    ;ER SHOULD = 4
014000  022777  007777  165106         CMP     #7777,@RSDA            ;DID DA GET MODIFIED?
014006  001001                         BNE     .+4                    ;NO
014010  104004                         HLT     !DA
014012  022777  150600  165076         CMP     #150600,@RSDS          ;DID ERR SET?
014020  001401                         BEQ     .+4                    ;YES
014022  104042                         HLT     !DS!ER                 ;ER DID NOT SET BECAUSE OF RMR
014024  022777  104230  165052         CMP     #104230,@RSCS1         ;IS CS1 CORRECT?
014032  001401                         BEQ     .+4                    ;YES
014034  104040                         HLT     !DS                    ;CS1 SHOULD = 144260
014036  104414                         CLRDK                          ;CLEAR ALL RS REG
014040  005777  165054                 TST     @RSER                  ;DID RMR CLEAR?
014044  001401                         BEQ     .+4                    ;YES
014046  104002                         HLT     !ER                    ;RMR DID NOT CLEAR WITH A CLEAR
014050  022777  004200  165026         CMP     #4200,@RSCS1           ;IS CS1 CORRECT?
014056  001401                         BEQ     .+4                    ;YES
014060  104040                         HLT     .DS                    ;NO

                                ;*****************************************************************************
                                ;TEST 74                 TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSER
                                ;*****************************************************************************
014062  104400                 TST74:  SCOPE

014064  104414                 RMRT2:  CLRDK                           ;CLEAR ALL RS REG
014066  013777  001102  165016         MOV     @#OBUFSV,@RSBA         ;SET UP CURRENT ADDRESS
014074  012777  177700  165006         MOV     #177700,@RSWC          ;SET WORD COUNT
014102  012777  000061  164774         MOV     #61,@RSCS1             ;GO WRITE
014110  105777  164770         2$:     TSTB    @RSCS1                 ;IS RDY SET?
014114  100775                         BMI     2$                     ;YES WAIT FOR IT TO CLEAR
014116  012777  177773  164774         MOV     #177773,@RSER          ;CAUSE ERROR
```

```
 2683  014124  004737  026670                  JSR     PC,WAITRY
 2684  014130  104001                          HLT     .CS1                ;RDY NEVER CAME UP
 2685  014132  022777  000004  164760          CMP     #4,@RSER            ;DID RMR SET?
 2686  014140  001401                          BEQ     .+4                 ;YES
 2687  014142  104002                          HLT     .ER                 ;ER SHOULD = 4
 2688  014144  022777  150600  164744          CMP     #150600,@RSDS       ;DID ERR SET?
 2689  014152  001401                          BEQ     .+4                 ;YES
 2690  014154  104042                          HLT     .DS!ER              ;ERR DID NOT SET BECAUSE OF RMR
 2691  014156  022777  144260  164720          CMP     #144260,@RSCS1      ;IS CS1 CORRECT?
 2692  014164  001401                          BEQ     .+4                 ;YES
 2693  014166  104040                          HLT     !DS                 ;CS1 SHOULD = 144260
 2694  014170  104414                          CLRDK                       ;CLEAR ALL RS REG
 2695
 2696                          ;*****************************************************************************
 2697                          ;TEST 75                TEST RMR IN RSER REGISTER TRYING TO WRITE INTO RSCS1
 2698                          ;*****************************************************************************
 2699  014172  104400          ST75:   SCOPE
 2700
 2701  014174  104414          RMRT3:  CLRDK                       ;CLEAR ALL RS REG
 2702  014176  013777  001102  164706          MOV     @#OBUFSV,@RSBA      ;SET UP CURRENT ADDRESS
 2703  014204  012777  177700  164676          MOV     #177700,@RSWC       ;SET WORD COUNT
 2704  014212  012777  000061  164664          MOV     #61,@RSCS1          ;GO WRITE
 2705  014220  105777  164660          2$:     TSTB    @RSCS1              ;IS RDY SET?
 2706  014224  100775                          BMI     2$                  ;YES WAIT FOR IT TO CLEAR
 2707  014226  012777  000030  164650          MOV     #30,@RSCS1          ;CAUSE ERROR
 2708  014234  004737  026670                  JSR     PC,WAITRY           ;WAIT FOR READY
 2709  014240  104001                          HLT     .CS1                ;RDY NEVER CAME UP
 2710  014242  022777  000004  164650          CMP     #4,@RSER            ;DID RMR SET?
 2711  014250  001401                          BEQ     .+4                 ;YES
 2712  014252  104002                          HLT     !ER                 ;ER SHOULD = 4
 2713  014254  022777  150600  164634          CMP     #150600,@RSDS       ;DID ERR SET?
 2714  014262  001401                          BEQ     .+4                 ;YES
 2715  014264  104042                          HLT     .DS.ER              ;ERID NOT SET BECAUSE OF RMR
 2716  014266  022777  144260  164610          CMP     #144260,@RSCS1      ;IS CS1 CORRECT?
 2717  014274  001401                          BEQ     .+4                 ;YES
 2718  014276  104040                          HLT     .DS                 ;CS1 SHOULD   144260
 2719  014300  104414                          CLRDK                       ;CLEAR ALL RS REG
```

```
                        ;*************************************************************************
                        ;TEST 76                TEST THAT RMR DOES NOT SET BY WRITTING INTO RSAS
                        ;*************************************************************************
014302  104400          TST76:  SCOPE

014304  104414          RMRT4:  CLRDK                           ;CLEAR ALL RS REG
014306  013777  001102  164576          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
014314  012777  177700  164566          MOV     #^177700,@RSWC  ;SET WORD COUNT
014322  012703  172060                  MOV     #172060,R3      ;GET RSLA REG
014326  011304          1$:     MOV     @R3,R4          ;WAIT FOR
014330  042704  000017                  BIC     #17,R4          ;THE MIDDLE
014334  022704  000020                  CMP     #20,R4          ;OF SECTOR 0
014340  001372                  BNE     1$              ;BEFORE DOING A SEARCH
014342  012777  000031  164534          MOV     #31,@RSCS1      ;SEARCH
014350  012777  000000  164544          MOV     #0,@RSAS        ;TRY TO CAUSE ERROR
014356  005037  001174                  CLR     WORK            ;CLEAR COUNTER
014362  032777  000200  164526  2$:     BIT     #BIT7,@RSDS     ;WAIT FOR DRY
014370  001004                  BNE     3$              ;READY CONT
014372  005237  001174                  INC     WORK            ;COUNT
014376  001371                  BNE     2$              ;RETRY
014400  104001                  HLT     !CS1            ;RDY NEVER CAME UP
014402  005777  164512          3$:     TST     @RSER           ;DID RMR SET?
014406  001401                  BEQ     .+4             ;NO
014410  104002                  HLT     .ER             ;ER SHOULD - 0
014412  022777  110600  164476          CMP     #110600,@RSDS   ;DID ERR SET?
014420  001401                  BEQ     .+4             ;NO
014422  104042                  HLT     !DS!ER          ;DS SHOULD = 110600
014424  022777  104230  164452          CMP     #104230,@RSCS1  ;IS CS1 CORRECT?
014432  001401                  BEQ     .+4             ;YES
014434  104040                  HLT     !DS             ;CS1 SHOULD = 144260
014436  104414                  CLRDK                   ;CLEAR ALL RS REG
014440  022777  004200  164436          CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
014446  001401                  BEQ     .+4             ;YES
014450  104040                  HLT     .DS             ;NO
```

```
                                ;*****************************************************************************
                                ;TEST 77                    TEST DCK IN RSER
                                ;*****************************************************************************
014452  104400                TST77:  SCOPE

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

014454  104414                DCKTST: CLRDK                           ;CLEAR ALL RS REG
014456  022737  000004  001162        CMP     #4,RS04DT               ;IS THIS A LA DISK?
014464  001004                      BNE     7$                      ;NO
014466  012737  177640  001200      MOV     #177640,WORK2           ;GET WC FOR LA DISK
014474  000411                      BR      1$                      ;CONTINUE
014476  012737  177500  001200  7$: MOV     #177500,WORK2           ;GET WC FOR RS04
014504  005737  001162              TST     RS04DT                  ;IS THIS A RS04?
014510  001003                      BNE     1$                      ;YES
014512  012737  177600  001200      MOV     #177600,WORK2           ;NO
014520  013777  001200  164362   $: MOV     WORK2,@RSWC             ;LOAD WC
014526  012737  177777  027454      MOV     #-1,OUTBUF              ;WRITE -1
014534  013777  001102  164350      MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
014542  052777  000010  164336  4$: BIS     #10,@RSCS2              ;SET BAI BIT
014550  012777  000061  164326      MOV     #61,@RSCS1              ;GO WRITE
014556  105777  164322          5$: TSTB    @RSCS1                  ;IS RDY SET?
014562  100375                      BPL     5$                      ;WAIT FOR WRITE TO FINISH
014564  005077  164324          2$: CLR     @RSDA                   ;SET DSK ADDRESS TO 0
014570  005037  027454              CLR     OUTBUF                  ;WRITE 0
014574  013777  001102  164310      MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
014602  012777  177777  164300      MOV     #-1,@RSWC               ;LOAD WC
014610  012702  172060              MOV     #172060,R2              ;PUT RSLA ADDR INTO R2
014614  011203                  3$: MOV     (R2),R3                 ;GET LA AND WAIT FOR
014616  042703  000077              BIC     #77,R3                  ;SECTOR 40
014622  022703  004000              CMP     #4000,R3                ;BEFORE
014626  001372                      BNE     3$                      ;WRITING
014630  012777  000061  164246      MOV     #61,@RSCS1              ;GO WRITE
014636  011203                  6$: MOV     (R2),R3                 ;GET RSLA AND WAIT FOR
014640  042703  000017              BIC     #17,R3                  ;MIDDLE OF SECTOR
014644  022703  000020              CMP     #20,R3                  ;0 BEFORE EXECUTING
014650  001372                      BNE     6$                      ;A CLEAR FUNCTION
014652  012777  000040  164226      MOV     #40,@RSCS2              ;CLEAR ALL REG. DO IT THIS WAY
014660  013777  001152  164220      MOV     UNNUM,@RSCS2            ;DO NOT USE TRAP
```

```
2793  014666  105777  164212          INCW:   TSTB    @RSCS1          ;IS BUSY CLEARED
2794  014672  100401                          BMI     6$              ;FLAG CLEARED
2795  014674  104001                          HLT     .CS1            ;RDY NEVER CAME UP
2796  014676  013777  001102  164206  6$:     MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
2797  014704  013777  001200  164176          MOV     WORK2,@RSWC     ;LOAD WC
2798  014712  012777  000071  164164          MOV     #71,@RSCS1      ;GO READ
2799  014720  105777  164160          5$:     TSTB    @RSCS1          ;IS RDY SET?
2800  014724  100375                          BPL     5$              ;WAIT FOR READ TO FINISH
2801  014726  022777  100000  164164          CMP     #100000,@RSER   ;DID DCK SET?
2802  014734  001401                          BEQ     .+4             ;YES
2803  014736  104002                          HLT     !ER             ;DCK DID NOT SET
2804  014740  022777  150600  164150          CMP     #150600,@RSDS   ;DID ERR SET?
2805  014746  001401                          BEQ     .+4             ;YES
2806  014750  104040                          HLT     !DS             ;ER DID NOT SET BY DCK
2807  014752  022777  144270  164124          CMP     #144270,@RSCS1  ;IS CS1 CORRECT?
2808  014760  001401                          BEQ     .+4             ;YES
2809  014762  104044                          HLT     !DS!DA
2810  014764  017700  164116                  MOV     @RSCS2,BAD      ;GET CS2
2811  014770  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
2812  014774  052701  000100                  BIS     #100,GOOD       ;SET IR
2813  015000  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
2814  015002  001401                          BEQ     .+4             ;YES
2815  015004  104000                          HLT
2816  015006  012701  177700                  MOV     #177700,GOOD    ;NO
2817  015012  017700  164072          1$:     MOV     @RSWC,BAD       ;DID TRANSFER STOP AT END OF SECTOR?
2818  015016  020100                          CMP     GOOD,BAD
2819  015020  001401                          BEQ     .+4             ;YES
2820  015022  104000                          HLT                     ;NO
2821  015024  012701  027454                  MOV     #OUTBUF,GOOD    ;GET BA
2822  015030  022737  000004  001162          CMP     #4,RS04DT       ;LA DISK?
2823  015036  001003                          BNE     7$              ;NO
2824  015040  062701  000100                  ADD     #100,GOOD       ;YES
2825  015044  000410                          BR      3$              ;CONTINUE
2826  015046  005737  001162          7$:     TST     RS04DT          ;RS04?
2827  015052  001003                          BNE     2$              ;YES
2828  015054  062701  000200                  ADD     #200,GOOD       ;RS03
2829  015060  000402                          BR      3$
2830  015062  062701  000400          2$:     ADD     #400,GOOD       ;GET CORRECT ANS FOR BA
2831  015066  017700  164020          3$:     MOV     @RSBA,BAD       ;GET BA
2832  015072  020001                          CMP     BAD,GOOD        ;IS BA CORRECT?
2833  015074  001401                          BEQ     .+4             ;YES
2834  015076  104000                          HLT                     ;NO
2835  015100  104414                          CLRDK                   ;CLEAR ALL RS REG
2836  015102  005777  164012                  TST     @RSER           ;DID DCK CLEAR?
2837  015106  001401                          BEQ     .+4             ;YES
2838  015110  104002                          HLT     .ER             ;DCK DID NOT CLEAR WITH CLEAR
2839  015112  012777  177500  163770          MOV     #177500,@RSWC   ;CLEAR DCK ON
2840  015120  013777  001102  163764          MOV     @#OBUFSV,@RSBA  ;DRIVE BY WRITING
2841  015126  012777  000061  163750          MOV     #61,@RSCS1      ;GOOD DATA
2842  015134  105777  163744          4$:     TSTB    @RSCS1          ;ON DRIVE
2843  015140  100375                          BPL     4$
```

```
                                ;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
                                ;*****************************************************************************
015142  104400                  TST100: SCOPE

015144  104414                  DKADR:  CLRDK                           ;CLEAR ALL RS REG
015146  012777  177777  163734          MOV     #177777,@RSWC           ;SET WORD COUNT TO -1
015154  013777  001102  163730          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
015162  012777  007777  163724          MOV     #7777,@RSDA             ;SET RSDA TO ALL ONES
015170  012777  000061  163706          MOV     #61,@RSCS1              ;GO WRITE ONE WORD
015176  004737  026670                  JSR     PC,WAITRY               ;WAIT FOR READY
015202  104001                          HLT     .CS1                    ;RDY DID NOT COME UP
015204  027727  163704  010000  5$:     CMP     @RSDA,#10000            ;DOES RSDA=0
015212  001401                          BEQ     .+4                     ;RSDA OK
015214  104004                          HLT     .DA                     ;DA DID NOT INCREMENT

                                ;*****************************************************************************
                                ;TEST 101                TEST IAE ERROR
                                ;*****************************************************************************
015216  104400                  TST101: SCOPE

                                ;IAE ERROR SHOULD SET ERR,ATA AND SC BITS

015220  104414                  IAERR:  CLRDK                           ;CLEAR ALL RS REG
015222  012777  177777  163660          MOV     #177777,@RSWC           ;SET WC TO -1
015230  013777  001102  163654          MOV     @#OBUFSV,@RSBA          ;SET UP BUS ADDRESS
015236  012777  017777  163650          MOV     #17777,@RSDA            ;SET DA TO RECEIVE ERROR
015244  012777  000061  163632          MOV     #61,@RSCS1              ;GO WRITE ONE WD
015252  105777  163626          7$:     TSTB    @RSCS1                  ;TEST FOR ERR OR RDY
015256  100401                          BMI     .+4                     ;OK CONT.
015260  000774                          BR      7$                      ;WAIT
015262  022777  002000  163630          CMP     #2000,@RSER             ;DID IAE SET?
015270  001401                          BEQ     .+4                     ;YES
015272  104002                          HLT     .ER                     ;IAE SHOULD BE SET
015274  022777  150600  163614          CMP     #150600,@RSDS           ;DID ERR SET?
015302  001401                          BEQ     .+4                     ;YES
015304  104140                          HLT     .DS.AS                  ;ERR SHOULD BE SET
015306  022777  144260  163570          CMP     #144260,@RSCS1          ;DID SC SET?
015314  001401                          BEQ     .+4                     ;YES
015316  104001                          HLT     .CS1                    ;SC SHOULD BE SET
015320  104414                          CLRDK                           ;CLEAR ALL RS REG
015322  005777  163572                  TST     @RSER                   ;CLR ERRORS?
015326  001401                          BEQ     .+4                     ;YES
015330  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
                                        ;*************************************************************************
                                        ;
015332  104400                          TST102: SCOPE
                                        ;
015334  104414                          NEDTST: CLRDK                           ;CLEAR ALL RS REG
015336  012737  000401  001174                  MOV     #401,WORK               ;SET UP FOR N.E.D. NUMBER
015344  005001                                  CLR     GUOD                    ;LOOK FOR NON EXISTENT DRIVES
015346  033737  001174  001154  1$:             BIT     WORK,UNITSV             ;ON THE SYSTEM
015354  001405                                  BEQ     3$                      ;FOUND NON EXISTENT DRIVE
015356  005201                                  INC     GOOD                    ;CONTAINS UNIT #
015360  006137  001174                          ROL     WORK                    ;KEEP LOOKING
015364  103452                                  BCS     NEDDON                  ;COULD NOT FIND ANY NON EXISTENT DRIVES
015366  000767                                  BR      1$                      ;LOOK FOR NED
015370  010177  163512          3$:             MOV     GOOD,@RSCS2             ;LOAD NED IN CS2
015374  005077  163514                          CLR     @RSDA                   ;WRITE DRIVE REG
015400  005777  163514                          TST     @RSER                   ;DID ANY BITS SET IN RSER?
015404  001401                                  BEQ     .+4                     ;NO
015406  104040                                  HLT     !DS                     ;WHY DID RSER CHANGE?
015410  017700  163472                          MOV     @RSCS2,BAD              ;GET CS2
015414  052701  010100                          BIS     #10100,GOOD             ;SET NED AND IR
015420  020100                                  CMP     GOOD,BAD                ;IS CS2 CORRECT?
015422  001401                                  BEQ     .+4                     ;YES
015424  104000                                  HLT                             ;GOOD=CORRECT CS2 BAD-CS2
015426  022777  160200  163450                  CMP     #160200,@RSCS1          ;IS CS1 CORRECT?
015434  001401                                  BEQ     .+4                     ;YES
015436  104200                                  HLT     .CS2                    ;TRE SHOULD SET BY NED ERROR
015440  005777  163456                          TST     @RSAS                   ;DID ANY BITS SET?
015444  001401                                  BEQ     .+4                     ;NO
015446  104100                                  HLT     !AS                     ;WHY DID AT BITS SET?
015450  112777  000100  163462                  MOVB    #100,@RSCS1B            ;CLEAR TRE
015456  032777  010000  163422                  BIT     #NED,@RSCS2             ;DID NED CLEAR
015464  001401                                  BEQ     .+4                     ;YES
015466  104200                                  HLT     .CS2                    ;NED DID NOT CLEAR
015470  017737  163420  001174                  MOV     @RSDA,WORK              ;READ DRIVE REG
015476  032777  010000  163402                  BIT     #NED,@RSCS2             ;DID NED SET?
015504  001001                                  BNE     .+4
015506  104040                                  HLT     .DS                     ;NED DID NOT SET
015510  000431                                  BR      NNDD                    ;GET OUT
015512  032737  010000  001160  NEDDON:         BIT     #BIT12,ONCEE            ;DWAS THIS TYPED BEFORE?
015520  001025                                  BNE     NNDD                    ;YES
015522  104402  015526                          TYPF    ..+2                    ;.ASCIZ <15><12>''COULD NOT FIND A NON-EXISTENT DRIVE''
015574  052737  010000  001160  NNDD:           BIS     #BIT12,ONCEE            ;SET TYPED FLAG
```

```
                                ;*****************************************************************************
                                ;TEST 103                       TEST THAT DAO IN RSER AND LBT IN RSDS DO SET
                                ;*****************************************************************************
015602  104400                  TST103: SCOPE
                        
015604  104414                  DAOTST: CLRDK                           ;CLEAR ALL RS REG
015606  022737  000004  001162          CMP     #4,RS04DT               ;RS03LA?
015614  001004                        BNE     3$                      ;NO
015616  012777  177737  163264        MOV     #-41,@RSWC              ;LOAD WORD COUNT
015624  000411                        BR      1$                      ;CONT
015626  012777  177577  163254  3$:   MOV     #-201,@RSWC             ;LOAD WC FOR RS04
015634  005737  001162                TST     RS04DT                  ;IS THIS A RS04?
015640  001003                        BNE     1$                      ;YES
015642  012777  177677  163240        MOV     #-101,@RSWC             ;NO
015650  012777  007777  163236  1$:   MOV     #7777,@RSDA             ;SET RSDA=TO ALL ONES
015656  013777  001102  163226  2$:   MOV     @#OBUFSV,@RSBA          ;CURRENT ADDRESS=OUTBUF
015664  012777  000061  163212        MOV     #61,@RSCS1              ;WRITE
015672  004737  026670                JSR     PC,WAITRY               ;WAIT FOR READY
015676  104001                        HLT     .CS1                    ;RDY DID NOT SET
015700  022777  001000  163212        CMP     #1000,@RSER             ;DID DAO SET?
015706  001401                        BEQ     .+4                     ;YES
015710  104002                        HLT     .ER                     ;DAO DID NOT SET
015712  022777  152600  163176        CMP     #152600,@RSDS           ;DID LBT SET?
015720  001401                        BEQ     .+4                     ;YES
015722  104040                        HLT     .DS                     ;LBT DID NOT SET
015724  005777  163154                TST     @RSCS1                  ;IS ERROR FLAG SET
015730  100401                        BMI     .+4                     ;ERROR IS SET
015732  104001                        HLT     .CS1                    ;SC DID NOT SET
015734  104414                        CLRDK                           ;CLEAR ALL RS REG
015736  022777  010600  163152        CMP     #10600,@RSDS            ;DID ATA +LBT CLEAR
015744  001401                        BEQ     .+4                     ;YES
015746  104040                        HLT     .DS                     ;ATA DID NOT CLEAR BY CLR BIT
015750  005777  163144                TST     @RSER                   ;DID DAO CLEAR?
015754  001401                        BEQ     .+4                     ;YES
015756  104002                        HLT     .ER                     ;DAO DID NOT CLEAR WITH CLEAR
```

```
2975                                    ;*****************************************************************************
2976                                    ;TEST 104                   TEST THAT LBT DOES SET AND DAO DOES NOT
2977                                    ;*****************************************************************************
2978  015760  104400                    TST104: SCOPE
2979
2980  015762  104414                    DAOTT:  CLRDK                           ;CLEAR ALL RS REG
2981  015764  022737  000004  001162            CMP     #4,RS04DT               ;RS03LA?
2982  015772  001004                            BNE     3$                      ;NO
2983  015774  012777  177741  163106            MOV     #-37,@RSWC              ;LOAD WORD COUNT
2984  016002  000411                            BR      1$                      ;CONT
2985  016004  012777  177601  163076  3$:       MOV     #-177,@RSWC             ;LOAD WC FOR RS04
2986  016012  005737  001162                    TST     RS04DT                  ;IS THIS A RS04?
2987  016016  001003                            BNE     1$                      ;YES
2988  016020  012777  177701  163062            MOV     #-77,@RSWC              ;NO
2989  016026  012777  007777  163060  1$:       MOV     #7777,@RSDA             ;SET RSDA=TO ALL ONES
2990  016034  013777  001102  163050  2$:       MOV     @#OBUFSV,@RSBA          ;CURRENT ADDRESS=OUTBUF
2991  016042  012777  000061  163034            MOV     #61,@RSCS1              ;WRITE
2992  016050  004737  026670                    JSR     PC,WAITRY               ;WAIT FOR READY
2993  016054  104001                            HLT     .CS1                    ;RDY DID NOT SET
2994  016056  005777  163036                    TST     @RSER                   ;ANY ERRORS?
2995  016062  001401                            BEQ     .+4                     ;NO
2996  016064  104002                            HLT     !ER                     ;YES
2997  016066  022777  012600  163022            CMP     #12600,@RSDS            ;DID LBT SET?
2998  016074  001401                            BEQ     .+4                     ;YES
2999  016076  104040                            HLT     !DS                     ;LBT DID NOT SET
3000  016100  005777  163000                    TST     @RSCS1                  ;IS ERROR FLAG SET
3001  016104  100001                            BPL     .+4                     ;NO
3002  016106  104001                            HLT     .CS1                    ;ERROR
3003  016110  104414                            CLRDK                           ;CLEAR ALL RS REG
3004  016112  022777  010600  162776            CMP     #10600,@RSDS            ;DID LBT CLEAR
3005  016120  001401                            BEQ     .+4                     ;YES
3006  016122  104040                            HLT     .DS                     ;ATA DID NOT CLEAR BY CLR BIT
```

```
                                        ;*************************************************************************
                                        ;TEST 105                   EXECUTE FUNCTION WITH ERROR BITS SET
                                        ;*************************************************************************
016124  104400                          TST105: SCOPE

016126  104414                          ERTST:  CLRDK                           ;CLEAR ALL RS REG
016130  012777  177017  162762                  MOV     #177017,@RSER           ;LOAD ER
016136  017700  162760                          MOV     @RSAS,BAD               ;GET AS REG
016142  013701  001156                          MOV     UNCMP,GOOD              ;GET UNIT ATA BIT
016146  042701  177400                          BIC     #177400,GOOD            ;CLEAR JUNK
016152  020100                                  CMP     GOOD,BAD                ;IS AS REG CORRECT?
016154  001401                                  BEQ     .+4                     ;YES
016156  104100                                  HLT     !AS                     ;AS BIT SHOULD BE SET
016160  022777  104200  162716                  CMP     #104200,@RSCS1          ;DID ERRS SET IN CS1?
016166  001401                                  BEQ     .+4                     ;YES
016170  104040                                  HLT     .DS                     ;CS1 SHOULD =104200
016172  013777  001156  162722                  MOV     UNCMP,@RSAS             ;CLEAR ATA BIT
016200  005777  162716                          TST     @RSAS                   ;DID IT CLEAR?
016204  001401                                  BEQ     .+4                     ;YES
016206  104100                                  HLT     .AS                     ;COULD NOT CLEAR AS BIT
                                                                                ;BY LOADING A 1 INTO IT
016210  022777  004200  162666                  CMP     #4200,@RSCS1            ;DID SC CLEAR BY
016216  001401                                  BEQ     .+4                     ;CLEARING ATA
016220  104002                                  HLT     .ER                     ;NO
016222  012737  177777  027454                  MOV     #177777,OUTBUF          ;DATA TO BE XFERED
016230  013777  001102  162654                  MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
016236  012777  177777  162644                  MOV     #-1,@RSWC               ;LOAD WC WITH -1
016244  012777  000071  162632                  MOV     #71,@RSCS1              ;DO READ FUNCTION
016252  032777  000001  162624                  BIT     #1,@RSCS1               ;DID GO BIT CLEAR
016260  001401                                  BEQ     .+4                     ;YES
016262  104001                                  HLT     .CS1                    ;GO BIT SHOULD BE CLEARED
016264  105777  162614          1$:             TSTB    @RSCS1                  ;WAIT FOR READY
016270  100375                                  BPL     1$                      ;WAIT
016272  022777  144270  162604                  CMP     #144270,@RSCS1          ;DID ERRS CLEAR BY SETTING GO BIT?
016300  001401                                  BEQ     .+4                     ;YES
016302  104002                                  HLT     .ER                     ;NO
```

```
3043  016304  017700  162576          MOV     @RSCS2,BAD      ;GET CS2
3044  016310  012701  001100          MOV     #1100,GOOD      ;GET CORRECT ANS
3045  016314  053701  001152          BIS     UNNUM,GOOD      ;GET UNIT #
3046  016320  020100                  CMP     GOOD,BAD        ;IS CS2 CORRECT?
3047  016322  001401                  BEQ     .+4             ;YES
3048  016324  104000                  HLT                     ;GOOD = WHAT CS2 SHOULD
3049  016326  022777  150600  162562  CMP     #150600,@RSDS   ;DID ERR BITS SET?
3050  016334  001401                  BEQ     .+4             ;NO
3051  016336  104040                  HLT     !DS             ;ERR BIT SHOULD BE 1
3052  016340  022777  177777  162542  CMP     #-1,@RSWC       ;DID WC MOVE?
3053  016346  001401                  BEQ     .+4             ;NO
3054  016350  104010                  HLT     .WC             ;WC SHOULD = 1777777
3055  016352  005777  162536          TST     @RSDA           ;DID DA MOV
3056  016356  001401                  BEQ     .+4             ;NO
3057  016360  104004                  HLT     .DA             ;DA SHOULD =0
3058  016362  023777  001102  162522  CMP     @#OBUFSV,@RSBA  ;DID BA MOVE
3059  016370  001401                  BEQ     .+4             ;NO
3060  016372  104020                  HLT     !BA             ;BA MOVED
3061  016374  033777  001156  162520  BIT     UNCMP,@RSAS     ;AS SHOULD BE SET
3062  016402  001001                  BNE     .+4             ;IS IT?
3063  016404  104100                  HLT     .AS             ;NO
3064  016406  022777  177017  162504  CMP     #177017,@RSER   ;DID ER CHANGE?
3065  016414  001401                  BEQ     .+4             ;NO
3066  016416  104002                  HLT     .ER             ;ER SHOULD NOT CHANGE
```

```
3067                                    ;*****************************************************************************
3068                                    ;TEST 106                   PAT AND MCPE TEST
3069                                    ;*****************************************************************************
3070  016420  104400                    TST106: SCOPE
3071
3072  016422  104414                    PATST:  CLRDK                           ;CLEAR ALL RS REG
3073  016424  052777  000020  162454            BIS     #BIT4,@RSCS2            ;SET PAT
3074  016432  005777  162472                    TST     @RSMR                   ;READ DRIVE REG
3075  016436  017700  162444                    MOV     @RSCS2,BAD              ;GET CS2
3076  016442  012701  000120                    MOV     #120,GOOD               ;MDPE SHOULD
3077  016446  053701  001152                    BIS     UNNUM,GOOD              ;NOT SET
3078  016452  020100                            CMP     GOOD,BAD                ;IS CS2 CORRECT?
3079  016454  001401                            BEQ     .+4                     ;YES
3080  016456  104000                            HLT                             ;BAD = CS2 GOOD = CORRECT ANS
3081  016460  012777  000010  162442            MOV     #10,@RSMR               ;CAUSE PAR TO SET IN RSER
3082  016466  022777  000010  162424            CMP     #10,@RSER               ;DID PAR SET?
3083  016474  001401                            BEQ     .+4                     ;YES
3084  016476  104140                            HLT     !AS!DS
3085  016500  017700  162416                    MOV     @RSAS,BAD               ;GET AS REG
3086  016504  013701  001156                    MOV     UNCMP,GOOD              ;GET UNIT ATA BIT
3087  016510  042701  177400                    BIC     #177400,GOOD            ;CLEAR JUNK
3088  016514  020100                            CMP     GOOD,BAD                ;IS AS REG CORRECT?
3089  016516  001401                            BEQ     .+4                     ;YES
3090  016520  104100                            HLT     !AS                     ;AS BIT SHOULD BE SET
3091  016522  022777  104200  162354            CMP     #104200,@RSCS1          ;DID ERRS SET IN CS1?
3092  016530  001401                            BEQ     .+4                     ;YES
3093  016532  104040                            HLT     .DS                     ;CS1 SHOULD =104200
3094  016534  104414                            CLRDK                           ;CLEAR RS REG
3095  016536  022777  004200  162340            CMP     #4200,@RSCS1            ;IS CS1 CORRECT?
3096  016544  001401                            BEQ     .+4                     ;CLEARING ATA
3097  016546  104002                            HLT     !ER                     ;NO
3098  016550  017700  162332                    MOV     @RSCS2,BAD              ;CHECK TO SEE
3099  016554  013701  001152                    MOV     UNNUM,GOOD              ;IF PAT CLEARS
3100  016560  052701  000100                    BIS     #100,GOOD
3101  016564  020100                            CMP     GOOD,BAD
3102  016566  001401                            BEQ     .+4
3103  016570  104000                            HLT                             ;PAT DID NOT CLEAR
```

```
                                ;*****************************************************************************
                                ;TEST 107                SET PAT BIT AND LOAD FUNCTION
                                ;*****************************************************************************
016572  104400                  TST107: SCOPE

016574  104414                  SETPAT: CLRDK                           ;CLEAR ALL REG
016576  052777  000010  162302          BIS     #BAI,@RSCS2             ;SET BAI
016604  012737  177777  027454          MOV     #177777,OUTBUF          ;DATA TO BE XFERED
016612  013777  001102  162272          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
016620  012777  177000  162262          MOV     #-1000,@RSWC            ;LOAD WC WITH -1
016626  052777  000020  162252          BIS     #BIT4,@RSCS2            ;SET PAT BIT
016634  012777  000071  162242          MOV     #71,@RSCS1              ;DO READ FUNCTION
016642  105777  162236          1$:     TSTB    @RSCS1                  ;WAIT FOR READY
016646  100375                          BPL     1$                      ;WAIT
016650  022777  144270  162226          CMP     #144270,@RSCS1          ;DID CS1 GET LOADED?
016656  001401                          BEQ     .+4                     ;NO
016660  104040                          HLT     DS                      ;IT SHOULD NOT
016662  023777  001102  162222          CMP     @#OBUFSV,@RSBA          ;DID BA MOVE?
016670  001401                          BEQ     .+4                     ;NO
016672  104020                          HLT     .BA                     ;YES
016674  022777  177000  162206          CMP     #-1000,@RSWC            ;DID WC MOVE?
016702  001401                          BEQ     .+4                     ;NO
016704  104010                          HLT     !WC                     ;YES WHY?

                                ;*****************************************************************************
                                ;TEST 110                DO FUNCTION THEN SET PAT BIT
                                ;*****************************************************************************
016706  104400                  TST110: SCOPE
016710  104414                  FUNDO:  CLRDK                           ;CLEAR ALL REG
016712  052777  000010  162166          BIS     #BAI,@RSCS2             ;SET BAI
016720  012737  177777  027454          MOV     #177777,OUTBUF          ;DATA TO BE XFERED
016726  013777  001102  162156          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
016734  012777  177000  162146          MOV     #-1000,@RSWC            ;LOAD WC WITH -1
016742  012777  000071  162134  3$:     MOV     #71,@RSCS1              ;DO A READ
016750  100774                          BMI     3$                      ;WAIT FOR BUSY
016752  052777  000020  162126          BIS     #BIT4,@RSCS2            ;SET PAT
016760  105777  162120          2$:     TSTB    @RSCS1                  ;WAIT FOR READY
016764  100375                          BPL     2$
016766  022777  144270  162110          CMP     #144270,@RSCS1          ;DID MCPE SET?
016774  001401                          BEQ     .+4                     ;NO
016776  104002                          HLT     .ER                     ;YES
017000  017700  162102                  MOV     @RSCS2,BAD              ;GET CS2
017004  012701  000730                  MOV     #730,GOOD               ;GET CORRECT ANS
017010  053701  001152                  BIS     UNNUM,GOOD              ;GET UNIT #
017014  020100                          CMP     GOOD,BAD                ;IS CS2 CORRECT?
017016  001401                          BEQ     .+4                     ;YES
017020  104000                          HLT                             ;GOOD   WHAT CS2 SHOULD
```

```
3151  017022  022777  010600  162066          CMP     #10600,@RSDS    ;DID ERR BITS SET?
3152  017030  001401                          BEQ     .+4             ;NO
3153  017032  104040                          HLT     .DS             ;ERR BIT SHOULD BE 1
3154  017034  005777  162060                  TST     @RSER           ;IS ER CLEAR?
3155  017040  001401                          BEQ     .+4             ;YES
3156  017042  104044                          HLT     !DS!DA          ;NO ERRORS SHOULD BE SET
3157  017044  104414                          CLRDK                   ;CLEAR ALL RS REG
3158  017046  022777  004200  162030          CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
3159  017054  001401                          BEQ     .+4             ;YES
3160  017056  104040                          HLT     !DS
3161                                  ;*************************************************************************
3162                                  ;TEST 111                TEST PAR BY SETTING PAT
3163                                  ;*************************************************************************
3164  017060  104400                  TST111: SCOPE
3165
3166  017062  104414                  PATTST: CLRDK                   ;CLEAR ALL RS REG
3167  017064  052777  000010  162014          BIS     #BAI,@RSCS2     ;SET BAI
3168  017072  012737  177777  027454          MOV     #177777,OUTBUF  ;DATA TO BE XFERED
3169  017100  013777  001102  162004          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
3170  017106  012777  177000  161774          MOV     #-1000,@RSWC    ;LOAD WC WITH -1
3171  017114  012777  000061  161762          MOV     #61,@RSCS1      ;DO WRITE FUNCTION
3172  017122  105777  161756          1$:     TSTB    @RSCS1          ;WAIT FOR READY
3173  017126  100775                          BMI     1$              ;WAIT
3174  017130  052777  000020  161750          BIS     #BIT4,@RSCS2    ;SET PAT
3175  017136  105777  161742          2$:     TSTB    @RSCS1          ;WAIT FOR READY
3176  017142  100375                          BPL     2$
3177  017144  022777  144260  161732          CMP     #144260,@RSCS1  ;DID MCPE SET?
3178  017152  001401                          BEQ     .+4             ;NO
3179  017154  104002                          HLT     !ER             ;YES
3180  017156  017700  161724                  MOV     @RSCS2,BAD      ;GET CS2
3181  017162  012701  000230                  MOV     #230,GOOD       ;GET CORRECT ANS-- DO NOT CHECK IR - REASON 50 CYCLE
3182  017166  053701  001152                  BIS     UNNUM,GOOD      ;GET UNIT #
3183  017172  042700  000100                  BIC     #BIT6,BAD       ;CLEAR IR BIT FOR CS2 COMPARE
3184  017176  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3185  017200  001401                          BEQ     .+4             ;YES
3186  017202  104000                          HLT                     ;GOOD   WHAT CS2 SHOULD
3187  017204  022777  150600  161704          CMP     #150600,@RSDS   ;DID FRR BITS SET?
3188  017212  001401                          BEQ     .+4             ;NO
3189  017214  104040                          HLT     .DS             ;ERR BIT SHOULD BE 1
3190  017216  022777  000010  161674          CMP     #10,@RSER       ;DID PAR SET?
3191  017224  001401                          BEQ     .+4             ;YES
3192  017226  104044                          HLT     !DS!DA          ;NO
3193  017230  104414                          CLRDK                   ;CLEAR ALL RS REG
3194  017232  022777  004200  161644          CMP     #4200,@RSCS1    ;IS CS1 CORRECT?
3195  017240  001401                          BEQ     .+4             ;YES
3196  017242  104040                          HLT     !DS
3197  017244  005777  161650                  TST     @RSER           ;DID PAR CLEAR?
3198  017250  001401                          BEQ     .+4             ;YES
3199  017252  104040                          HLT     .DS
```

```
3200                                    ;*****************************************************************************
3201                                    ;TEST 112                TEST THE ABILITY TO FILL THE LAST SECTOR
3202                                    ;*****************************************************************************
3203  017254  104400                    TST112: SCOPE
3204
3205  017256  104414                    LASTSC: CLRDK                           ;CLEAR ALL RS REG
3206  017260  012777  007777  161626            MOV     #7777,@RSDA             ;SET RSDA=TO ALL ONES
3207  017266  022737  000004  001162            CMP     #4,RS04DT               ;LA DISK?
3208  017274  001004                           BNE     2$                      ;NO
3209  017276  012777  177740  161604            MOV     #-40,@RSWC              ;LOAD WORD COUNT
3210  017304  000411                           BR      1$                      ;CONTINUE
3211  017306  012777  177700  161574    2$:     MOV     #-100,@RSWC             ;WORD COUNT=-100
3212  017314  005737  001162                   TST     RS04DT                  ;IS THIS A RS04?
3213  017320  001403                           BEQ     1$                      ;NO
3214  017322  012777  177600  161560           MOV     #-200,@RSWC             ;YES
3215  017330  013777  001102  161554    1$:     MOV     @#OBUFSV,@RSBA          ;CURRENT ADDRESS=OUTBUF
3216  017336  012777  000061  161540           MOV     #61,@RSCS1              ;WRITE
3217  017344  004737  026670                   JSR     PC,WAITRY               ;WAIT FOR READY
3218  017350  104001                           HLT     !CS1                    ;RDY DID NOT SET
3219  017352  005777  161542                   TST     @RSER                   ;DID ANY ERROR BITS SET?
3220  017356  001401                           BEQ     .+4                     ;NO
3221  017360  104002                           HLT     !ER                     ;GOT AN ERROR
3222  017362  022777  012600  161526           CMP     #12600,@RSDS            ;DID LBT SET?
3223  017370  001401                           BEQ     .+4                     ;YES
3224  017372  104040                           HLT     !DS                     ;LBT DID NOT SET
3225  017374  005777  161504                   TST     @RSCS1                  ;IS ERROR FLAG SET
3226  017400  100001                           BPL     .+4                     ;ERROR IS SET
3227  017402  104001                           HLT     .CS1                    ;SC DID NOT SET
3228  017404  104414                           CLRDK                           ;CLEAR ALL RS REG
3229  017406  022777  010600  161502           CMP     #10600,@RSDS            ;DID ATA +LBT CLEAR
3230  017414  001401                           BEQ     .+4                     ;YES
3231  017416  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
                                        ;*************************************************************************
017420  104400                  TST113: SCOPE
017422  104414                  SECT:   CLRDK                           ;CLEAR ALL RS REG
017424  012737  177777  027454          MOV     #-1,OUTBUF              ;PUT -1NTO OUTBUF
017432  013777  001102  161452          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDR
017440  022737  000004  001162          CMP     #4,RS04DT               ;RS03LA DISK?
017446  001004                          BNE     4$                      ;NO
017450  012777  177740  161432          MOV     #-40,@RSWC              ;LOAD WORD COUNT
017456  000411                          BR      5$                      ;CONTINUE
017460  012777  177600  161422  4$:     MOV     #-200,@RSWC             ;LOAD WC FOR RS04
017466  005737  001162                  TST     RS04DT                  ;RS04?
017472  001003                          BNE     5$                      ;YES
017474  012777  177700  161406          MOV     #-100,@RSWC             ;SET WORD COUNT TO -100
017502  052777  000010  161376  5$:     BIS     #BAI,@RSCS2             ;SET BAI BIT
017510  012777  000061  161366          MOV     #61,@RSCS1              ;WRITE
017516  105777  161362          3$:     TSTB    @RSCS1                  ;IS RDY SET?
017522  100375                          BPL     3$                      ;NO
017524  005077  161364                  CLR     @RSDA                   ;SET DSK ADDRESS TO 0
017530  012737  177777  027454          MOV     #-1,OUTBUF              ;PUT 177777 INTO OUTBUF
017536  013777  001102  161346          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDR
017544  012777  177777  161336          MOV     #-1,@RSWC               ;SET WORD COUNT TO -1
017552  052777  000010  161326          BIS     #10,@RSCS2              ;SET BAI BIT
017560  012777  000061  161316          MOV     #61,@RSCS1              ;WRITE
017566  105777  161312          1$:     TSTB    @RSCS1                  ;IS RDY SET?
017572  100375                          BPL     1$                      ;NO
017574  042777  000010  161304          BIC     #10,@RSCS2              ;CLEAR BAI BIT
017602  005737  001162                  TST     RS04DT                  ;RS04?
017606  001404                          BEQ     7$                      ;NO
017610  012737  000200  001174          MOV     #200,WORK               ;YES
017616  000403                          BR      8$                      ;CONT
017620  012737  000100  001174  7$:     MOV     #100,WORK               ;SET UP BUFFER
017626  013701  001102          8$:     MOV     @#OBUFSV,R1             ;GET STARTING ADD OF BUF
017632  012721  177777                  MOV     #-1,(R1)+               ;LOAD FIRST WD WITH -1
017636  005021                  6$:     CLR     (R1)+                   ;LOAD REST WITH 0
017640  005337  001174                  DEC     WORK                    ;DONE YET?
017644  001374                          BNE     6$                      ;NO
017646  005077  161242                  CLR     @RSDA                   ;SET DSK ADDRESS TO 0
017652  013777  001102  161232          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDR
017660  022737  000004  001162          CMP     #4,RS04DT               ;RS03LA DISK?
017666  001004                          BNE     11$                     ;NO
017670  012777  177740  161212          MOV     #-40,@RSWC              ;LOAD WORD COUNT
017676  000412                          BR      10$                     ;CONTINUE
017700  005737  001162          11$:    TST     RS04DT                  ;RS04?
017704  001404                          BEQ     9$                      ;NO
017706  012777  177600  161174          MOV     #-200,@RSWC             ;YES
017714  000403                          BR      10$                     ;CONT
017716  012777  177700  161164  9$:     MOV     #-100,@RSWC             ;SET WORD COUNT TO -100
017724  012777  000051  161152  10$:    MOV     #51,@RSCS1              ;WRITE CHECK
```

```
3286  017732  032777  000200  161144  2$:     BIT     #200,@RSCS1     ;IS RDY SET?
3287  017740  001774                          BEQ     2$              ;NO
3288  017742  013701  001152                  MOV     UNNUM,GOOD      ;GET UNIT #
3289  017746  052701  000100                  BIS     #100,GOOD       ;SET IR BIT
3290  017752  017700  161130                  MOV     @RSCS2,BAD      ;GET CS2
3291  017756  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3292  017760  001401                          BEQ     .+4             ;YES
3293  017762  104002                          HLT     !ER             ;THERE WAS A WRITE CHECK ERROR
3294
3295                                  ;*************************************************************************
3296                                  ;TEST 114               IF MEMORY MANAGEMENT IS AVAILABLE CHECK THE EXTENDED MEMORY ADDR
3297                                  ;*************************************************************************
3298  017764  104400                  TST114: SCOPE
3299
3300  017766  104414                  EXTTST: CLRDK                           ;CLEAR ALL RS REG.
3301  017770  013737  022504  001164          MOV     TIMES,TIMSV     ;SAVE LOOP #
3302  017776  012737  000010  022504          MOV     #10,TIMES       ;LOOP 10 TIMES
3303  020004  012737  020510  000004          MOV     #EXTTRP,4       ;SETUP TIMEOUT TRAP
3304  020012  012737  000340  000006          MOV     #340,6
3305  020020  005737  177572                  TST     @#SR0           ;IF MEMORY MANAGEMENT IS NOT
3306                                                                  ;AVAILABLE THE PROGRAM WILL TRAP
3307                                                                  ;AND TRANSFER TO END OF THE TEST
3308  020024  012737  020502  000004          MOV     #EXTRP,4
3309  020032  012737  007600  172356          MOV     #7600,@#KIPAR7  ;OPEN I/O REGISTERS
3310  020040  005037  172340                  CLR     @#KIPAR0        ;FREE FIRST 4K
3311  020044  012737  000200  172342          MOV     #200,@#KIPAR1   ;ENABLE SECOND 4K
3312  020052  012737  002000  172344          MOV     #2000,@#KIPAR2
3313  020060  012737  177406  172300          MOV     #400*256.-400+UP+RW,@#KIPDR0    ;SET KIPDR0 RW UP 400 BLOCKS
3314  020066  012737  177406  172302          MOV     #400*256.-400+UP+RW,@#KIPDR1    ;SET KIPDR1-RW UP 400 BLOCKS
3315  020074  012737  177406  172304          MOV     #400*256.-400+UP+RW,@#KIPDR2    ;SET KIPDR2=RW UP 400 BLOCKS
3316  020102  012737  177406  172316          MOV     #400*256.-400+UP+RW,@#KIPDR7    ;SET KIPDR7-RW UP 400 BLOCKS
3317  020110  012737  000001  177572          MOV     #1,@#SR0        ;TURN ON MEMORY MANAGEMENT
3318  020116  012702  040000                  MOV     #40000,R2       ;R2 EQUALS BASE ADDR
```

```
3319  020122  012712  177777          7$:     MOV     #177777,(R2)    ;INSERT PATTERN INTO 200000
3320  020126  012777  177776  160754          MOV     #-2,@RSWC       ;SETUP WORDCOUNT
3321  020134  012777  177777  160750          MOV     #177777,@RSBA   ;SETUP BUS ADDR
3322  020142  012777  000061  160734          MOV     #61,@RSCS1      ;WRITE TWO WORDS ON DISK.  RSBA
3323                                                                  ;STARTS AT 177777 TO FORCE CARRY
3324                                                                  ;TO SET A16
3325  020150  105777  160730                  TSTB    @RSCS1          ;WAIT FOR READY
3326  020154  100375                          BPL     .-4
3327  020156  005777  160722                  TST     @RSCS1
3328  020162  100002                          BPL     1$
3329  020164  104046                          HLT     !ER!DA.DS       ;STATUS ERROR AFTER 2 WORD WRITE
3330  020166  000447                          BR      2$              ;USING MEX0
3331  020170  022777  004660  160706  1$:     CMP     #4660,@RSCS1    ;IS CS1 CORRECT
3332  020176  001402                          BEQ     3$              ;YES
3333  020200  104002                          HLT     .ER             ;CS2 DID NOT COMPARE
3334  020202  000441                          BR      2$
3335  020204  005012                  3$:     CLR     (R2)            ;CLEAR LOCATION 200000
3336  020206  005077  160702                  CLR     @RSDA           ;SETUP DA
3337  020212  012777  177777  160672          MOV     #177777,@RSBA   ;SETUP BA
3338  020220  012777  177776  160662          MOV     #-2,@RSWC       ;SETUP WC
3339  020226  012777  000071  160650          MOV     #71,@RSCS1      ;READ TWO WORDS INTO LOCATIONS
3340                                                                  ;177777 AND 200000.
3341  020234  105777  160644                  TSTB    @RSCS1          ;WAIT FOR READY
3342  020240  100375                          BPL     .-4
3343  020242  005777  160636                  TST     @RSCS1          ;ANY ERRORS?
3344  020246  100002                          BPL     4$              ;BRANCH IF NO
3345  020250  104002                          HLT     .ER             ;ERROR OFTER READING 2 WORDS
3346  020252  000415                          BR      2$
3347  020254  022777  004670  160622  4$:     CMP     #4670,@RSCS1    ;IS CS1 CORRECT?
3348  020262  001402                          BEQ     5$              ;YES
3349  020264  104002                          HLT     .ER             ;CS1 DID NOT COMPARE
3350  020266  000407                          BR      2$              ;READ STARTING AT 177777
3351  020270  022712  177777          5$:     CMP     #177777,(R2)    ;WAS DATA READ INTO LOCATION
3352  020274  001404                          BEQ     2$              ;200000 CORRECTLY? - BRANCH IF YES
3353  020276  012701  177777                  MOV     #177777,GOOD
3354  020302  011200                          MOV     (R2),BAD
3355  020304  104000                          HLT                     ;DATA COMPARE ERROR AT 200000
3356  020306  000240                  2$:     NOP
```

```
3357  020310  104414                    EXTT1:  CLRDK                   ;CLEAR ALL REG
3358  020312  012737  004000  172344            MOV     #4000,@#KIPAR2
3359  020320  012702  040000                    MOV     #40000,R2       ;R2 EQUALS THE BASE ADDR
3360  020324  012712  177777            7$:     MOV     #177777,(R2)    ;INSERT PATTERN INTO 400000
3361  020330  012777  177777  160554            MOV     #177777,@RSBA   ;SETUP BUS ADDR
3362  020336  012777  177776  160544            MOV     #-2,@RSWC       ;LOAD WC
3363  020344  012777  000461  160532            MOV     #461,@RSCS1     ;SET BIT A16 AND WRITE
3364  020352  105777  160526                    TSTB    @RSCS1          ;WAIT FOR READY
3365  020356  100375                            BPL     .-4
3366  020360  005777  160520                    TST     @RSCS1          ;ANY ERRORS?
3367  020364  100001                            BPL     4$              ;BRANCH IF NO
3368  020366  104002                            HLT     .ER             ;ERROR AFTER READING 2 WORDS
3369  020370  022777  005260  160506    4$:     CMP     #5260,@RSCS1    ;IS CS1 CORRECT?
3370  020376  001401                            BEQ     10$             ;BRANCH IF YES
3371  020400  104002                            HLT     !ER             ;NO CS1 DID NOT COMPARE
3372                                                                    ;READ STARTING AT 377777
3373  020402  005012                    10$:    CLR     (R2)            ;CLEAR LOCATION 400000
3374                                                                    ;READ TWO WORDS STARTING AT 377777
3375  020404  012777  177776  160476            MOV     #-2,@RSWC       ;SETUP WC
3376  020412  005077  160476                    CLR     @RSDA           ;SETUP DA
3377  020416  012777  177777  160466            MOV     #177777,@RSBA
3378  020424  012777  000471  160452            MOV     #471,@RSCS1     ;CLEAR A 17 SET A16,READ
3379  020432  105777  160446                    TSTB    @RSCS1          ;WAIT FOR READY
3380  020436  100375                            BPL     .-4
3381  020440  005777  160440                    TST     @RSCS1          ;ANY ERRORS?
3382  020444  100002                            BPL     11$             ;BRANCH IF NO
3383  020446  104002                            HLT     .ER             ;ERROR WHILE READING TWO WORDS
3384  020450  000414                            BR      EXTRP
3385  020452  022777  005270  160424    11$:    CMP     #5270,@RSCS1    ;IS CS1 CORRECT?
3386  020460  001401                            BEQ     12$             ;BRANCH IF YES
3387  020462  104002                            HLT     .ER             ;CS1 DID NOT COMPARE
3388                                                                    ;READ STARTING AT 377777
3389  020464  022712  177777            12$:    CMP     #177777,(R2)    ;WAS DATA READ INTO LOCATION 400000
3390  020470  001404                            BEQ     EXTRP           ;CORRECTLY? - BRANCH IF YES
3391  020472  012701  177777                    MOV     #177777,GOOD
3392  020476  011200                            MOV     (R2),BAD
3393  020500  104000                            HLT                     ;DATA COMPARE ERROR AT 400000 IF
3394                                                                    ;RECEIVED-0 - LOCATION WASN'T ACCESSED
3395  020502  005037  177572            EXTRP:  CLR     @#SR0           ;TURN OFF MEMORY MANAGEMENT
3396  020506  000401                            BR      EXT1
3397  020510  000240                    EXTTRP: NOP                     ;UPDATE TEST NUMBERS
3398  020512  012706  000500            EXT1:   MOV     #500,SP         ;RESTORE STACK
3399  020516  012737  000006  000004  MEMOUT: MOV     #6,4
3400  020524  005037  000006                    CLR     6
```

```
3401                                    ;*****************************************************************************
3402                                    ;TEST 115                TEST PROGRAM INTERRUPT BY MOVING 300 INTO RSCS1
3403                                    ;*****************************************************************************
3404  020530  104400                    TST115: SCOPE
3405
3406  020532  104414                    QES:    CLRDK                       ;CLEAR ALL DRIVES
3407  020534  012706  000500                    MOV     #500,SP             ;SETUP STACK
3408  020540  012777  020612  160366            MOV     #PGTRAP,@RSVEC      ;SET UP VECTOR
3409  020546  012777  000340  160362            MOV     #340,@RSVCPS        ;SET TRAP PS
3410  020554  012737  000200  177776            MOV     #200,@#PS           ;SET PS AT PRIORITY 4
3411  020562  012777  000300  160314            MOV     #300,@RSCS1         ;THIS SHOULD CAUSE A TRAP
3412  020570  012737  000500  001174            MOV     #500,WORK           ;SETUP LOOP
3413  020576  005337  001174            1$:     DEC     WORK                ;DEC LOOP SHOULD
3414  020602  001375                            BNE     1$                  ;INTERRUPE BEFORE LOOP IS DONE
3415  020604  104001                            HLT     !CS1                ;SHOULD NEVER GET HERE
3416  020606  000137  020626                    JMP     QESDON              ;GET OUT
3417
3418  020612  022626                    PGTRAP: CMP     (6)+,(6)+           ;TRAP OK
3419  020614  022777  004200  160262            CMP     #4200,@RSCS1        ;DID IE CLEAR?
3420  020622  001401                            BEQ     .+4                 ;YES
3421  020624  104001                            HLT     .CS1                ;IE SHOULD BE CLEARED
3422  020626                            QESDON:
3423
3424                                    ;*****************************************************************************
3425                                    ;TEST 116                TEST THAT DISK DOES NOT INTERRUPT WHEN PS IS AT 5
3426                                    ;*****************************************************************************
3427  020626  104400                    TST116: SCOPE
3428
3429  020630  012706  000500            INTR5:  MOV     #500,SP             ;SETUP STACK
3430  020634  013737  001164  022504            MOV     TIMSV,TIMES         ;RESTORE LOOP COUNTER
3431  020642  104414                            CLRDK                       ;CLEAR ALL RS REG
3432  020644  012777  020724  160262            MOV     #INT112,@RSVEC      ;SET UP INTERRUPT VECTOR
3433  020652  012777  000340  160256            MOV     #340,@RSVCPS        ;SET PRIO.
3434  020660  012737  000240  177776            MOV     #240,@#PS           ;LOCK OUT ALL INTERRUPTS ABOVE
3435  020666  013700  177776                    MOV     @#PS,BAD            ;GET PS
3436  020672  012777  177777  160210            MOV     #177777,@RSWC       ;SET WORD COUNT TO -1
3437  020700  013777  001102  160204            MOV     @#OBUFSV,@RSBA      ;LOAD CURRENT ADDRESS
3438  020706  012777  000161  160170            MOV     #161,@RSCS1         ;GO WRITE (INTERRUPT ENABLED)
3439  020714  004737  026670                    JSR     PC,WAITRY           ;WAIT FOR READY
3440  020720  104001                            HLT     .CS1                ;NO RDY NEVER CAME UP
3441  020722  000403                            BR      INTDON              ;RESTART ROUTINE
3442                                    ;PROCESSOR SHOULD NOT TRAP TO INT112
3443
3444  020724  012701  000240            INT112: MOV     #240,GOOD           ;WHAT PS SHOULD HAVE
3445  020730  104000                            HLT                         ;GOOD = CORRECT ANS FOR PS
3446  020732                            INTDON:                             ;DONE GET OUT
```

```
                                ;*****************************************************************************
                                ;TEST 117                TEST THAT DISK DOES INTERRUPT WHEN PS IS AT 4
                                ;*****************************************************************************
021732  104400                TST117: SCOPE

021734  012706  000500        INTR4:  MOV     #500,SP         ;SETUP STACK
021740  104414                        CLRDK                   ;CLEAR ALL RS REG
021742  012777  021036  160164        MOV     #INT114,@RSVEC  ;SET UP DISK TRAP VECTOR
021750  012777  000340  160160        MOV     #340,@RSVCPS    ;SET PRIO.
021756  012737  000200  177776        MOV     #200,@#PS       ;SET PROCESSOR TO PRIORITY 4
021764  013700  177776                MOV     @#PS,BAD        ;GET PS
021770  012701  000200                MOV     #200,GOOD       ;GET CORRECT PS
021774  012777  177777  160106        MOV     #177777,@RSWC   ;SET WORD COUNT TO -1
021002  013777  001102  160102        MOV     @#OBUFSV,@RSBA  ;LOAD CURRENT ADDRESS
021010  012777  000161  160066        MOV     #161,@RSCS1     ;WRITE (INTERRUPT ENABLE
021016  005037  001174                CLR     WORK
021022  005237  001174                INC     WORK            ;WAIT FOR INTERRUPT TO OCCUR
021026  001375                        BNE     .-4
021030  104000                        HLT                     ;GOOD-CORRECT PS BAD=WRONG PS
021032  104042                        HLT     .ER.DS
021034  000405                        BR      DONINT          ;CONT
021036  022777  004260  160040  INT114: CMP    #4260,@RSCS1    ;DID IE CLEAR?
021044  001401                        BEQ     .+4             ;YES
021046  104001                        HLT     .CS1            ;WHY DID NOT IE CLEAR
021050                          DONINT:

                                ;*****************************************************************************
                                ;TEST 120                TEST INTERRUPT ON ERROR
                                ;*****************************************************************************
021050  104400                TST120: SCOPE

021052  012706  000500        ERINT:  MOV     #500,SP         ;SETUP STACK
021056  012737  000200  177776        MOV     #200,@#PS       ;SET PS AT PRI 4
021064  012777  021142  160042        MOV     #ERRINT,@RSVEC  ;SET UPINTERRUPT ADD.
021072  104414                        CLRDK                   ;CLEAR ALL RS REG
021074  012777  000340  160034        MOV     #340,@RSVCPS    ;SET PRIO.
021102  012777  177777  160004        MOV     #177777,@RSDA   ;SET RSDA-TO ALL ONES
021110  012777  177600  157772        MOV     #177600,@RSWC   ;WORD COUNT=-200
021116  013777  001102  157766        MOV     @#OBUFSV,@RSBA  ;CURRENT ADDRESS=OUTBUF
021124  012777  000161  157752        MOV     #161,@RSCS1     ;WRITE
021132  004737  026670                JSR     PC,WAITRY       ;WAIT FOR READY
021136  104042                '$:     HLT     !ER!DS          ;Y DIDN'T PGM INTERRUPT IS RDY SET?
021140  000406                        BR      FINTST          ;GET OUT
021142  022777  144260  157734  ERRINT: CMP    #144260,@RSCS1  ;IS CS1 RIGHT?
021150  001401                        BEQ     .+4             ;YES
021152  104042                        HLT     .ER.DS
021154  022626                        CMP     (6)+,(6)+       ;CLEAR STACK
021156                          FINTST:
```

```
                                ;*****************************************************************************
                                ;TEST 121                    DYNAMIC FUNCTION TEST
                                ;*****************************************************************************
021156  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

021160  104414                  MODNUM: CLRDK                           ;CLEAR ALL RS REG
021162  013737  022504  001164          MOV     TIMES,TIMSV             ;SAVE LOOP COUNT
021170  012737  000010  022504          MOV     #10.,TIMES              ;LOOP ONLY 10 TIMES
021176  005037  001176                  CLR     WORK1                   ;CLEAR WORK LOC.
021202  005003                          CLR     R3
021204  005004                          CLR     R4
021206  012702  022134                  MOV     #DVTAB,R2               ;SETUP TABLE
021212  012737  000401  001174          MOV     #401,WORK               ;SETUP TO TEST FOR MORE DRIVES
021220  033737  001174  001154  7$:     BIT     WORK,UNITSV             ;IS DRIVE ON SYSTEM?
021226  001403                          BEQ     6$                      ;NO
021230  020437  001152                  CMP     R4,UNNUM                ;IS THIS THE SAME DRIVE?
021234  001017                          BNE     8$                      ;NO
021236  005204                  6$:     INC     R4                      ;UPDATE 2ND UNIT #
021240  000241                          CLC
021242  006137  001174                  ROL     WORK                    ;CHECK FOR NEXT DRIVE
021246  103364                          BCC     7$                      ;NOT DONE YET
021250  032737  000010  001176          BIT     #BIT3,WORK1             ;MULTI DRIVE?
021256  001016                          BNE     12$                     ;YES
021260  013705  001152                  MOV     UNNUM,R5                ;LOAD UNIT NO
021264  005205                          INC     R5                      ;CHANGE IT
021266  042705  177770                  BIC     #177770,R5              ;CLEAR JUNK
021272  000410                          BR      12$
021274  052737  000010  001176  8$:     BIS     #BIT3,WORK1             ;SET FOUND MULTI DRIVE
021302  010422                          MOV     R4,(R2)+                ;LOAD UNT # INTO TABLE
021304  005203                          INC     R3                      ;COUNT # OF DRIVES
021306  010337  001172                  MOV     R3,SAVEE                ;SAVE IT
021312  000751                          BR      6$
021314  012777  021430  157612  12$:    MOV     #TSTVEC,@RSVEC          ;SETUP INT. TRAP
021322  012777  000340  157606          MOV     #340,@RSVCPS            ;SETUP PRIO.
021330  005037  027454                  CLR     OUTBUF                  ;CLR TO READ INTO
021334  013777  001102  157550          MOV     @#OBUFSV,@RSBA          ;SET UP CURRENT ADDRESS
021342  012777  177000  157540          MOV     #-1000,@RSWC            ;SET WORD COUNT
021350  012777  000060  157536  1$:     MOV     #60,@RSDA               ;LOAD DA
021356  012702  022134                  MOV     #DVTAB,R2               ;GET TABLE
021362  012777  000161  157514          MOV     #161,@RSCS1             ;GO WRITE
021370  005703                          TST     R3                      ;MORE THEN 1 DRIVE?
021372  001003                          BNE     13$                     ;YES
021374  010577  157506                  MOV     R5,@RSCS2               ;NO MODIFY UNIT #
021400  000407                          BR      14$
```

```
3543  021402  012277  157500          13$:    MOV     (R2)+,@RSCS2    ;LOAD UNIT#
3544  021406  012777  000131  157470          MOV     #131,@RSCS1     ;DO SEARCH
3545  021414  005303                          DEC     R3              ;DONE ALL DRIVES YET?
3546  021416  001371                          BNE     13$             ;NO
3547  021420  012737  000200  177776  14$:    MOV     #200,@#PS       ;ENABLE INTERRUPTS
3548  021426  00000'                  WTDV:   WAIT
3549  021430  013777  001152  157450  TSTVEC: MOV     UNNUM,@RSCS2    ;GET 1ST DRIVE
3550  021436  017700  157442                  MOV     @RSCS1,BAD      ;GET CS1
3551  021442  042700  100000                  BIC     #BIT15,BAD      ;CLEAR SC
3552  021446  012701  004260                  MOV     #4260,GOOD      ;GET CORRECT ANS
3553  021452  020100                          CMP     GOOD,BAD        ;IS CS1 CORRECT?
3554  021454  001402                          BEQ     4$              ;NO. X-FER OK
3555  021456  104000                          HLT                     ;CS1 SHOULD = 14270 OR 4270
3556  021460  104140                          HLT     .DS!AS
3557  021462  005777  157422          4$:     TST     @RSWC           ;TEST WC
3558  021466  001401                          BEQ     .+4             ;WORD COUNT DID OVERFLOW
3559  021470  104010                          HLT      WC             ;SHOULD - 0
3560  021472  013701  001152                  MOV     UNNUM,GOOD      ;GET CORRECT
3561  021476  052701  000100                  BIS     #100,GOOD       ;ANS OF CS2
3562  021502  017700  157400                  MOV     @RSCS2,BAD      ;GET CS2
3563  021506  020100                          CMP     GOOD,BAD        ;IS CS2 CORRECT?
3564  021510  001401                          BEQ     .+4             ;YES
3565  021512  104000                          HLT                     ;GOOD = CORRECT ANS FOR CS2
3566  021514  017700  157372                  MOV     @RSBA,BAD       ;FETCH CURRENT ADDRESS
3567  021520  013701  001102                  MOV     @#OBUFSV,GOOD   ;WHAT RSBA SHOULD EQUAL
3568  021524  062701  002000                  ADD     #2000,GOOD      ;UPDATE IT
3569  021530  020001                          CMP     BAD,GOOD        ;IS RSBA CORRECT
3570  021532  001401                          BEQ     .+4             ;YES EXECUTE CONTINUE
3571  021534  104000                          HLT                     ;RSBA FAILED TO INCREMENT
3572  021536  022737  000004  001162          CMP     #4,RS04DT       ;RS03LA?
3573  021544  001006                          BNE     2$              ;NO
3574  021546  022777  000100  157340          CMP     #100,@RSDA      ;IS DA CORRECT?
3575  021554  001420                          BEQ     3$              ;OK
3576  021556  104104                          HLT     .DA.AS
3577  021560  000416                          BR      3$              ;CONTINUE
3578  021562  005737  001162          2$:     TST     RS04DT          ;IS THIS A RS04?
3579  021566  001006                          BNE     5$              ;YES
3580  021570  022777  000070  157316          CMP     #70,@RSDA       ;IS DA CORRECT?
3581  021576  001407                          BEQ     3$              ;YES
3582  021600  104104                          HLT     .DA!AS          ;DA NOT CORRECT
3583  021602  000405                          BR      3$              ;CONTINUE
3584  021604  022777  000064  157302  5$:     CMP     #64,@RSDA       ;WAS RSDA INCREMENTED
3585  021612  001401                          BEQ     .+4             ;RSDA OK
3586  021614  104046                          HLT     !DA!ER!DS       ;RSDA SHOULD CONTAIN A 64
3587  021616  012777  040000  157260  3$:     MOV     #TRE,@RSCS1     ;CLEAR ALL ERRORS IF ANY
3588  021624  032737  000010  001176          BIT     #BIT3,WORK1     ;MULTI DRIVE?
3589  021632  001461                          BEQ     WTDV'           ;NO
3590  021634  012777  021660  157272  1$:     MOV     #TTVEC,@RSVEC   ;SETUP INT FOR NEXT DRIVE
3591  021642  012716  021656                  MOV     #WTDV2,(SP)     ;GET WAIT
3592  021646  012777  000100  157230          MOV     #100,@RSCS'     ;SET IE
3593  021654  000002                          RTI                     ;RETURN
3594  021656  000001                  WTDV2:  WAIT
```

```
3595                                    ;SERVICE ROUTINE FOR SEARCH FUNCTIONS
3596  021660  005002                    TTVEC:  CLR     R2              ;CLEAR UNIT #
3597  021662  000241                            CLC
3598  021664  012737  000401  001174            MOV     #401,WORK
3599  021672  033777  001174  157222    1$:     BIT     WORK,@RSAS      ;DID THIS DRIVE INT?
3600  021700  001006                            BNE     2$              ;YES
3601  021702  005202                            INC     R2              ;UPDATE UNIT #
3602  021704  000241                            CLC
3603  021706  006137  001174                    ROL     WORK
3604  021712  103367                            BCC     1$
3605  021714  104100                            HLT     !AS             ;WHY DID WE INT WITH NO ATA???
3606  021716  010277  157164            2$:     MOV     R2,@RSCS2       ;GET DRIVE
3607  021722  022777  110600  157166            CMP     #110600,@RSDS   ;DID PIP CLEAR?
3608  021730  001401                            BEQ     .+4             ;YES
3609  021732  104140                            HLT     !DS!AS          ;PIP BIT DID NOT CLEAR
3610  021734  022777  104230  157142            CMP     #104230,@RSCS1  ;DID SC SET?
3611  021742  001401                            BEQ     .+4             ;YES
3612  021744  104140                            HLT     !AS!DS          ;SC DID NOT SET
3613  021746  005337  001172                    DEC     SAVEE           ;COUNT # OF INT
3614  021752  001411                            BEQ     WTDV1           ;DONE YET?
3615  021754  013777  001174  157140            MOV     WORK,@RSAS      ;CLEAR AS
3616  021762  012777  000100  157114            MOV     #100,@RSCS1     ;SET IE
3617  021770  012716  021656                    MOV     #WTDV2,(SP)     ;RETURN TO WAIT
3618  021774  000002                            RTI
3619  021776  012737  000340  177776  WTDV1:    MOV     #340,@#PS
3620  022004  012706  000500                    MOV     #500,SP         ;CLEAR STACK
3621  022010  013777  001136  157116            MOV     RSVCPS,@RSVEC   ;RESTORE INT VECTOR
3622  022016  005077  157114                    CLR     @RSVCPS
3623  022022  104400                    MODDON: SCOPE                   ;DONE
3624  022024  013737  001164  022504            MOV     TIMSV,TIMES     ;RESTORE LOOP COUNT
3625  022032  012737  000340  177776            MOV     #340,@#PS       ;RESTORE PS
3626  022040  012737  000001  001000            MOV     #1,ICNT         ;FUGE TEST NUMBERS
3627  022046  000137  001730            OUT:    JMP     @#TRYNX         ;TEST NEXT DRIVE
3628                                    .SBTTL          $DONE - BELL AND SCOPE ROUTINE
3629
3630  022052  104400                    DONE:   SCOPE                   ;TERMINATIONG SCOPE FOR LOOPING
3631  022054  062737  000001  001006            ADD     #1,PCNT+2       ;ADD 1 TO THE PASS COUN
3632  022062  005537  001004                    ADC     PCNT            ;MAKE IT DOUBLE PREC.
3633  022066  032777  002000  156732            BIT     #SW10,@SWR      ;RING THE BELL?
3634  022074  001004                            BNE     4$              ;NO!
3635  022076  104402  022102                    TYPE    ,..+2           ;.ASCIZ <BELL><177>
3636  022106  013700  000042            4$:     MOV     @#42,R0         ;GET MONITOR ADDRESS
3637  022112  001405                            BEQ     $END1           ;IF NONE
3638  022114  000005                            RESET
3639  022116  004710                    $ENDAD: JSR     7,(0)           ;GO TO MONITOR
3640  022120  000240  000240  000240            240,240,240             ;SAVE ROOM FOR ACT11
3641  022126  000137  001202            $END1:  JMP     @#BEGIN         ;RETURN
3642
3643  022132  000000                    .TBIT:  0                       ;T BIT FLAG
3644
3645  022134  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.

022154  010446          .TYPE:  MOV     R4,-(6)         ;SAVE R4
022156  010546                  MOV     R5,-(6)         ;SAVE R5
022160  017605  000004          MOV     @4(6),R5        ;GET ADDRESS TO BE TYPED
022164  032705  177400          BIT     #177400,R5      ;IS IT A TYPEM?
022170  001002                  BNE     1$              ;NO
022172  016605  000004          MOV     4(6),R5         ;GET ADDRESS OF CHARACTER
022176  105715           1$:    TSTB    (R5)            ;TERMINATOR?
022200  001423                  BEQ     2$              ;GET OUT IF SO
022202  122715  000012          CMPB    #12,(R5)        ;IS THE CHAR A LINE FEED
022206  001012                  BNE     4$              ;NO - GET OUT
022210  113704  001015          MOVB    FILCHR+1,R4     ;GET THE FILL COUNT
022214  113777  001014  156602  5$:     MOVB    FILCHR,@TPB     ;TYPE A FILLER
022222  105777  156570          TSTB    @TPS            ;DONE YET?
022226  100375                  BPL     .-4             ;NO - WAIT
022230  005304                  DEC     R4              ;DEC COUNT
022232  001370                  BNE     5$              ;LOOP UNTIL 0
022234  112577  156564          MOVB    (R5)+,@TPB      ;LOAD AND TYPE THE CHARACTER
022240  105777  156552          TSTB    @TPS            ;IS THE PRINTER READY
022244  100375                  BPL     .-4             ;WAIT UNTIL IT IS
022246  000753                  BR      1$              ;GET THE NEXT CHARACTER
022250  017646  000004          MOV     @4(6),-(6)      ;GET ADDRESS TO BE TYPED
022254  062766  000002  000006  ADD     #2,6(6)         ;ADD 2 TO THE ADDRESS
022262  022666  000004          CMP     (6)+,4(6)       ;IS IT .+2?
022266  001006                  BNE     3$              ;NO
022270  062705  000002          ADD     #2,R5           ;ADD 2 TO THE ADDRESS
022274  042705  000001          BIC     #1,R5           ;BACK UP TO AN EVEN BYTE
022300  010566  000004          MOV     R5,4(6)         ;RESTORE ADDRESS
022304  012605           3$:    MOV     (6)+,R5         ;RESTORE R5
022306  012604                  MOV     (6)+,R4         ;RESTORE R4
022310  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:"

022312  104416                  .SCOPE: KBDIN                   ;GO CHECK FOR ^G
022314  032777  000400  156504          BIT     #SW8,@SWR       ;LOOP ON SPEC. TEST?
022322  001404                          BEQ     1$              ;NO LOOP ON SPEC. TEST
022324  127737  156476  001000          CMPB    @SWR,ICNT       ;ON RIGHT TEST?   *SW7-0*
022332  001453                          BEQ     .OVER           ;NOT RIGHT TEST
022334  032777  040000  156464  1$:     BIT     #SW14,@SWR      ;LOOP ON TEST?
022342  001045                          BNE     .KIT            ;LOOP ON TEST IS SET
022344  000416                          BR      3$              ;SKIP - NOP FOR XOR TESTER
022346  013746  000004                  MOV     @#4,-(6)        ;PUSH @#4 ON STACK
022352  012737  022372  000004          MOV     #4$,@#4         ;SET FOR TIMEOUT
022360  005737  177060                  TST     @#177060        ;ERROR ON XOR?
022364  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
022370  000422                          BR      .SVLAD          ;NO ERROR - GO TO NEXT TEST
022372  022626                  4$:     CMP     (6)+,(6)+       ;CLEAR STACK
022374  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
022400  000426                          BR      .KIT            ;ERROR - LOOP ON TEST
022402  032777  004000  156416  3$:     BIT     #SW11,@SWR      ;KILL ITERATIONS
022410  001012                          BNE     .SVLAD          ;YES - KILL ITERATIONS
022412  105737  001001                  TSTB    ICNT+1          ;FIRST ONE?
022416  001404                          BEQ     2$              ;BRANCH IF FIRST
022420  123737  022504  001001          CMPB    TIMES,ICNT+1    ;DONE?
022426  003013                          BGT     .KIT            ;BRANCH IF NOT
022430  112737  000001  001001  2$:     MOVB    #1,ICNT+1       ;FIRST ITERATION
022436  105237  001000          .SVLAD: INCB    ICNT            ;COUNT TEST NUMBERS
022442  011637  001010                  MOV     (6),LAD         ;SAVE LOOP ADDRESS
022446  013777  001000  156354          MOV     ICNT,@DISPLAY   ;DISPLAY TEST NO. AND ITERATION COUNT
022454  000002                          RTI                     ;RETURN

022456  105237  001001          .KIT:   INCB    ICNT+1          ;INC THE ITERATION COUNT
022462  013777  001000  156340  .OVER:  MOV     ICNT,@DISPLAY   ;SET UP DISPLAY
022470  005737  001010                  TST     LAD             ;FIRST ONE?
022474  001760                          BEQ     .SVLAD          ;YES
022476  013716  001010                  MOV     LAD,(6)         ;FUDGE RETURN ADDRESS
022502  000002                          RTI                     ;FIXES PS

022504  000100                  TIMES:  100                     ;RUN 100 TIMES
```

```
                                .SBTTL          $HLT - HLT ROUTINE (ERROR TYPEOUT)

                                ;THIS ROUTINE PRINTS OUT ERROR MESSAGES STARTING WITH THE
                                ;ADDRESS OF THE 'HLT'. IT ALSO COUNTS THE NUMBER OF ERRORS
                                ;AND HAS THE CAPABILITY OF LOOPING ON ERROR, BELL ON ERROR,
                                ;'HALT' ON ERROR, AND INHIBIT TYPEOUTS. AN OPTIONAL ARGUMENT
                                ;(HLT+3) WILL BE PLACED IN '.HLTCT:' FOR ADITIONAL TYPEOUTS.

022506  104416                  .HLT:   KBDIN                   ;GO CHECK FOR ^G
022510  032777  002000  156310          BIT     #SW10,@SWR      ;BELL ON ERROR?
022516  001402                  BEQ     1$                      ;NO - SKIP
022520  104402  000007          TYPE    ,BELL                   ;RING BELL
022524  005237  001002          1$:     INC     ERRORS          ;COUNT THE NUMBER OF ERRORS
022530  032777  020000  156270          BIT     #SW13,@SWR      ;SKIP TYPEOUT IF SET
022536  001025                  BNE     2$                      ;SKIP TYPEOUTS
022540  104402  022544          TYPE    ,.+2                    ;.ASCIZ <15><12>
022550  011637  001012          MOV     (6),HLTADR              ;PUT ADDRESS OF INSTRUCTION ON STACK
022554  162737  000002  001012  SUB     #2,HLTADR               ;FUDGE ADDRESS
022562  117737  156224  022644  MOVB    @HLTADR,.HLTCT          ;GET HLT ARGUEMENT
022570  013746  001012          MOV     HLTADR,-(6)             ;PUT HLTADR ON STACK
022574  104404                  TYPEO                           ;TYPE STACK IN OCTAL
022576  104402  022602          TYPE    ,.+2                    ;.ASCIZ '' ''
022606  004737  026156          JSR     PC,RSREG                ;GO TO USER ERROR ROUTINE
022612  005777  156210          2$:     TST     @SWR            ;HALT ON ERROR
022616  100001                  BPL     .+4                     ;SKIP IF CONTINUE
022620  000000                  HALT                            ;HALT ON ERROR!
022622  032777  001000  156176          BIT     #SW9,@SWR       ;CHECK FOR INHIBIT LOOP ON ERROR
022630  001003                  BNE     3$                      ;SKIP IF LOOP ON ERROR
022632  105037  001001          CLRB    ICNT+1                  ;CLEAR ITERATION COUNT
022636  000002                  RTI                             ;RETURN
022640  000137  022456          3$:     JMP     .KIT            ;LOOP ON TEST UNTIL NO ERRORS

022644  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 BITS. IT IS CALLED VIA THE TYPOCT, TYPBIT, OR TYPOCS MACRO'S.

022646  012737  170101  023034  .TYPEB: MOV     #170101,.PR     ;SET BIT FLAG AND 16. CHARACTER COUNT
022654  000411                          BR      .PTIT           ;NOW TYPE IT IN BIT FORM
022656  112737  000001  023034  .TYPEO: MOVB    #1,.PR          ;SET ZERO FILL SWITCH
022664  000402                          BR      .+6             ;SKIP
022666  005037  023034          .TYPES: CLR     .PR             ;SUPRESS LEADING ZERO'S
022672  112737  177772  023035          MOVB    #-6,.PR+1       ;SET COUNT
022700                          .PTIT:
022700  010446                          MOV     R4,-(6)         ;PUSH R4 ON STACK
022702  010546                          MOV     R5,-(6)         ;PUSH R5 ON STACK
022704  016605  000010                  MOV     10(6),R5        ;GET THE DATA
022710  012704  023036                  MOV     #.PR+2,R4       ;SET POINTER TO FIRST ASCII CHAR.
022714  105014                          CLRB    (4)             ;CLEAR FIRST BYTE
022716  000411                          BR      .PRF            ;ROTATE FIRST BIT
022720  105014          .PRL:   CLRB    (4)             ;CLEAR BYTE OF CHARACTER
022722  032737  000100  023034          BIT     #100,.PR        ;BIT TYPING MODE?
022730  001004                          BNE     .PRF            ;YES - SKIP 2 ROTATES
022732  006105                          ROL     R5              ;ROTATE BIT INTO C
022734  106114                          ROLB    (4)             ;PACK IT
022736  006105                          ROL     R5              ;ROTATE BIT INTO C
022740  106114                          ROLB    (4)             ;PACK IT
022742  006105          .PRF:   ROL     R5              ;ROTATE BIT INTO C
022744  106114                          ROLB    (4)             ;PACK IT
022746  105714                          TSTB    (4)             ;IS IT ZERO?
022750  001402                          BEQ     .+6             ;SKIP INC
022752  105237  023034                  INCB    .PR             ;SET FILL SWITCH
022756  105737  023034                  TSTB    .PR             ;CHECK FILL SWITCH
022762  001402                          BEQ     .+6             ;SKIP BITSET
022764  152724  000060                  BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
022770  105237  023035                  INCB    .PR+1           ;INC COUNT
022774  001351                          BNE     .PRL            ;REPEAT
022776  022704  023036                  CMP     #.PR+2,R4       ;EMPTY BUFFER?
023002  001002                          BNE     .+6             ;SKIP IF NOT
023004  112724  000060                  MOVB    #'0,(4)+        ;LOAD 1 ZERO
023010  105014                          CLRB    (4)             ;NULL TERMINATOR
023012  104402  023036                  TYPE    ,.PR+2          ;TYPE IT
023016  012605                          MOV     (6)+,R5         ;POP STACK INTO R5
023020  012604                          MOV     (6)+,R4         ;POP STACK INTO R4
023022  016666  000002  000004          MOV     2(6),4(6)       ;GET RID OF
023030  012616                          MOV     (6)+,(6)        ;DATA WORD
023032  000002                          RTI                     ;RETURN

023034  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'.

023060  012777  023204  000124  .POWER: MOV     #.ILLUP,@.PUVEC ;SET FOR FAST UP
023066  012777  000340  000120          MOV     #340,@.PUVEC$+2 ;PRIO:7
023074  010046                  MOV     R0,-(6)         ;PUSH R0 ON STACK
023076  010146                  MOV     R1,-(6)         ;PUSH R1 ON STACK
023100  010246                  MOV     R2,-(6)         ;PUSH R2 ON STACK
023102  010346                  MOV     R3,-(6)         ;PUSH R3 ON STACK
023104  010446                  MOV     R4,-(6)         ;PUSH R4 ON STACK
023106  010546                  MOV     R5,-(6)         ;PUSH R5 ON STACK
023110  010637  023210          MOV     SP,.SAVR6       ;SAVE SP
023114  012777  023124  000070  MOV     #.POWUP,@.PUVEC ;SET UP VECTOR
023122  000000                  HALT                    ;WAIT FOR PF

023124  013706  023210  .POWUP: MOV     .SAVR6,SP       ;GET SP
023130  005001                  CLR     R1              ;WAIT LOOP FOR THE TTY
023132  005201          1$:     INC     R1              ;WAIT FOR THE INC
023134  001376                  BNE     1$              ;OF  WORD
023136  012605                  MOV     (6)+,R5         ;POP STACK INTO R5
023140  012604                  MOV     (6)+,R4         ;POP STACK INTO R4
023142  012603                  MOV     (6)+,R3         ;POP STACK INTO R3
023144  012602                  MOV     (6)+,R2         ;POP STACK INTO R2
023146  012601                  MOV     (6)+,R1         ;POP STACK INTO R1
023150  012600                  MOV     (6)+,R0         ;POP STACK INTO R0
023152  012737  023060  000024  MOV     #.POWER,@#24    ;SET UP THE POWER DOWN VECTOR
023160  012737  000340  000026  MOV     #340,@#26       ;PRIO:7
023166  104402  023172          TYPE    ..+2            ;.ASCIZ <15><12>'POWER'
023202  000002                  RTI                     ;RETURN

023204  000000          .ILLUP: HALT                    ;THE POWER UP SEQUENCE WAS STARTED
023206  000776                  BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE

023210  000000          .SAVR6: 0                       ;PUT THE SP HERE
023212  000024  000026  .PUVEC: 24,26                   ;POWER UP VECTOR
```

```
3850                                    .SBTTL          $RDOCT - OCTAL INPUT ROUTINE
3851
3852                                    ;THIS ROUTINE CALLS RDLIN, INPUTS A LINE FROM THE TTY AND CONVERTS
3853                                    ;IT INTO AN OCTAL NUMBER WHICH IS THE FIRST WORD ON THE STACK.
3854
3855  023216  011646                    .RDOCT: MOV     (6),-(6)        ;MOVE THE PC
3856  023220  016666  000004  000002            MOV     4(6),2(6)       ;MOVE THE PS
3857  023226  010146                            MOV     R1,-(6)         ;PUSH R1 ON STACK
3858  023230  010246                            MOV     R2,-(6)         ;PUSH R2 ON STACK
3859  023232  010346                            MOV     R3,-(6)         ;PUSH R3 ON STACK
3860  023234  104412                    4$:     RDLIN                   ;READ A LINE INTO INPUT
3861  023236  005001                            CLR     R1              ;INIT DATA WORD
3862  023240  005037  027366                    CLR     CTN             ;CLEAR COUNT WORD
3863  023244  012703  023472                    MOV     #INPUT,R3       ;INIT POINTER
3864  023250  112302                    1$:     MOVB    (3)+,R2         ;GET A BYTE
3865  023252  122702  000015                    CMPB    #15,R2          ;WAS IT A ,CR?
3866  023256  001421                            BEQ     2$              ;GET OUT IF YES
3867  023260  122702  000060                    CMPB    #'0,R2          ;CHECK FOR 0 OR GREATER
3868  023264  003024                            BGT     3$              ;ERROR - LESS THAN 0
3869  023266  122702  000067                    CMPB    #'7,R2          ;CHECK FOR 7 OR LESS
3870  023272  002421                            BLT     3$              ;ERROR - GREATER THAN 7
3871  023274  006002                            ROR     R2              ;GET
3872  023276  006002                            ROR     R2              ;INTO
3873  023300  006002                            ROR     R2              ;POSITION
3874  023302  006101                            ROL     R1              ;FIRST BIT
3875  023304  006102                            ROL     R2              ;GET
3876  023306  006101                            ROL     R1              ;SECOND BIT
3877  023310  006102                            ROL     R2              ;GET
3878  023312  006101                            ROL     R1              ;THIRD BIT
3879  023314  005237  027366                    INC     CTN             ;YES HE TYPED SOMETHING
3880  023320  000753                            BR      1$              ;LOOP
3881  023322  010166  000012            2$:     MOV     R1,12(6)        ;SAVE THE RESULT
3882  023326  012603                            MOV     (6)+,R3         ;POP STACK INTO R3
3883  023330  012602                            MOV     (6)+,R2         ;POP STACK INTO R2
3884  023332  012601                            MOV     (6)+,R1         ;POP STACK INTO R1
3885  023334  000002                            RTI                     ;RETURN
3886
3887  023336                            3$:
3888  023336  104402  023342                    TYPE    ,..+2           ;.ASCIZ '?'<15><12>
3889  023346  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.

023350  010546          .RDLIN: MOV     R5,-(6)         ;SAVE R5
023352  012705  023472  1$:     MOV     #INPUT,R5       ;GET ADDRESS
023356  022705  023512  2$:     CMP     #INPUT+16.,R5   ;BUFFER FULL?
023362  001423                  BEQ     4$              ;YES - TYPE ''?''
023364  105737  177560          TSTB    @#177560        ;WAIT FOR
023370  100375                  BPL     .-4             ;A CHARACTER
023372  113715  177562          MOVB    @#177562,(5)    ;GET CHARACTER
023376  142715  000200          BICB    #200,(5)        ;GET RID OF JUNK
023402  122715  000025          CMPB    #25,(5)         ;IS IT A ^U
023406  001006                  BNE     5$              ;BRANCH IF NOT
023410  104402  023414          TYPE    ,.+2            ;.ASCIZ ''^U''<15><12>
023422  000753                  BR      1$              ;START OVER
023424  122715  000177  5$:     CMPB    #177,(5)        ;IS IT A RUBOUT
023430  001005                  BNE     3$              ;SKIP IF NOT
023432                  4$:
023432  104402  023436          TYPE    ,.+2            ;.ASCIZ ''?''<15><12>
023442  000743                  BR      1$              ;ZAP THE BUFFER AND LOOP
023444  111527  000000  3$:     MOVB    (5),#0          ;SET UP FOR TYPING
023450  104402  023446          TYPE    ,3$+2           ;ECHO IT
023454  122725  000015          CMPB    #15,(5)+        ;CHECK FOR RETURN
023460  001336                  BNE     2$              ;LOOP IF NOT RETURN
023462  104402  000012          TYPE    ,12             ;TYPE A LINE FEED
023466  012605                  MOV     (6)+,R5         ;RESTORE R5
023470  000002                  RTI                     ;RETURN
023472                  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.

023512  011646          .TRAP:  MOV     (6),-(6)        ;GET ADDRESS OF TRAP +2
023514  162716  000002          SUB     #2,(6)          ;MAKE IT ADDRESS OF TRAP
023520  017616  000000          MOV     @(6),(6)        ;GET TRAP INSTRUCTION
023524  062716  117132          ADD     #.TRP+2-TRAP,(6);GET DATA AND MAKE IT AN OFFSET
023530  013607          .TRP:   MOV     @(6)+,PC        ;GO TO PROPER SUBROUTINE

023532  022312                  .SCOPE                  ;SCOPE  =  TRAP+0       (104400)
023534  022154                  .TYPE                   ;TYPE   =  TRAP+2       (104402)
023536  022656                  .TYPEO                  ;TYPEO  =  TRAP+4       (104404)
023540  022666                  .TYPES                  ;TYPES  =  TRAP+6       (104406)
023542  023216                  .RDOCT                  ;RDOCT  =  TRAP+10      (104410)
023544  023350                  .RDLIN                  ;RDLIN  =  TRAP+12      (104412)
023546  026140                  .CLRDK                  ;CLRDK  =  TRAP+14      (104414)
023550  027216                  .KBDIN                  ;KBDIN  =  TRAP+16      (104416)
023552  027076                  .SUSWR                  ;SUSWR  =  TRAP+20      (104420)
023554  027300                  .CNTLU                  ;CNTLU  =  TRAP+22      (104422)
```

```
3946                                    ;ROUTINE TO ALLOW THE OPERATOR TO SET BITS
3947                                    ;IN THE I/O REGISTERS VIA THE SWITCH REGISTER
3948
3949                                    ;WORD COUNT REGISTER
3950  023556  012706  000500            SRSWC:  MOV     #500,SP         ;SET UP STACK FOR TRAP CALL
3951  023562  104416                    1$:     KBDIN                   ;CHECK THE WORLD
3952  023564  017777  155236  155316            MOV     @SWR,@RSWC      ;MOV SWR INTO WORD COUNT REG
3953  023572  017777  155312  155230            MOV     @RSWC,@DISPLAY  ;DISPLAY IN LIGHTS
3954  023600  000770                            BR      1$
3955
3956                                    ;CURRENT ADDRESS REGISTER
3957  023602  012706  000500            SRSBA:  MOV     #500,SP         ;INIT THE STACK
3958  023606  104416                    1$:     KBDIN                   ;CTW
3959  023610  017777  155212  155274            MOV     @SWR,@RSBA      ;MOV SWR INTO CURRENT ADDR REG
3960  023616  017777  155270  155204            MOV     @RSBA,@DISPLAY  ;SHOW IN LIGHTS
3961  023624  000770                            BR      1$
3962
3963                                    ;DISK ADDRESS REGISTER
3964  023626  012706  000500            SRSDA:  MOV     #500,SP         ;INIT THE STACK
3965  023632  104416                    1$:     KBDIN                   ;CTW
3966  023634  017777  155166  155252            MOV     @SWR,@RSDA      ;MOV SWR INTO DISK ADDR REG
3967  023642  017777  155246  155160            MOV     @RSDA,@DISPLAY  ;SHOW IN LIGHTS
3968  023650  000770                            BR      1$
3969
3970                                    ;DRIVE STATUS REGISTER
3971  023652  012706  000500            SRSDS:  MOV     #500,SP         ;INIT THE STACK
3972  023656  104416                    1$:     KBDIN                   ;CTW
3973  023660  017777  155142  155230            MOV     @SWR,@RSDS      ;MOV SWR INTO DRIVE STATUS
3974  023666  017777  155224  155134            MOV     @RSDS,@DISPLAY  ;SHOW IN LIGHTS
3975  023674  000770                            BR      1$
3976
3977                                    ;DRIVE ERROR REGISTER
3978  023676  012706  000500            SRSER:  MOV     #500,SP         ;INIT THE STACK
3979  023702  104416                    1$:     KBDIN                   ;CTW
3980  023704  017777  155116  155206            MOV     @SWR,@RSER      ;LOAD ER REG
3981  023712  017777  155202  155110            MOV     @RSER,@DISPLAY  ;DISPLAY IT IN LIGHTS
3982  023720  000770                            BR      1$              ;LOOP
3983
3984                                    ;WATCH LOOK AHEAD REGISTER
3985  023722  017777  155176  155100  SRSLA:  MOV     @RSLA,@DISPLAY  ;SHOW IN LIGHTS
3986  023730  000774                            BR      SRSLA
```

```
3987
3988  023732  012706  000500          ;RSCS2 REGISTER
3989  023736  104416          SRCS2:  MOV     #500,SP         ;INIT THE STACK
3990  023740  017777  155062  155140  1$:     KBDIN           ;CTW
3991  023746  017777  155134  155054          MOV     @SWR,@RSCS2     ;LOAD CS2
3992  023754  000770                  MOV     @RSCS2,@DISPLAY ;DISPLAY IT
3993                                  BR      1$
3994
3995  023756  012706  000500          ;RSAS REGISTER
3996  023762  104416          SRAS:   MOV     #500,SP         ;INIT THE STACK
3997  023764  017777  155036  155130  1$:     KBDIN           ;CTW
3998  023772  017777  155124  155030          MOV     @SWR,@RSAS      ;LOAD RSAS
3999  024000  000770                  MOV     @RSAS,@DISPLAY  ;DISPLAY IT
4000                                  BR      1$
4001
4002  024002  012706  000500          ;RSMR REGISTER
4003  024006  104416          RSMRR:  MOV     #500,SP         ;INIT THE STACK
4004  024010  017777  155012  155112   $:     KBDIN           ;CTW
4005  024016  017777  155106  155004          MOV     @SWR,@RSMR      ;LOAD RSMR
4006  024024  000770                  MOV     @RSMR,@DISPLAY  ;DISPLAY IT
4007                                  BR      1$
4008
4009  024026  012706  000500          ;DISK CONTROL STATUS REGISTER
4010  024032  104416          SRSCS1: MOV     #500,SP         ;INIT THE STACK
4011  024034  012737  000340  177776  1$:     KBDIN           ;CTW
4012  024042  012777  177777  155040          MOV     #340,@#PS       ;LOCK UP INTERRUPTS
4013  024050  013777  001102  155034          MOV     #177777,@RSWC   ;SET WORD COUNT -1 WORD
4014  024056  017777  154744  155020          MOV     @#OBUFSV,@RSBA  ;SET UP CURRENT ADDRESS
4015  024064  032777  000001  155012          MOV     @SWR,@RSCS1     ;MOV SWR INTO CONTROL REG
4016  024072  001757                  BIT     #BIT0,@RSCS1    ;IS FUNCTION BITS SET
4017  024074  105777  155004          BEQ     1$              ;FUNCTION BITS NOT SET
4018  024100  100375          2$:     TSTB    @RSCS1          ;TEST FOR DISK READY
4019  024102  000753                  BPL     2$              ;DISK STILL NOT READY
                                      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

024104  012706  000500          TKSEL:  MOV     #500,SP         ;SET STACK
024110  000240                          NOP
024112  104402  024116                  TYPE    ,.+2            ;.ASCIZ <15><12>'TYPE UNIT # ''
024136  104410                          RDOCT
024140  012637  001152                  MOV     (6)+,UNNUM
024144  104402  024150                  TYPE    ,.+2            ;.ASCIZ <15><12>'TYPE POSITIVE (OCTAL) WC ''
024204  104410                          RDOCT
024206  012637  001174                  MOV     (6)+,WORK
024212  005137  001174                  COM     WORK
024216  104402  024222                  TYPE    ,.+2            ;.ASCIZ <15><12>'TYPE PATTERN DESIRED ''
024252  104410                          RDOCT
024254  012637  027454                  MOV     (6)+,OUTBUF
024260  042737  000001  027214          BIC     #BIT0,SWI       ;CLEAR THE BEENHEREBIT
024266  104420                          SUSWR                   ;INIT SWITCHLESS
024270  017737  154532  001200  TK1:    MOV     @SWR,WORK2      ;SAVE SWR
024276  104414                  TK2:    CLRDK                   ;CLEAR ALL RS REG
024300  052777  000010  154600          BIS     #BIT3,@RSCS2    ;SET BAI
024306  017737  154514  001176          MOV     @SWR,WORK1      ;GET SWR FOR DSK ADDR
024314  042737  170000  001176          BIC     #170000,WORK1   ;CLEAR UNIT #
024322  013777  001176  154564  TKKS:   MOV     WORK1,@RSDA     ;LOAD THE DA
024330  013777  001174  154552          MOV     WORK,@RSWC      ;LOAD WORD COUNT
024336  032777  010000  154462          BIT     #BIT12,@SWR     ;READ?
024344  001412                          BEQ     WTE             ;NO
024346  012777  027456  154536          MOV     #OUTBUF+2,@RSBA ;LOAD CURRENT ADDRESS
024354  012777  000071  154522          MOV     #71,@RSCS1      ;GO AND READ
024362  105777  154516          WT:     TSTB    @RSCS1          ;TEST FOR READY
024366  100375                          BPL     .-4
024370  000407                          BR      SWRCHG
024372  012777  027454  154512  WTE:    MOV     #OUTBUF,@RSBA
024400  012777  000061  154476          MOV     #61,@RSCS1
024406  000765                          BR      WT
024410  017777  154470  154412  SWRCHG: MOV     @RSCS1,@DISPLAY ;DISPLAY CS1
024416  005777  154462                  TST     @RSCS1          ;ANY ERRORS?
024422  100001                          BPL     1$              ;NO
024424  104014                          HLT     !DA.WC
024426  104416                  1$:     KBDIN                   ;CHECK FOR NEW VALUE
024430  027737  154372  001200          CMP     @SWR,WORK2      ;DID SWR CHANGE?
024436  001314                          BNE     TK1             ;YES
024440  000716                          BR      TK2             ;NO
```

```
                                ;*****************************************************************************
                                ;TEST 122                WRITE LOCK TEST
                                ;*****************************************************************************
024442  104400                  TST122: SCOPE

024444                          WRTLCK:
024444  104402  024450                  TYPE    ,.+2            ;.ASCIZ <15><12>'LOAD SW WITH UNIT # AND CONT''
024510  022737  000176  001026          CMP     #SWREG,SWR
024516  001402                          BEQ     7$              ;CHECK IF SWITCHLESS CPU
024520  000000                          HALT
024522  000401                          BR      8$              ;GO AROUND TRAP CALL
024524  104422                  7$:     CNTLU                   ;GET SWREG VALUE
024526  017737  154274  001152  8$:     MOV     @SWR,UNNUM      ;GET UNIT #
024534  104414                          CLRDK                   ;CLEAR ALL REG
024536  005037  027454                  CLR     OUTBUF          ;PUT A C INTO DATA BUFFER
024542  012777  027454  154342          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
024550  012777  007700  154336          MOV     #7700,@RSDA     ;TO A WRITE
024556  012777  177777  154324          MOV     #-1,@RSWC
024564  012777  000061  154312          MOV     #61,@RSCS1
024572  105777  154306          6$:     TSTB    @RSCS1          ;WAIT FOR DONE
024576  100375                          BPL     6$
024600  104402  024604                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRITE LOCK ENABLE AND CONTINUE''
024652  000000                          HALT
024654  012777  000000  154232  1$:     MOV     #0,@RSDA
024662  022777  014600  154226          CMP     #14600,@RSDS
024670  001401                          BEQ     .+4
024672  104044                          HLT     .DS.DA          ;DS SHOULD-14600
024674  012777  000100  154212          MOV     #100,@RSDA
024702  022777  010600  154206          CMP     #10600,@RSDS
024710  001401                          BEQ     .+4
024712  104044                          HLT     .DS!DA          ;DS SHOULD=10600
024714  104402  024720                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LOC SW 0 AND CONT''
024754  000000                          HALT
024756  022777  014600  154132  2$:     CMP     #14600,@RSDS
024764  001401                          BEQ     .+4
024766  104044                          HLT     .DS.DA          ;DS SHOULD-14600
024770  012777  000300  154116          MOV     #300,@RSDA
024776  022777  010600  154112          CMP     #10600,@RSDS
025004  001401                          BEQ     .+4
025006  104044                          HLT     .DS!DA          ;DS SHOULD=10600
025010  104402  025014                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LOC SW 1 AND CONT''
025050  000000                          HALT
025052  022777  014600  154036  3$:     CMP     #14600,@RSDS
025060  001401                          BEQ     .+4
025062  104044                          HLT     .DS.DA          ;DS SHOULD-14600
025064  012777  000700  154022          MOV     #700,@RSDA
025072  022777  010600  154016          CMP     #10600,@RSDS
025100  001401                          BEQ     .+4
025102  104044                          HLT     !DS!DA          ;DS SHOULD=10600
025104  104402  025110                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LCK SW 2 AND CONT''
025144  000000                          HALT
```

```
 4120  025146  022777  014600  153742  4$:     CMP     #14600,@RSDS
 4121  025154  001401                          BEQ     .+4
 4122  025156  104044                          HLT     !DS.DA          ;DS SHOULD=14600
 4123  025160  012777  001700  153726          MOV     #1700,@RSDA
 4124  025166  022777  010600  153722          CMP     #10600,@RSDS
 4125  025174  001401                          BEQ     .+4
 4126  025176  104044                          HLT     !DS.DA          ;DS SHOULD=10600
 4127  025200  104402  025204                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LCK SW 3 AND CONT''
 4128  025240  000000                  HALT:   HALT
 4129  025242  022777  014600  153646          CMP     #14600,@RSDS
 4130  025250  001401                          BEQ     .+4
 4131  025252  104044                          HLT     !DS!DA          ;DS SHOULD=14600
 4132  025254  012777  003700  153632          MOV     #3700,@RSDA
 4133  025262  022777  010600  153626          CMP     #10600,@RSDS
 4134  025270  001401                          BEQ     .+4
 4135  025272  104044                          HLT     !DS.DA          ;DS SHOULD=10600
 4136  025274  104402  025300                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LCK SW 4 AND CONT''
 4137  025334  000000                          HALT
 4138  025336  022777  014600  153552          CMP     #14600,@RSDS
 4139  025344  001401                          BEQ     .+4
 4140  025346  104044                          HLT     !DS.DA          ;DS SHOULD=14600
 4141  025350  012777  006000  153536          MOV     #6000,@RSDA
 4142  025356  022777  010600  153532          CMP     #10600,@RSDS
 4143  025364  001401                          BEQ     .+4
 4144  025366  104044                          HLT     !DS.DA          ;DS SHOULD=10600
 4145  025370  104402  025374                  TYPE    ,.+2            ;.ASCIZ <15><12>''SET WRT LCK SW 5 AND CONT''
 4146  025430  000000                          HALT
 4147  025432  022777  014600  153456          CMP     #14600,@RSDS
 4148  025440  001401                          BEQ     .+4
 4149  025442  104044                          HLT     !DS.DA          ;DS SHOULD=14600
 4150  025444  012777  007700  153442          MOV     #7700,@RSDA
 4151  025452  022777  014600  153436          CMP     #14600,@RSDS
 4152  025460  001401                          BEQ     .+4
 4153  025462  104044                          HLT     !DS!DA          ;DS SHOULD=14600
 4154  025464  012737  177777  027454          MOV     #-1,OUTBUF      ;PUT A 1 INTO DATA BUFFER
 4155  025472  012777  027454  153412          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
 4156  025500  012777  007700  153406          MOV     #7700,@RSDA     ;TO A WRITE
 4157  025506  012777  177777  153374          MOV     #-1,@RSWC
 4158  025514  012777  000061  153362          MOV     #61,@RSCS1      ;TRY TO WRITE
 4159  025522  105777  153356          7$:     TSTB    @RSCS1          ;WAIT FOR DONE
 4160  025526  100375                          BPL     7$
 4161  025530  105777  153350          5$:     TSTB    @RSCS1          ;WAIT FOR READY
 4162  025534  100375                          BPL     5$
 4163  025536  022777  154600  153352          CMP     #154600,@RSDS
 4164  025544  001401                          BEQ     .+4
 4165  025546  104044                          HLT     !DS.DA          ;DS SHOULD-154600
```

```
4166  025550  022777  004000  153342          CMP     #4000,@RSER
4167  025556  001401                          BEQ     .+4
4168  025560  104044                          HLT     !DS.DA          ;ER SHOULD=4000
4169  025562  104414                          CLRDK                   ;CLEAR ALL REG
4170  025564  022777  014600  153324          CMP     #14600,@RSDS    ;DID WLE CLEAR?
4171  025572  001401                          BEQ     .+4             ;NO
4172  025574  104040                          HLT     .DS             ;A CLEAR SHOULD NOT CLEAR WLE
4173  025576  005037  027454                  CLR     OUTBUF          ;PUT A 0 INTO DATA BUFFER
4174  025602  012777  027454  153302          MOV     #OUTBUF,@RSBA   ;SETUP REG TO
4175  025610  012777  007700  153276          MOV     #7700,@RSDA     ;TO A WRITE
4176  025616  012777  177777  153264          MOV     #-1,@RSWC
4177  025624  012777  000071  153252          MOV     #71,@RSCS1      ;DO A READ TO SEE IF DISK DID
4178  025632  105777  153246          8$:     TSTB    @RSCS1          ;ACTUALLY GET WRITTEN ON TO
4179  025636  100375                          BPL     8$              ;WAIT FOR DONE
4180  025640  005737  027454                  TST     OUTBUF          ;IS DATA STILL 0 ON THE DSK?
4181  025644  001401                          BEQ     .+4             ;YES
4182  025646  104040                          HLT     DS              ;NO DSK DID GET WRITTEN ONTO WITH WLE SET
4183  025650  104402  025654                  TYPE    ..+2            ;.ASCIZ <15><12>'RESET ALL W/L SWITCHES''
4184  025706  000000                          HALT
4185  025710  022777  010600  153200          CMP     #10600,@RSDS    ;DID WLE CLEAR
4186  025716  001401                          BEQ     .+4             ;YES
4187  025720  104040                          HLT     !DS             ;NO
4188
4189                          ;ROUTINE FOR FINDING MEMORY ON 'B'' PORT
4190  025722  012737  026006  000004  FINDM:  MOV     #MAXREF,4       ;SET UP I/O BUS TRAP
4191  025730  012737  000340  000006          MOV     #340,6          ;SET PS
4192  025736  032777  010000  153062          BIT     #BIT12,@SWR     ;INHIBIT OBUFSV FROM CHANGING?
4193  025744  001003                          BNE     EXREF           ;YES
4194  025746  062737  020000  001102          ADD     #20000,OBUFSV   ;ADD 4 K
4195  025754  005777  153122          EXREF:  TST     @OBUFSV         ;LEGAL LOC ? IF NO TRAPS
4196  025760  012737  000006  000004          MOV     #6,4            ;RESTORE I/O BUS TRAP
4197  025766  005037  000006                  CLR     6
4198  025772  022737  177446  001102          CMP     #177446,OBUFSV  ;TEST FOR GREATER THEN 28K
4199  026000  103403                          BLO     MAXRF1          ;YES
4200  026002  000137  007032                  JMP     WRTSTB          ;RETRY WRITING
4201  026006  022626                  MAXREF: CMP     (6)+,(6)+       ;CLEAR STACK
4202  026010  012737  000006  000004  MAXRF1: MOV     #6,4            ;RESTORE I/O BUS TRAP.
4203  026016  005037  000006                  CLR     6
4204  026022  012737  027454  001102          MOV     #OUTBUF,OBUFSV  ;RESTORE ORIGINAL VALUE
4205  026030  032777  020000  152770          BIT     #BIT13,@SWR     ;INHIBIT TYPEOUT?
4206  026036  001031                          BNE     1$              ;YES
4207  026040  032737  020000  001160          BIT     #BIT13,ONCEE    ;DID WE TYPE THIS YET?
4208  026046  001025                          BNE     1$              ;YES
4209  026050  104402  026054                  TYPE    ..+2            ;.ASCIZ <15><12>''COULD NOT FIND MEMORY ON -B- PORT''<15><
4210                          .EVEN
4211  026122  052737  020000  001160  1$:     BIS     #BIT13,ONCEE    ;SET TYPE FLAG
4212  026130  104400                          SCOPE                   ;UPDATE
4213  026132  104400                          SCOPE                   ;TEST NUMBERS
4214  026134  000137  007622                  JMP     NXM             ;CONT TESTING
4215
4216                          ;CLEAR ALL DISK REGISTERS
4217  026140  012777  000040  152740  .CLRDK: MOV     #40,@RSCS2      ;CLEAR ALL DSK REG
4218  026146  013777  001152  152732          MOV     UNNUM,@RSCS2    ;GET UNIT NUMBER
4219  026154  000002                          RTI
```

```
                                        ;ERROR TYPTXTOUT ROUTINE
                                
026156  005737  022644          RSREG:  TST     .HLTCT          ;SHOULD WE TYPTXT GOOD AND BAD
026162  001021                          BNE     8$              ;NO
026164  104402  026170                  TYPE    ,.+2            ;.ASCIZ '' BAD=''
026176  010046                          MOV     BAD,-(6)        ;PUT BAD ON STACK
026200  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026202  104402  026206                  TYPE    ,.+2            ;.ASCIZ '' GOOD=''
026216  010146                          MOV     GOOD,-(6)       ;PUT GOOD ON STACK
026220  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026222  000137  026660                  JMP     PTDONE          ;GET OUT
026226                          8$:
026226  104402  026232                  TYPE    ,.+2            ;.ASCIZ '' CS1=''
026240  017746  152640                  MOV     @RSCS1,-(6)     ;PUT @RSCS1 ON STACK
026244  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026246                          1$:
026246  104402  026252                  TYPE    ,.+2            ;.ASCIZ '' ER=''
026260  017746  152634                  MOV     @RSER,-(6)      ;PUT @RSER ON STACK
026264  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026266                          2$:
026266  104402  026272                  TYPE    ,.+2            ;.ASCIZ '' CS2=''
026300  017746  152602                  MOV     @RSCS2,-(6)     ;PUT @RSCS2 ON STACK
026304  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026306  032737  000200  022644          BIT     #200,.HLTCT     ;TYPTXT SECOND SET ?
026314  001076                          BNE     SEEC            ;YES
026316  032737  000100  022644          BIT     #AS,.HLTCT      ;TYPTXT ER ?
026324  001410                          BEQ     3$              ;NO
02[illegible]26  104402  026332        TYPE    ,.+2            ;.ASCIZ '' AS=''
026340  017746  152556                  MOV     @RSAS,-(6)      ;PUT @RSAS ON STACK
026344  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026346  032737  000020  022644  3$:     BIT     #BA,.HLTCT      ;TYPTXT BUS ASSRESS
026354  001410                          BEQ     4$              ;NO
026356  104402  026362                  TYPE    ,.+2            ;.ASCIZ '' BA=''
026370  017746  152516                  MOV     @RSBA,-(6)      ;PUT @RSBA ON STACK
026374  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026376  032737  000004  022644  4$:     BIT     #DA,.HLTCT      ;TYPTXT DA ?
026404  001410                          BEQ     5$              ;NO
026406  104402  026412                  TYPE    ,.+2            ;.ASCIZ '' DA=''
026420  017746  152470                  MOV     @RSDA,-(6)      ;PUT @RSDA ON STACK
026424  104404                          TYPEO                   ;TYPE STACK IN OCTAL
026426  032737  000010  022644  5$:     BIT     #WC,.HLTCT      ;TYPTXT WC?
026434  001410                          BEQ     6$              ;NO
026436  104402  026442                  TYPE    ,.+2            ;.ASCIZ '' WC-''
026450  017746  152434                  MOV     @RSWC,-(6)      ;PUT @RSWC ON STACK
026454  104404                          TYPEO                   ;TYPE STACK IN OCTAL
```

```
4265  026456  032737  000040  022644  6$:     BIT     #DS,..HLTCT     ;DRIVE STATUS
4266  026464  001475                          BEQ     PTDONE          ;NO
4267  026466  104402  026472                  TYPE    ,..+2           ;.ASCIZ '' DS=''
4268  026500  017746  152412                  MOV     @RSDS,-(6)      ;PUT @RSDS ON STACK
4269  026504  104404                          TYPEO                   ;TYPE STACK IN OCTAL
4270  026506  000137  026660                  JMP     PTDONE          ;GET OUT
4271  026512  042737  000200  022644  SEEC:   BIC     #200,..HLTCT    ;CLEAR COMMON BIT
4272  026520  032737  000240  022644          BIT     #DT,..HLTCT     ;TYPTXT DRIVE TYPE?
4273  026526  001410                          BEQ     9$              ;NO
4274  026530  104402  026534                  TYPE    ,..+2           ;.ASCIZ '' DT=''
4275  026542  017746  152364                  MOV     @RSDT,-(6)      ;PUT @RSDT ON STACK
4276  026546  104404                          TYPEO                   ;TYPE STACK IN OCTAL
4277  026550  032737  000210  022644  9$:     BIT     #DB,..HLTCT     ;TYPTXT DATA BUFFER
4278  026556  001410                          BEQ     10$             ;NO
4279  026560  104402  026564                  TYPE    ,..+2           ;..ASCIZ '' DB=''
4280  026572  017746  152330                  MOV     @RSDB,-(6)      ;PUT @RSDB ON STACK
4281  026576  104404                          TYPEO                   ;TYPE STACK IN OCTAL
4282  026600  032737  000220  022644  10$:    BIT     #MR,..HLTCT     ;TYPTXT MR?
4283  026606  001410                          BEQ     11$             ;NO
4284  026610  104402  026614                  TYPE    ,..+2           ;.ASCIZ '' MR=''
4285  026622  017746  152302                  MOV     @RSMR,-(6)      ;PUT @RSMR ON STACK
4286  026626  104404                          TYPEO                   ;TYPE STACK IN OCTAL
4287  026630  032737  000204  022644  11$:    BIT     #LA,..HLTCT     ;TYPTXT LA?
4288  026636  001410                          BEQ     PTDONE          ;NO
4289  026640  104402  026644                  TYPE    ,..+2           ;.ASCIZ '' LA=''
4290  026652  017746  152246                  MOV     @RSLA,-(6)      ;PUT @RSLA ON STACK
4291  026656  104404                          TYPEO                   ;TYPE STACK IN OCTAL
4292  026660  052737  100000  001160  PTDONE: BIS     #BIT15,ONCEE    ;SET FORND ERROR FLAG
4293  026666  000207                          RTS     PC
4294
4295  026670  005037  001174          WAITRY: CLR     WORK            ;CLEAR COUNTER
4296  026674  105777  152204          1$:     TSTB    @RSCS1          ;TEST READY
4297  026700  100406                          BMI     2$              ;OK CONT
4298  026702  005237  001174                  INC     WORK            ;UPDATE COUNTER
4299  026706  005737  001174                  TST     WORK            ;DONE YET?
4300  026712  001403                          BEQ     3$              ;READY DID NOT COME UP
4301  026714  000767                          BR      1$              ;CONTINUE WAITING
4302  026716  062716  000002          2$:     ADD     #2,(SP)         ;UPDATE RETURN PC
4303  026722  000207                  3$:     RTS     PC              ;RETURN
```

```
4304                                    ;RANDOM DATA GENERATOR SUBROUTINE
4305
4306  026724  013737  027066  027072  RANDOM: MOV     LONUM,LOSAV
4307  026732  013737  027070  027074          MOV     HINUM,HISAV
4308  026740  013700  027066          RAND1:  MOV     LONUM,R0        ;SET UP R0 WITH 5 DIGITS LOW
4309  026744  013704  027070                  MOV     HINUM,R4        ;SET UP R1 WITH 5 DIGITS HIGH
4310  026750  012703  000007                  MOV     #7,R3           ;SET UP SHIFT COUNT
4311  026754  005002                          CLR     R2              ;CLEAR R2
4312  026756  006300                  SHIFT:  ASL     R0              ;SHIFT R0 LEFT AND
4313  026760  006104                          ROL     R4              ;ROTATE CARRY INTO LSB OF R1 INTO
4314  026762  006102                          ROL     R2              ;ROTATE CARRY OUT OF R1 INTO R2
4315  026764  005303                          DEC     R3              ;DECREMENT R3
4316  026766  001373                          BNE     SHIFT           ;CONTINUE SHIFT LOOP
4317  026770  063700  027066                  ADD     LONUM,R0        ;ADDN IN NUMBER TO MAKE X 129
4318  026774  005504                          ADC     R4              ;PROPOGATE CARRY
4319  026776  063704  027070                  ADD     HINUM,R4        ;ADDN IN NUMBER TO MAKE X 129
4320  027002  005502                          ADC     R2              ;PROPOGATE CARRY
4321  027004  062700  001057                  ADD     #1057,R0        ;ADDN LOW CONSTANT
4322  027010  005504                          ADC     R4              ;PROPOGATE CARRIES
4323  027012  005502                          ADC     R2              ;PROPOGATE AGAIN
4324  027014  062704  047401                  ADD     #47401,R4       ;ADDN HIGH CONSTANT
4325  027020  005502                          ADC     R2              ;PROPOGATE CARRY
4326  027022  062702  000006                  ADD     #6,R2           ;ADDN HIGHEST CONSTANT
4327  027026  062700  000002                  ADD     #2,R0           ;REPRIME R0 WITH HIGH DIGIT
4328  027032  005504                          ADC     R4              ;PROPOGATE CARRY
4329  027034  010037  027066                  MOV     R0,LONUM        ;PUT R0 BACK IN LONUM
4330  027040  01002*                          MOV     R0,(R1)+        ;LOAD WC
4331  027042  005337  001174                  DEC     WORK
4332  027046  001406                          BEQ     EXGEN
4333  027050  010437  027070                  MOV     R4,HINUM        ;PUT R1 BACK IN HINUM
4334  027054  010421                          MOV     R4,(1)+         ;HOLD HINUM FOR PROGRAM
4335  027056  005337  001174                  DEC     WORK
4336  027062  001326                          BNE     RAND1
4337  027064  000205                  EXGEN:  RTS     R5              ;RETURN TO PROGRAM
4338  027066  000000                  LONUM:  0
4339  027070  000000                  HINUM:  0
4340  027072  000000                  LOSAV:  0
4341  027074  000000                  HISAV:  0
4342  027076                          RANEND:
4343
4344  027076  032737  000001  027214  .SUSWR: BIT     #BIT0,SWI
4345  027104  001037                          BNE     XXX
4346  027106  013746  000006                  MOV     6,-(SP)         ;SAVE 6 ON STACK
4347  027112  013746  000004                  MOV     4,-(SP)         ;SAVE 4 ON STACK
4348  027116  012737  027136  000004          MOV     #1$,4           ;SET UP TRAP ADDRESS
4349  027124  022777  177777  151674          CMP     #-1,@SWR        ;TEST 177570
4350  027132  001402                          BEQ     2$              ;FAKE OUT
4351  027134  000407                          BR      3$              ;HARDWARE AVAILABLE
4352  027136  022626                  1$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
4353  027140  012737  000176  001026  2$:     MOV     #SWREG,SWR      ;SET UP SOFTWARE REGISTERS
4354  027146  012737  000174  001030          MOV     #DISPREG,DISPLAY
4355  027154  022737  000176  001026  3$:     CMP     #SWREG,SWR      ;1ST TIME THRU?
4356  027162  001004                          BNE     4$              ;NO CHANGE STILL 177570
4357  027164  005737  000042                  TST     42              ;ANY XXDP OR ACT
4358  027170  001001                          BNE     4$              ;SWR=000000
4359  027172  104422                          CNTLU                   ;GET INITIAL SETTINGS
```

```
 4360  027174  012637  000004          4$:     MOV     (SP)+,4         ;REPLACE 4 FROM STACK
 4361  027200  012637  000006                  MOV     (SP)+,6         ;REPLACE 6 FROM STACK
 4362  027204  052737  000001  027214  XXX:    BIS     #BIT0,SWI       ;SET THE BEENHEREBIT
 4363  027212  000002                          RTI                     ;ALL DONE
 4364
 4365  027214  000000                  SWI:    0
 4366
 4367
 4368
 4369  027216  005737  000042          .KBDIN: TST     42              ;GOT XXDP OR ACT
 4370  027222  001057                          BNE OKT                 ;YES,GET OUT
 4371  027224  022737  000176  001026          CMP     #SWREG,SWR      ;GOT SWITCH-LESS MACHINE?
 4372  027232  001053                          BNE     OKT             ;NO GET OUT
 4373  027234  105777  151560                  TSTB    @TKS            ;HAVE A CHARACTER
 4374  027240  100050                          BPL     OKT             ;NO GET OUT
 4375  027242  017737  151554  027364          MOV     @TKB,.MSG
 4376  027250  042737  177600  027364          BIC     #177600,.MSG    ;STRIP OFF GARBAGE
 4377  027256  122737  000007  027364          CMPB    #7,.MSG         ;DO WE HAVE A ^G
 4378  027264  001036                          BNE OKT                 ;NO,GET OUT
 4379  027266  104402  027272                  TYPE    ,.+2            ;.ASCIZ <15><12>''^G''
 4380  027300                          .CNTLU:
 4381  027300  104402  027304                  TYPE    ,.+2            ;.ASCIZ <15><12>''SWR  ''
 4382  027314  013746  000176                  MOV     SWREG,-(6)      ;PUT SWREG ON STACK
 4383  027320  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 4384  027322  104402  027326                  TYPE    ,.+2            ;.ASCIZ ''   NEW= ''
 4385  027340  104410                          RDOCT
 4386  027342  012637  027364                  MOV     (SP)+,.MSG      ;GET NEW VALUE OFF STACK
 4387  027346  005737  027366                  TST     CTN             ;DID HE TYPE <CR> OF 000000?
 4388  027352  001403                          BEQ     OKT             ;DONT CHANGE IF <CR>
 4389  027354  013737  027364  000176          MOV     .MSG,SWREG      ;CHANGE VALUE OF SWREG
 4390  027362  000002                  OKT:    RTI                     ;ALL DONE-EXIT
 4391
 4392  027364  000000                  .MSG:   0
 4393  027366  000000                  CTN:    0
```

```
 4394
 4395                                   ;TABLES FOR ILLEGAL FUNCTION TESTS
 4396
 4397  027370  000003                   ILLTAB: 3
 4398  027372  000005                           5
 4399  027374  000007                           7
 4400  027376  000013                           13
 4401  027400  000015                           15
 4402  027402  000017                           17
 4403  027404  000023                           23
 4404  027406  000025                           25
 4405  027410  000027                           27
 4406  027412  000033                           33
 4407  027414  000035                           35
 4408  027416  000037                           37
 4409  027420  000041                           41
 4410  027422  000043                           43
 4411  027424  000045                           45
 4412  027426  000047                           47
 4413  027430  000000                           0
 4414
 4415  027432  000053                   ILLTB2: 53
 4416  027434  000055                           55
 4417  027436  000057                           57
 4418  027440  000063                           63
 4419  027442  000065                           65
 4420  027444  000073                           73
 4421  027446  000075                           75
 4422  027450  000077                           77
 4423  027452  000000                           0
 4424  027454  000300                   OUTBUF: .BLKW   300
 4425  030254  000300                   INBUF:  .BLKW   300
 4426  031054  000000                   PARITY: 0       ;USED FOR PARITY TEST 67
 4427          000001                           .END
```

```
ADDCF   012214          2357    2366#
AROUND  001406           811     816#
AS    = 000100           740#     961    1514    1524    1546    1577    1590    1612    1655    2080    2138    2297    2612
                        2886    2926    3019    3026    3063    3084    3090    3556    3576    3582    3605    3609    3612
                        4245
ATA   - 100000           761#
AOB1    001166           775#
BA    = 000020           738#     931     989     995    1077    1081    1085    1107    1346    1350    1511    1543    1574
                        1609    1675    2086    2141    2208    2223    3060    3123    4250
BAI   = 000010           764#    1985    1998    2007    3110    3133    3167    3251
BAITST  010050          1982#
BEGIN   001202           615     633     795#    3641
BELL  = 000007           642#    3636    3740
BITBA   004444          1342#
BITCS2  004330          1318#
BITST   004256          1305#
BITWC   004374          1330#
BIT0  = 000001           651#     878     896    1290    1676    1726    1779    1858    1911    2112    2180    4015    4042
                        4344    4362
BIT1  = 000002           652#
BIT10 = 002000           661#
BIT11 = 004000           614     632     662#    806    1816
BIT12 = 010000           663#    1814    2936    2939    4051    4192
BIT13 = 020000           664#     834     860     882    2523    4205    4207    4211
BIT14 = 040000           601     665#    2457    2482    2506    2509    2513    2534    2559    2583    2586    2591
BIT15 - 100000           666#     837     862     871    1375    3551    4292
BIT2  - 000004           653#
BIT3  = 000010           654#    3520    3526    3588    4046
BIT4  - 000020           655#    3073    3114    3139    3174
BIT5    000040           656#
BIT6  - 000100           657#    3183
BIT7    000200           658#    2736
BIT8  - 000400           659#
BIT9  = 001000           660#    2356    2360
BLOCK   010302          2035#
BPORTT  001170           778#    1923*   2526    2528*   2536*   2541*   2543*   2557    2588*
CHCKDV  001744           874     878#
CLRDK = 104414          1019    1305    1351    1359    1384    1409    1455    1492    1520    1555    1586    1626    1665
                        1716    1760    1803    1848    1891    1932    1982    1997    2006    2035    2105    2148    2167
                        2227    2241    2263    2305    2310    2354    2413    2450    2496    2510    2527    2573    2587
                        2597    2639    2663    2676    2694    2701    2719    2725    2750    2761    2835    2855    2873
                        2890    2902    2945    2968    2980    3003    3012    3072    3094    3109    3132    3157    3166
                        3193    3205    3228    3240    3300    3357    3406    3431    3453    3481    3504    3942#   4045
                        4082    4169
CNTLU - 104422          3945#    4080    4359
CSTST   012144          2352#
CS1   - 000001           734#     926     984    1024    1028    1032    1040    1310    1314    1369    1373    1499    1531
                        1562    1597    1652    1679    1681    1687    1723    1725    1731    1767    1769    1811    1813
                        1824    1855    1857    1863    1899    1901    1910    1948    1951    1988    2021    2064    2086
                        2123    2126    2141    2144    2147    2191    2194    2197    2208    2211    2223    2226    2489
                        2505    2566    2582    2606    2609    2621    2650    2684    2709    2740    2795    2861    2889
                        2958    2967    2993    3002    3037    3218    3227    3415    3421    3440    3470
CS2   = 000200           741#     918     980    1050    1060    1064    1069    1366    1378    1395    1420    1431    1443
                        2028    2630    2923    2930
CTN     027366          3862*   3879*   4387    4393#
DA    - 000004           736#     937    1152    1156    1160    1181    1508    1540    1571    1606    1641    1684    1687
```

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                        1693    1728    1778    1781    1821    1830    1860    1913    1951    1954    1960    2147    2197
                        2656    2809    2864    3057    3156    3192    3329    3576    3582    3586    4064    4095    4099
                        4104    4108    4113    4117    4122    4126    4131    4135    4140    4144    4149    4153    4165
                        4168    4255
DAO     - 001000         762#
DAOTST  015604          2945#
DAOTT   015762          2980#
DB      = 000210         743#   4277
DCK     = 100000         763#
DCKTST  014454          2761#
DISPLA  001030          683#   3718*   3722*   3953*   3960*   3967*   3974*   3981*   3985*   3991*   3998*   4005*   4061*
                        4354*
DISPRE  000174          604#   4354
DKADR   015144          2855#
DLT     = 100000         756#   1441
DONCS   012332          2370    2390#
DONE    022052           890    3630#
DONEF   002112           879     890#
DONINT  021050          3467    3471#
DRCLR   006050          1626#
DRY     = 000200         757#   2047    2057
DS      000040           739#    922    1534    1580    1600    1618    1687    1693    1708    1728    1731    1778    1830
                        1860    1951    1960    1996    2012    2049    2053    2061    2064    2083    2091    2123    2126
                        2151    2154    2191    2194    2230    2233    2266    2291    2294    2309    2316    2388    2427
                        2489    2566    2624    2633    2659    2662    2669    2690    2693    2715    2718    2746    2749
                        2753    2806    2809    2886    2915    2934    2964    2971    2999    3006    3022    3051    3084
                        3093    3120    3153    3156    3160    3189    3192    3196    3199    3224    3231    3329    3466
                        3488    3492    3556    3586    3609    3612    4095    4099    4104    4108    4113    4117    4122
                        4126    4131    4135    4140    4144    4149    4153    4165    4168    4172    4182    4187    4265
DT      000240           745#   4272
DVNUM   001442           828     831#
DVTAB   022134          3510    3537    3645#
ER      = 000002         735#    943    1001    1189    1193    1200    1206    1213    1502    1549    1565    1615    1644
                        1687    1728    1731    1778    1860    1951    2000    2123    2126    2191    2194    2262    2287
                        2309    2313    2388    2489    2566    2653    2659    2666    2687    2690    2712    2715    2743
                        2746    2803    2838    2883    2893    2961    2974    2996    3030    3042    3066    3097    3144
                        3179    3221    3293    3329    3333    3345    3349    3368    3371    3383    3387    3466    3488
                        3492    3586
ERINT   021052          3478#
ERR     - 040000         760#
ERRINT  021142          3480    3490#
ERRORS  001002           673#   3741*   3761
ERRR    012076          2337    2343#
ERTST   016126          3012#
EXGEN   027064          4332    4337#
EXREF   025754          4193    4195#
EXTRP   020502          3308    3384    3390    3395#
EXTTRP  020510          3303    3397#
EXTTST  017766          3300#
EXTT1   020310          3357#
EXT1    020512          3396    3398#
FILCHR  001014           677#   3666    3667
FINDM   025722          1818    4190#
FINTST  021156          3489    3494#
FLOTBA  003146          1090#
FLOTDA  003446          1165#
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FLOTWC  003306          1128#
FUNDO   016710          3132#
HALT    025240          4128#
HINUM   027070          4307    4309    4319    4333*   4339#
HISAV   027074          4307*   4341#
HLT   = 104000           639#    918     922     926     931     937     943     949     955     961     980     984     989
                         995    1001    1006    1011    1024    1028    1032    1040    1050    1056    1060    1064    1069
                        1077    1081    1085    1096    1107    1115    1119    1123    1134    1144    1152    1156    1160
                        1171    1181    1189    1193    1200    1206    1213    1223    1230    1238    1246    1266    1280
                        1295    1310    1314    1326    1334    1338    1346    1350    1366    1369    1373    1378    1395
                        1400    1405    1420    1428    1431    1443    1451    1475    1483    1499    1502    1505    1508
                        1511    1514    1524    1531    1534    1537    1540    1543    1546    1549    1562    1565    1568
                        1571    1574    1577    1580    1590    1597    1600    1603    1606    1609    1612    1615    1618
                        1638    1641    1644    1649    1652    1655    1658    1672    1675    1679    1681    1684    1687
                        1690    1693    1699    1705    1708    1723    1725    1728    1731    1734    1740    1746    1751
                        1767    1769    1775    1778    1781    1784    1790    1811    1813    1821    1824    1827    1830
                        1836    1842    1855    1857    1860    1863    1866    1872    1878    1884    1899    1901    1907
                        1910    1913    1916    1922    1948    1951    1954    1957    1960    1966    1972    1988    1993
                        1996    2000    2012    2018    2021    2028    2044    2049    2053    2061    2064    2076    2080
                        2083    2086    2089    2091    2120    2123    2126    2132    2138    2141    2144    2147    2151
                        2154    2188    2191    2194    2197    2205    2208    2211    2218    2223    2226    2230    2233
                        2253    2259    2262    2266    2278    2284    2287    2291    2294    2297    2309    2313    2316
                        2328    2345    2362    2385    2388    2424    2427    2479    2485    2489    2495    2502    2505
                        2556    2562    2566    2572    2579    2582    2606    2609    2612    2618    2621    2624    2630
                        2633    2650    2653    2656    2659    2662    2666    2669    2684    2687    2690    2693    2709
                        2712    2715    2718    2740    2743    2746    2749    2753    2795    2803    2806    2809    2815
                        2820    2834    2838    2861    2864    2883    2886    2889    2893    2915    2920    2923    2926
                        2930    2934    2958    2961    2964    2967    2971    2974    2993    2996    2999    3002    3006
                        3019    3022    3026    3030    3037    3042    3048    3051    3054    3057    3060    3063    3066
                        3080    3084    3090    3093    3097    3103    3120    3123    3126    3144    3150    3153    3156
                        3160    3179    3186    3189    3192    3196    3199    3218    3221    3224    3227    3231    3293
                        3329    3333    3345    3349    3355    3368    3371    3383    3387    3393    3415    3421    3440
                        3445    3465    3466    3470    3488    3492    3555    3556    3559    3565    3571    3576    3582
                        3586    3605    3609    3612    4064    4095    4099    4104    4108    4113    4117    4122    4126
                        4131    4135    4140    4144    4149    4153    4165    4168    4172    4182    4187
HLTADR  001012           676#   3745*   3746*   3747    3748    3762
IAERR   015220          2873#
ICNT    001000           672#    802*   3626*   3696    3711    3713    3715*   3716*   3718    3721*   3722    3728    3757*
IE    = 000100           765#
ILFDN   011056          2108    2156#
ILFDNE  011426          2171    2235#
ILFTB2  027432          2168    4415#
ILF67   011430          2241#
ILLFUN  011060          2167#
ILLTAB  027370          2106    4397#
ILL51   010602          2103#
INBUF   030254          4425#
INCW    014666          2793#
INPUT   023472          3863    3898    3899    3922#
INTDON  020732          3441    3446#
INTR4   020734          3452#
INTR5   020630          3429#
INT112  020724          3432    3444#
INT114  021036          3454    3468#
IR      000100           751#
KBDIN   104416          3693    3737    3943#   3951    3958    3965    3972    3979    3989    3996    4003    4010    4065
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KIPAR0= 172340          713#  3310*
KIPAR1= 172342          714#  3311*
KIPAR2= 172344          715#  3312*  3358*
KIPAR7= 172356          716#  3309*
KIPDR0= 172300          717#  3313*
KIPDR1= 172302          718#  3314*
KIPDR2= 172304          719#  3315*
KIPDR7= 172316          720#  3316*
LA    = 000204          742#  2328   2345   4287
LAD     001010          675#   803*  1256*  1270*  1284*  3717*  3723   3725   3728
LASTSC  017256         3205#
LATDON  012142         2342   2346#
LATST   012020         2326#
LBT   = 002000          759#
LONUM   027066         4306   4308   4317   4329*  4338#
LOP1    004066         1256   1257#
LOP2    004136         1270   1271#
LOP3    004206         1284   1285#
LOSAV   027072         4306*  4340#
MAXREF  026006         4190   4201#
MAXRF1  026010         4199   4202#
MEMOUT  020516         3399#
MODDON  022022         3623#
MODNUM  021160         3504#
MPR0    172100          777#  2400
MR    - 000220          744#   949   1006   1223   1230   1238   1246   1649   2044   2362   2388   4282
MULTII  001412          824#
N       000123          638#   819    823#   899    903#   962    966#  1012   1016#  1033   1034#  1042   1046#
                       1071   1072#  1087   1088#  1099   1100#  1108  1109#  1124   1125#  1138   1139#  1145
                       1146#  1161   1162#  1175   1176#  1182   1183#  1195  1196#  1201   1202#  1207   1208#
                       1214   1215#  1224   1225#  1231   1232#  1239   1240#  1247   1251#  1300   1304#  1316
                       1317#  1328   1329#  1340   1341#  1352   1356#  1379   1383#  1406   1407#  1452   1453#
                       1487   1491#  1515   1519#  1550   1554#  1581   1585#  1619   1623#  1660   1664#  1711
                       1715#  1752   1756#  1798   1802#  1843   1847#  1885   1889#  1927   1931#  1977   1981#
                       2001   2005#  2030   2034#  2093   2097#  2157   2161#  2236   2240#  2299   2303#  2321
                       2325#  2329   2330#  2347   2351#  2391   2395#  2441   2445#  2514   2518#  2592   2596#
                       2634   2638#  2671   2675#  2696   2700#  2720   2724#  2754   2758#  2850   2854#  2866
                       2870#  2897   2901#  2940   2944#  2975   2979#  3007   3011#  3067   3071#  3104   3108#
                       3128   3132#  3161   3165#  3200   3204#  3236   3240#  3295   3299#  3401   3405#  3424
                       3428#  3447   3451#  3473   3477#  3495   3499#  4069   4073#
NED     010000          754#  2928   2932
NEDDON  015512         2909   2936#
NEDTST  015334         2902#
NMDD    015574         2935   2937   2939#
NMOOP   005340         1520#
NMOP21  005656         1586#
NOOP    005214         1492#
NOOP21  005520         1555#
NOPAR   012532         2411   2428   2434   2438#
NOWGO   002116          872    889    895#
NXM     007622         1923#  4214
NXMTSM  010154         2006#
OBUFSV  001102          687#   805*   895*  1494   1509   1526   1541   1557   1572   1592   1607   1667   1673
                       1701   1718   1742   1762   1786   1804   1806   1838   1850   1874   1879   1892   1894
                       1918   1923   1924*  1938   1968   1983   1989   2037   2084   2109   2139   2172   2206
                       2219   2243   2250   2268   2274   2452   2468   2491   2526*  2529   2545   2568   2590*
```

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                        2599    2640    2677    2702    2726    2772    2779    2796    2840    2857    2875    2955    2990
                        3032    3058    3112    3121    3135    3169    3215    3242    3257    3269    3275    3437    3460
                        3485    3534    3567    4013    4194*   4195    4198    4204*
OKT     027362          4370    4372    4374    4378    4388    4390#
ONCEE   001160           614*    632*    772#    804*    806     837*    862     871*    878     896*   2457    2482    2506
                        2509*   2513*   2523    2534    2559    2583    2586*   2591*   2936    2939*   4207    4211*   4292*
OOUT    010600          2050    2090    2092#
OR    = 000200           752#   1429
OUT     022046          3627#
OUTBUF  027454           805     895    1253    1255    1269    1283    1493*   1525*   1556*   1591*   1666*   1717*   1747
                        1761*   1924    1937*   2451*   2459*   2461*   2464*   2466*   2480    2511*   2538*   2590    2598*
                        2771*   2778*   2821    3031*   3111*   3134*   3168*   3241*   3256*   3533*   4041*   4053    4058
                        4083*   4084    4154*   4155    4173*   4174    4180    4204    4424#
PARITY  031054          2396    2414    2440*   4426#
PART    012334          2396#
PARTST  011742          2304#
PATST   016422          3072#
PATTST  017062          3166#
PCNT    001004           674#   3631*   3632*   3643
PGE   = 002000           753#   2626
PGETST  013506          2597#
PGTRAP  020612          3408    3418#
PIP   - 020000           758#
PRTP    012512          2398    2432#
PRTP1   012514          2408    2433#
PS    = 177776           640#    641     903*    967*   3410*   3434*   3435    3456*   3457    3479*   3547*   3619*   3625*
                        4011*
PSW   = 177776           641#
PTDONE  026660          4230    4266    4270    4288    4292#
QES     020532          3406#
QESDON  020626          3416    3422#
QQ    - 000001           819#    899#    962#   1012#   1033#   1042#   1071#   1087#   1099#   1108#   1124#   1138#   1145#
                        1161#   1175#   1182#   1195#   1201#   1207#   1214#   1224#   1231#   1239#   1247#   1300#   1316#
                        1328#   1340#   1352#   1379#   1406#   1452#   1487#   1515#   1550#   1581#   1619#   1660#   1711#
                        1752#   1798#   1843#   1885#   1927#   1977#   2001#   2030#   2093#   2157#   2236#   2299#   2321#
                        2329#   2347#   2391#   2441#   2514#   2592#   2634#   2671#   2696#   2720#   2754#   2850#   2866#
                        2897#   2940#   2975#   3007#   3067#   3104#   3128#   3161#   3200#   3236#   3295#   3401#   3424#
                        3447#   3473#   3495#   4069#
RANDOM  026724          1254    4306#
RAND1   026740          4308#   4336
RANEND  027076          4342#
RANNU   001150           768#
RANTS   004036          1252#
RDLIN   104412          3860    3941#
RDOCT   104410          3940#   4033    4036    4040    4385
RDTST   006472          1716#
RDTSTB  007250          1848#
RMRT1   013706          2639#
RMRT2   014064          2676#
RMRT3   014174          2701#
RMRT4   014304          2725#
RSAS    001122           698#    831     959    1512    1522    1544    1575    1588    1610    1653    2073    2075    2077*
                        2078    2135    2295    2610    2734*   2924    3014    3023*   3024    3061    3085    3599    3615*
                        3997*   3998    4248
RSBA    001112           694#    906*    929     970*    987    1074*   1075    1078*   1079    1082*   1083    1092*   1093
                        1103*   1104*   1105    1288    1293    1342*   1344    1347*   1348    1494*   1509    1526*   1541
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                        1557*  1572   1592*  1607   1667*  1673   1700   1718*  1741   1762*  1785   1806*  1837
                        1850*  1873   1894*  1917   1938*  1967   1983*  1990   2009*  2037*  2084   2109*  2139
                        2172*  2206   2221   2245*  2249   2270*  2275   2414*  2452*  2468*  2490   2529*  2545*
                        2567   2599*  2640*  2677*  2702*  2726*  2772*  2779*  2796*  2831   2840*  2857*  2875*
                        2955*  2990*  3032*  3058   3112*  3121   3135*  3169*  3215*  3242*  3257*  3275*  3321*
                        3337*  3361*  3377*  3437*  3460*  3485*  3534*  3566   3959*  3960   4013*  4053*  4058*
                        4084*  4155*  4174*  4253
RSBAB   001146           708#  1343*
RSCS1   001104           691#   905*   924    969*   982   1021*  1022   1025*  1026   1029*  1030   1036*  1037*
                        1038   1306*  1308   1311*  1312   1367   1370*  1371   1496*  1497   1528*  1529   1559*
                        1560   1578   1594*  1595   1616   1631*  1650   1669*  1676*  1677   1685   1720*  1721
                        1729   1764*  1765   1776   1808*  1809   1822   1852*  1853   1861   1896*  1897   1908
                        1949   1986*  2010*  2019   2022*  2046*  2062   2111*  2114   2117   2152   2179*  2182
                        2185   2228   2246*  2247   2271*  2272   2288*  2289   2416*  2417   2425   2454*  2455
                        2471*  2472   2487   2503   2531*  2532   2548*  2549   2564   2580   2601*  2602   2604*
                        2607   2625*  2631   2647*  2660   2667   2679*  2680   2691   2704*  2705   2707*  2716
                        2733*  2747   2751   2774*  2775   2786*  2793   2798*  2799   2807   2841*  2842   2859*
                        2877*  2878   2887   2921   2956*  2965   2991*  3000   3020   3028   3034*  3035   3038
                        3040   3091   3095   3115*  3116   3118   3137*  3140   3142   3158   3171*  3172   3175
                        3177   3194   3216*  3225   3252*  3253   3260*  3261   3285*  3286   3322*  3325   3327
                        3331   3339*  3341   3343   3347   3363*  3364   3366   3369   3378*  3379   3381   3385
                        3411*  3419   3438*  3461*  3468   3486*  3490   3538*  3544*  3550   3587*  3592*  3610
                        3616*  4014*  4015   4017   4054*  4055   4059*  4061   4062   4087*  4088   4158*  4159
                        4161   4177*  4178   4233   4296
RSCS1B  001140           705#  1307*  2927*
RSCS2   001106           692#   825*   829*   840*   904*   911*   916    919*   968*   975*   977*   978    981*
                        1048   1051*  1052   1054   1057*  1058   1061*  1062   1065*  1066*  1067   1070*  1318*
                        1319*  1323   1361   1374   1390   1417   1429   1441   1632   1696   1737   1772   1816
                        1833   1869   1904   1963   1985*  1998   2007*  2015   2023   2127   2200   2213   2256
                        2281   2419   2474   2499   2551   2576   2615   2627   2773*  2791*  2792*  2810   2911*
                        2916   2928   2932   3043   3073*  3075   3098   3110*  3114*  3133*  3139*  3145   3167*
                        3174*  3180   3251*  3259*  3263*  3290   3541*  3543*  3549*  3562   3606*  3990*  3991
                        4046*  4217*  4218*  4241
RSCS2B  001142           706#  1320*
RSDA    001114           695#   907*   935    971*   993   1149*  1150   1153*  1154   1157*  1158   1167*  1168
                        1177*  1178*  1179   1274   1278   1506   1538   1569   1604   1628*  1639   1682   1726
                        1779   1819   1858   1911   1952   2036*  2045*  2145   2195   2366*  2368*  2369   2381
                        2470*  2547*  2648*  2654   2777*  2858*  2862   2876*  2912*  2931   2954*  2989*  3055
                        3206*  3255*  3274*  3336*  3376*  3483*  3536*  3574   3580   3584   3966*  3967   4049*
                        4085*  4092*  4096*  4105*  4114*  4123*  4132*  4141*  4150*  4156*  4175*  4258
RSDB    001126           700#   973*  1360   1385*  1386*  1397   1402   1412*  1425   1437*  1447   1458*  1464*
                        1472   1480   4280
RSDS    001116           696#   920   1532   1598   1691   1828   1958   2047   2051   2057   2059   2081   2124
                        2192   2307   2314   2657   2688   2713   2736   2744   2804   2884   2962   2969   2997
                        3004   3049   3151   3187   3222   3229   3607   3973*  3974   4093   4097   4102   4106
                        4111   4115   4120   4124   4129   4133   4138   4142   4147   4151   4163   4170   4185
                        4268
RSDT    001132           702#   841    845    849    853    855   4275
RSER    001120           697#   826*   908*   941    972*   999   1186*  1187   1190*  1191   1197*  1198   1203*
                        1204   1209*  1210*  1211   1500   1521*  1547   1563   1587*  1613   1629*  1642   1706
                        1994   2121   2149   2189   2231   2260   2264   2285   2292   2306*  2311   2622   2651
                        2664   2682*  2685   2710   2741   2801   2836   2881   2891   2913   2959   2972   2994
                        3013*  3064   3082   3154   3190   3197   3219   3980*  3981   4166   4237
RSLA    001124           699#   2326   2334   2338   2375   3985   4290
RSMR    001130           701#   909*   947    976*   1004   1218*  1219   1226*  1227*  1228   1233*  1234   1241*
                        1242   1630*  1645   2040   2356   2360   2373   3074   3081*  4004*  4005   4285
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RSMRR   024002   628  4002#
RSREG   026156  3751  4222#
RSVCPS  001136   704# 3409* 3433* 3455* 3482* 3532* 3621  3622*
RSVEC   001134   703# 3408* 3432* 3454* 3480* 3531* 3590* 3621*
RSWC    001110   693#  910*  953   974* 1009  1112* 1113  1116* 1117  1120* 1121  1130* 1131
                1140* 1141* 1142  1260  1264  1330* 1332  1335* 1336  1495* 1503  1527* 1535
                1558* 1566  1593* 1601  1627* 1656  1668* 1670  1688  1719* 1732  1763* 1782
                1807* 1825  1851* 1864  1895* 1914  1939* 1955  1984* 2008* 2038* 2087  2110*
                2142  2173* 2209  2224  2242* 2267* 2415* 2453* 2469* 2530* 2546* 2600* 2619
                2641* 2678* 2703* 2727* 2770* 2780* 2797* 2817  2839* 2856* 2874* 2948* 2950*
                2953* 2983* 2985* 2988* 3033* 3052  3113* 3124  3136* 3170* 3209* 3211* 3214*
                3245* 3247* 3250* 3258* 3278* 3282* 3284* 3320* 3338* 3362* 3375* 3436* 3459*
                3484* 3535* 3557  3952* 3953  4012* 4050* 4086* 4157* 4176* 4263
RSWCB   001144   707# 1331*
RSWCWT  006722  1768#
RS04DT  001162   773#  843*  847*  851*  859* 2762  2767  2822  2826  2946  2951  2981  2986
                3207  3212  3243  3248  3264  3276  3280  3572  3578
RW    = 000006   721# 3313  3314  3315  3316
SAVBAD  001100   686#
SAVEE   001172   779# 3529* 3613*
SC    = 100000   750#
SCOPE = 104400   822   902   965  1015  1033  1045  1071  1087  1099  1108  1124  1138  1145
                1161  1175  1182  1195  1201  1207  1214  1224  1231  1239  1250  1303  1316
                1328  1340  1355  1382  1406  1452  1490  1518  1553  1584  1622  1663  1714
                1755  1801  1846  1888  1930  1980  2004  2033  2096  2160  2239  2302  2324
                2329  2350  2394  2444  2517  2595  2637  2674  2699  2723  2757  2853  2869
                2900  2943  2978  3010  3070  3107  3131  3164  3203  3239  3298  3404  3427
                3450  3476  3498  3623  3630  3936# 4072  4212  4213
SECT    017422  3240#
SEEC    026512  4244  4271#
SETPAT  016574  3109#
SHIFT   026756  4312#  4316
SILO    004726  1409#
SILOB   004516  1359#
SILOFL  005100  1455#
SRAS    023756   627  3995#
SRCS2   023732   626  3988#
SRSBA   023602   621  3957#
SRSCS1  024026   629  4009#
SRSDA   023626   622  3964#
SRSDS   023652   623  3971#
SRSER   023676   624  3978#
SRSLA   023722   625  3985#  3986
SRSWC   023556   620  3950#
SR0   = 177572   712# 3305  3317* 3395*
STRT    000230   608   614#
STTEST  001526   835   838#  876
SUSWR = 104420   809  3944#  4043
SWI     027214  4042* 4344  4362* 4365#
SWR     001026   682#  834   860   882  1814  3633  3694  3696  3698  3709  3738  3742  3752
                3755  3952  3959  3966  3973  3980  3990  3997  4004  4014  4044  4047  4051
                4066  4076  4081  4192  4205  4349  4353* 4355  4371
SWRCHG  024410  4057  4061#
SWREG   000176   605#  4076  4353  4355  4371  4382  4389*
SW10    002000   593#  3633  3737  3738
SW11    004000   592#  3709
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SW12  = 010000            591#   3634    3636
SW13  = 020000            590#   3742
SW14  = 040000            589#   3698
SW15  = 100000            588#
SW8   = 000400            596#   3693    3694
SW9   = 001000            595#   3755
TIMES   022504             897    898*   1020*   2103    2104*   2304*   2352    2353*   2397*   3301    3302*   3430*   3505
                          3506*  3624*   3713    3728#
TIMSV   001164             774#   897*   1020    2103*   2304    2352*   2397    3301*   3430    3505*   3624
TKB     001022             680#   4375
TKKS    024322            4049#
TKS     001020             679#   4373
TKSEL   024104             808    4030#
TK1     024270            4044#   4067
TK2     024276            4045#   4068
TMEOUT  012330            2372    2388#
TPB     001024             681#   3667*   3672*
TPS     001016             678#   3668    3673
TRE   = 040000             749#   1370    2022    2625    3587
TRY     001422             826#    830
TRYNX   001730             839     858     873#    3627
TSTAGN  012366            2401#   2436
TSTNEM  010214            2013#
TSTVEC  021430            3531    3549#
TST1    001410             822#
TST10   003144            1087#
TST100  015142            2853#
TST101  015216            2869#
TST102  015332            2900#
TST103  015602            2943#
TST104  015760            2978#
TST105  016124            3010#
TST106  016420            3070#
TST107  016572            3107#
TST11   003176            1099#
TST110  016706            3131#
TST111  017060            3164#
TST112  017254            3203#
TST113  017420            3239#
TST114  017764            3298#
TST115  020530            3404#
TST116  020626            3427#
TST117  020732            3450#
TST12   003222            1108#
TST120  021050            3476#
TST121  021156            3498#
TST122  024442            4072#
TST13   003304            1124#
TST14   003336            1138#
TST15   003362            1145#
TST16   003444            1161#
TST17   003476            1175#
TST2    002146             902#
TST20   003522            1182#
TST21   003564            1195#
TST22   003606            1201#
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TST23	003630	1207#											
TST24	003654	1214#											
TST25	003712	1224#											
TST26	003740	1231#											
TST27	003776	1239#											
TST3	002370	965#											
TST30	004034	1250#											
TST31	004254	1303#											
TST32	004326	1316#											
TST33	004372	1328#											
TST34	004442	1340#											
TST35	004514	1355#											
TST36	004616	1382#											
TST37	004724	1406#											
TST4	002602	1015#											
TST40	005076	1452#											
TST41	005212	1490#											
TST42	005336	1518#											
TST43	005516	1553#											
TST44	005654	1584#											
TST45	006046	1622#											
TST46	006242	1663#											
TST47	006470	1714#											
TST5	002674	1033#											
TST50	006656	1755#											
TST51	007030	1801#											
TST52	007246	1846#											
TST53	007442	1888#											
TST54	007636	1930#											
TST55	010046	1980#											
TST56	010152	2004#											
TST57	010300	2033#											
TST6	002722	1045#											
TST60	010600	2096#											
TST61	011056	2160#											
TST62	011426	2239#											
TST63	011740	2302#											
TST64	012016	2324#											
TST65	012032	2329#											
TST66	012142	2350#											
TST67	012332	2394#											
TST7	003062	1071#											
TST70	012550	2444#											
TST71	013112	2517#											
TST72	013504	2595#											
TST73	013704	2637#											
TST74	014062	2674#											
TST75	014172	2699#											
TST76	014302	2723#											
TST77	014452	2757#											
TTAGG	002372	967#											
TTMOUT	010576	2056	2091#										
TTVEC	021660	3590	3596#										
TYPE	104402	815	836	864	870	886	887	2344	2938	3635	3740	3744	3750	3802
		3842	3888	3907	3912	3915	3918	3937#	4032	4035	4039	4075	4090	4100
		4109	4118	4127	4136	4145	4183	4209	4224	4227	4232	4236	4240	4247

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                    4252    4257    4262    4267    4274    4279    4284    4289    4379    4381    4384
TYPEO = 104404      3749    3938#   4226    4229    4234    4238    4242    4249    4254    4259    4264    4269    4276
                    4281    4286    4291    4383
TYPES = 104406       868     885    3939#
UNCMP   001156       771#    832*    838     857     873*    880*   1512    1522    1544    1575    1588    1610    1653
                    2133    3015    3023    3061    3086
UNITST  007640      1932#
UNITSV  001154       770#    831*    838     857*   2905    3512
UNNUM   001152       769#    833*    840     867     875*    881*    884     904     919     968     981    1070    1318
                    1321    1363    1389    1416    1634    1694    1735    1770    1831    1867    1902    1934    1941
                    1961    2013    2024    2065    2128    2201    2214    2254    2279    2421    2475    2497    2552
                    2574    2613    2792    2811    3045    3077    3099    3147    3182    3288    3514    3522    3549
                    3560    4034*   4081*   4218
UP      = 000000     722#    3313    3314    3315    3316
WAITRY  026670      1680    1724    1768    1812    1856    1900    1947    1987    2011    2605    2649    2683    2708
                    2860    2957    2992    3217    3439    3487   4295#
WC      = 000010     737#     955    1011    1115    1119    1123    1144    1334    1338    1505    1537    1568    1603
                    1658    1672    1690    1734    1784    1827    1866    1916    1957    2089    2144    2211    2226
                    2621    3054    3126    3559    4064    4260
WCE     = 040000     755#
WCEDNB  013446      2544    2586#
WCEDNE  013062      2467    2509#
WCEDON  013104      2462    2513#
WCEDOS  013470      2525    2539    2590#
WCETB   013144      2529#   2589
WCETSB  013114      2523#
WCETST  012552      2450#
WCETT   012560      2452#   2512
WORK    001174       791#   1219*   1220*   1221    1234*   1235*   1236    1242*   1243*   1244    1252*   1387*   1393*
                    1645*   1646*   1647    1804*   1805*   1849*   1879*   1880    1892*   1893*   2039*   2042*   2065*
                    2069    2071*   2169*   2178*   2198    2219*   2220*   2221    2243*   2244*   2245    2268*   2269*
                    2270    2333*   2336*   2367*   2371*   2735*   2738*   2903*   2905    2908*   2931*   3266*   3268*
                    3272*   3412*   3413*   3462*   3463*   3511*   3512    3518*   3598*   3599    3603*   3615    4037*
                    4038*   4050    4295*   4298*   4299    4331*   4335*
WORK1   001176       792#   2174*   2175*   2176    2377*   2379*   3507*   3520    3526*   3588    4047*   4048*   4049
WORK2   001200       793#   2764*   2766*   2769*   2770    2797    4044*   4066
WRCKT   006660      1760#
WRCKTB  007444      1891#
WRTLCK  024444       611    4074#
WRTST   006244      1665#
WRTSTB  007032      1803#   4200
WT      024362      4055#   4060
WTDV    021426      3548#
WTDV1   021776      3589    3614    3619#
WTDV2   021656      3591    3594#   3617
WTE     024372      4052    4058#
WWP     - 000004     776#   2402
XXX     027204      4345    4362#
ZERONE  004620      1384#
$ENDAD  022116       599    3639#
$END1   022126      3637    3641#
.       031056       597#    598#    600#    603#    607#    610#    613#    619#    631#    670#    685#    807     815
                     836     864     887     888#    917     921     925     930     936     942     948     954     960
                     979     983     988     994    1000    1005    1010    1023    1027    1031    1039    1049    1059
                    1063    1068    1076    1080    1084    1095    1106    1114    1118    1122    1133    1143    1151
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                    1692    1698    1704    1707    1722    1727    1730    1733    1739    1745    1750    1766    1774
                    1777    1780    1783    1789    1810    1820    1826    1829    1835    1841    1854    1859    1865
                    1871    1877    1883    1898    1906    1912    1915    1921    1950    1953    1956    1959    1965
                    1971    1992    1995    1999    2017    2020    2027    2052    2060    2063    2079    2082    2085
                    2088    2119    2122    2125    2131    2137    2140    2143    2146    2150    2153    2187    2190
                    2193    2196    2204    2207    2210    2217    2222    2225    2229    2232    2252    2258    2261
                    2265    2277    2283    2286    2290    2293    2296    2308    2312    2315    2327    2344    2359
                    2361    2384    2423    2426    2488    2494    2501    2504    2565    2571    2578    2581    2608
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                    2689    2692    2711    2714    2717    2742    2745    2748    2752    2802    2805    2808    2814
                    2819    2833    2837    2863    2879    2882    2885    2888    2892    2914    2919    2922    2925
                    2929    2933    2938    2960    2963    2966    2970    2973    2995    2998    3001    3005    3018
                    3021    3025    3029    3036    3041    3047    3050    3053    3056    3059    3062    3065    3079
                    3083    3089    3092    3096    3102    3119    3122    3125    3143    3149    3152    3155    3159
                    3178    3185    3188    3191    3195    3198    3220    3223    3226    3230    3292    3326    3342
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                    3636#   3643    3645#   3669    3674    3728    3744    3745#   3750    3751#   3753    3761    3762
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                    4145    4148    4152    4164    4167    4171    4181    4183    4184#   4186    4209    4224    4227
                    4228#   4232    4236    4237#   4240    4247    4248#   4252    4253#   4257    4258#   4262    4263#
                    4267    4268#   4274    4275#   4279    4280#   4284    4285#   4289    4290#   4379    4380#   4381
                    4384    4385#   4424#   4425#
.CLRDK  026140      3942    4217#
.CNTLU  027300      3945    4380#
.HLT    022506       798    3737#
.HLTCT  022644      3747*   3761#   4222    4243    4245    4250    4255    4260    4265    4271*   4272    4277    4282
                    4287
.ILLUP  023204      3818    3845#
.KBDIN  027216      3943    4369#
.KIT    022456      3699    3708    3714    3721#   3759
.MSG    027364      4375*   4376*   4377    4386*   4389    4392#
.OVER   022462      3697    3722#
.POWER  023060       796    3818#   3840
.POWUP  023124      3827    3830#
.PR     023034      3768*   3770*   3772*   3773*   3778    3782    3792*   3793    3796*   3798    3802    3809#
.PRF    022742      3780    3783    3788#
.PRL    022720      3781#   3797
.PTIT   022700      3769    3774#
.PUVEC  023212      3818*   3819*   3827*   3849#
.QQ.   = 000024     3923#   3936    3937#   3938#   3939#   3940#   3941#   3942#   3943#   3944#   3945#   3946#
.RDLIN  023350      3897#   3941
.RDOCT  023216      3855#   3940
.SAVR6  023210      3826*   3830    3848#
.SCOPE  022312      3693#   3936
.SUSWR  027076      3944    4344#
.SVLAD  022436      3705    3710    3716#   3724
.SWOPT= 167400       581#    588     589     590     591     592     593     594     595     596     597    3633    3634
                    3636    3693    3737    3742    3755
.TBIT   022132      3643#
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.TRAP   023512            800     3930#
.TRP    023530           3933     3934#
.TYPE   022154           3656#    3937
.TYPEB  022646           3768#
.TYPEO  022656           3770#    3938
.TYPES  022666           3772#    3939
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          1161   1175    1182    1195    1201    1207    1214    1224    1231    1239    1247    1300    1316    1328    1340
          1352   1379    1406    1452    1487    1515    1550    1581    1619    1660    1711    1752    1798    1843    1885
          1927   1977    2001    2030    2093    2157    2236    2299    2321    2329    2347    2391    2441    2514    2592
          2634   2671    2696    2720    2754    2850    2866    2897    2940    2975    3007    3067    3104    3128    3161
          3200   3236    3295    3401    3424    3447    3473    3495    4069
ODT11        1#
ODT11X       1#
POP          1#    667#   3704    3707    3803    3834    3882
PRINT        1#    667#     815     836     864     887    2344    2938    3635    3744    3750    3842    3887    3907    3911
          4032   4035    4039    4075    4090    4100    4109    4118    4127    4136    4145    4183    4209    4224    4227
          4232   4236    4240    4247    4252    4257    4262    4267    4274    4279    4284    4289    4379    4381    4384
PUSH         1#    667#   3701    3774    3820    3857
SCOPE.       1#    819#    899#    962#   1012#   1033#   1042#   1071#   1087#   1099#   1108#   1124#   1138#   1145#   1161#
          1175#  1182#   1195#   1201#   1207#   1214#   1224#   1231#   1239#   1247#   1300#   1316#   1328#   1340#   1352#
          1379#  1406#   1452#   1487#   1515#   1550#   1581#   1619#   1660#   1711#   1752#   1798#   1843#   1885#   1927#
          1977#  2001#   2030#   2093#   2157#   2236#   2299#   2321#   2329#   2347#   2391#   2441#   2514#   2592#   2634#
          2671#  2696#   2720#   2754#   2850#   2866#   2897#   2940#   2975#   3007#   3067#   3104#   3128#   3161#   3200#
          3236#  3295#   3401#   3424#   3447#   3473#   3495#   4069#
SET       3923#  3936    3937    3938    3939    3940    3941    3942    3943    3944    3945
TYPADR       1#
TYPBIT       1#    667#
TYPCHR       1#    667#
TYPDEC       1#    667#
TYPLIN       1#    667#
TYPOCS       1#    667#     866     884
TYPOCT       1#    667#    3748    4225    4228    4233    4237    4241    4248    4253    4258    4263    4268    4275    4280
          4285   4290    4382
TYPTXT       1#    667#     815     836     864     887    2343    2938    4032    4035    4039    4074    4090    4100    4109
          4118   4127    4136    4145    4183    4209    4224    4227    4231    4235    4239    4247    4252    4257    4262
          4267   4274    4279    4284    4289    4379    4380    4384
$CATCH       1#    581#    597
$CMTAG       1#    581#    670
$DONE        1#    581#   3628
$EQUAT       1#    581#    638
$HLT         1#    581#   3729
$KBDIN       1#    581#   4368
$KMMR        1#
$OCTAL       1#    581#   3762
$POWER       1#    581#   3810
$RAND2       1#
$RAND4       1#
$RDDEC       1#
$RDLIN       1#    581#   3890
$RDOCT       1#    581#   3850
$SCOPE       1#    581#   3686
$SET      3923#  3936    3937    3938    3939    3940    3941    3942    3943    3944    3945
$SETUP       1#    581#    795
$SMMR        1#
$SUSWR       1#    581#   4343
$SWDOC       1#    581#    585
$TRAP        1     581#   3923
$TYPE        1#    581#   3646
$TYPEA       1#
```

```
$TYPED      1#
$UMMR       1#


. ABS.  031056      000


 ERRORS DETECTED:  0

 C.BIN,C.LST/CRF/SOL/NL:TOC=CZRSBC.SML,CZRSBG.P11
 RUN-TIME:  10 15 .1 SECONDS
 RUN-TIME RATIO: 79/28-2.8
 CORE USED:  22K  (43 PAGES)
```