IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZMMF-A-D
(SUPERSEDES MAINDEC-11-D1FB)

PRODUCT NAME: 11'S SUSCEPTABILITY TEST

DATE REVISED: MAY 15,1972

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: JOHN RODENHISER/ JIM LACEY

1, ABSTRACT

THIS TEST VERIFIES THAT THE CORES OF Y AXIS ADDRESS STRINGS
OF THE SELECTED MEMORY TEST ZONE ARE NOT SENSITIVE TO Ø
READ NOISE PROPAGATED ALONG THE ADDRESS STRING, SCOPE LOOP
OPTIONS ARE PROVIDED TO FACILITATE ANY ADDITIONAL
DIAGNOSTIC PROCEDURES THAT MAY BE USED IN CONJUNCTION WITH
THIS TEST,

2, REQUIREMENTS

2,1 EQUIPMENT

PDP-11 WITH MINIMUM OF 4K MEMORY

2,2 STORAGE

2,2,1 PROGRAM STORAGE - THE ROUTINE USES MEMORY FROM 200 TO 2722',

3, LOADING PROCEDURE

3,1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED,

1, ABSOLUTE LOADER MUST BE IN MEMORY',
2, PLACE BINARY TAPE IN READER,
3, LOAD ADDRESS #7500', (* DETERMINED BY ADDRESS OF LOADER)
4, PRESS "START" (PROGRAM WILL LOAD)',

4, STARTING PROCEDURE

4,1 CONTROL SWITCH SETTING

STARTING AT SA 200 ALL SWITCHES SHOULD BE DOWN OR ZERO',

4,2 STARTING ADDRESS OR ADDRESSES

200= START WITH AUTOMATIC TEST LIMITS
202= START WITH SELECTED TEST LIMITS

4,3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY,
SET SWITCH REGISTER TO STARTING ADDRESS,
LOAD ADDRESS 200',
PRESS START,
THE PROGRAM WILL RUN THROUGH THE SELECTED ADDRESS FIELD
AND LOOP,

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200, WITH ALL SWITCHES DOWN, THE PROGRAM WILL PRINT OUT ON ERRORS AND CONTINUE IN TEST.

5.1.2 SWITCHES SETTINGS ARE

SW15 = 1 OR UP ... HALT ON ERROR
SW14 = 1 OR UP ... SCOPE LOOP
SW13 = 1 OR UP ... INHIBIT PRINTOUT
SW12 = 1 OR UP ... HALT ON END OF PROGRAM

5.1.3 AUTOMATIC TEST LIMITS

IF THE PROGRAM IS STARTED AT ADDRESS 200 THE PROGRAM WILL TEST ALL AVAILABLE MEMORY, CARE SHOULD BE TAKEN TO SELECT THE PROPER OPERATIONAL SWITCH SETTINGS (REFER TO 5.1.2) BEFORE STARTING.

5.1.4 SELECTED TEST LIMITS

IF THE PROGRAM IS STARTED AT ADDRESS 202 A MESSAGE WILL BE PRINTED ON THE TELETYPE INSTRUCTING THE OPERATOR ON THE METHOD OF SELECTING OTHER MEMORY TEST AREAS AND THEN THE PROGRAM WILL STOP AT THE FIRST OF THREE HALTS.

A. SET THE LOW TEST LIMIT IN THE SWITCH REGISTER AND PRESS CONTINUE.

B. THEN SET THE HIGH TEST LIMIT IN THE SWITCH REGISTER AND PRESS CONTINUE.

C. THEN SET THE OPERATIONAL SWITCH SETTINGS (REF 5.1.2) AND PRESS CONTINUE.

THE PROGRAM WILL NOW BEGIN TESTING THE SELECTED AREA. THE PROGRAM WILL NOT ALLOW LIMITS TO BE SELECTED THAT WOULD CAUSE ITSELF TO BE DESTROYED, AN EXCEPTION TO THIS WOULD BE THE INSTRUCTIONAL TEXT STORAGE AREA. STARTING THE PROGRAM AT 200 OR SELECTING LIMITS WHICH OVERLAP THIS AREA WILL CAUSE THE TEXT MESSAGE TO BE DESTROYED.

5,2 SUBROUTINE ABSTRACTS

5,2,1 ERROR1

SUBROUTINE ERROR1 IS CALLED WHENEVER A LOCATION FAILS TO WRITE AND READ A -1 CONFIGURATION UPON THE CONCLUSION OF A BURST OF 64 READ ZERO-RESTORE ZERO OPERATIONS ON THAT LOCATION, UPON ENTERING THE SUBROUTINE THE BURST FLAG (BSTFLG) IS SET TO A -1 CONFIGURATION, THE STARTING ADDRESS OF THE ERROR MESSAGE IS ACCESSED, AND THE INHIBIT PRINT SWITCH (SW13) IS TESTED TO DETERMINE IF THE ADDRESS AND CONTENTS OF THE ERROR LOCATION WILL BE PRINTED. THE SUBROUTINE UPON THE END OF PRINTING (OR IN THE EVENT SW13 IS PRESENT) CHECKS THE HALT-SCOPE SWITCHES (SW15 AND 14 RESPECTIVELY), IF NEITHER SWITCH IS SET THE PROGRAM WILL CLEAR THE ERROR FLAGS AND IMMEDIATELY RETURN TO THE MAIN TEST PROGRAM, IF SW15 IS SET, THE SUBROUTINE WILL TEST THE DISTURBANCE FLAG TO DETERMINE THE TYPE OF ERROR, IT SHOULD BE NOTED HERE THAT THERE IS NO SCOPE LOOP AVAILABLE ON A DISTURBANCE ERROR; HENCE IF THE DISTURBANCE FLAG IS SET THE SUBROUTINE BYPASSES THE ERROR MESSAGE (SINCE THE ERROR MESSAGE IS SCOPE LOOP INFORMATION), AND HALTS, IF THE DISTURBANCE FLAG IS DOWN, THE BURST FLAG IS ASSUMED TO BE UP AND THE ERROR MESSAGE WILL BE PRINTED. A HALT WILL OCCUR ON THE RETURN FROM PRINTING TO WAIT FOR THE OPERATOR TO SET SW14. A CONTINUE FROM EITHER TYPE OF HALT WILL FIRST FILTER OUT THE DISTURBANCE ERROR, RETURNING TO THE MAIN TEST PROGRAM IF THE DISTURBANCE FLAG IS SET, OR IF A BURST ERROR ENTERS THE SCOPE LOOP CHECK, IF THE SW14 IS SET THE SUBROUTINE WILL PERFORM A WRITE-READ LOOP THROUGH THE ERROR LOCATION, ERROR PRINTOUTS MAY BE ENABLED OR INHIBITED DURING THE SCOPE LOOP AS COMMANDED BY THE POSITION OF SW13, THE SCOPE LOOP IS TERMINATED AT ANY TIME DURING THE LOOP BY RESETTING SW14, IF SW14 WAS RESET PRIOR TO OR AFTER THE ERROR HALT, OR IS RESET DURING THE SCOPE LOOP, THE PROGRAM WILL RETURN TO MAIN TEST PROGRAM AND RESUME TESTING.

5,2,2 ERROR2

SUBROUTINE ERROR2 IS CALLED WHENEVER THE PROGRAM FINDS ONE OF THE BITS IN THE Y AXIS STRING RESET AS A RESULT OF THE BURST OF 64 ZERO READ-RESTORE OPERATIONS ON THE LEAST SIGNIFICANT LOCATION IN THE STRING, ERROR2 SETS THE DISTURBANCE FLAG (DSTFLG) TO -1 AND PICKS UP THE STARTING ADDRESS OF THE ERROR MESSAGE, THE REMAINING FUNCTIONS OF ERROR2 ARE AS DESCRIBED ABOVE UNDER ERROR1, WITH THE EXCEPTION OF THE SCOPE LOOP WHEREAS NO SCOPE LOOP PROVISIONS ARE AVAILABLE FOR DISTURBANCE ERRORS.

6, ERRORS

6,1 ERROR PRINTOUT

PRINTS ALL ERRORS UNLESS INHIBITED BY SW13

6,2 ERROR RECOVERY

A, IF IN A SCOPE LOOP, RESET SW14.

B, TO RECOVER FROM AN ERROR HALT, MAKE SURE SW14 IS RESET THEN DEPRESS CONTINUE.

C, RELOAD SA AND START.

7, RESTRICTIONS

7,1 STARTING RESTRICTIONS

NONE

7,2 OPERATIONAL RESTRICTION

NONE

8, MISCELLANEOUS

8,1 EXECUTION TIME

THE PROGRAM RINGS THE TELETYPE BELL AFTER EVERY 424 PASSES THRU THE PROGRAM WHICH IS APPROXIMATELY ONCE PER MINUTE WITH 4K OF MEMORY.

9', PROGRAM DESCRIPTION

THE 1/S SUSCEPTABILITY TEST IS DESIGNED TO TEST THE NOISE SENSITIVITY ON THE MEMORY PLANE Y AXIS, THE TEST SETS ALL Y AXIS CORES IN AN ADDRESS STRING TO THE "1" STATE, AND THEN PERFORMS A BURST OF 64 ZERO READ-RESTORE OPERATIONS ON THE LEAST SIGNIFICANT Y AXIS CORES IN THE STRING, AN ADDRESS STRING IS DEFINED AS THOSE GROUP OF ADDRESSES FROM XXXX00 TO XXXX76 WHERE XXXX IS THE NUMERICAL PREFIX OF FOR ANY MEMORY LOCATION AVAILABLE FOR TEST, FOR EXAMPLE: 002300 WOULD BE THE LEAST SIGNIFICANT LOCATION IN ONE ADDRESS STRING, AND 002376 WOULD BE THE MOST SIGNIFICANT ADDRESS IN THE SAME STRING, THE NEXT STRING WOULD START AT 002400 AND EXTEND TO 002476', AFTER THE BURST, THE BURST LOCATION IS RELOADED WITH THE -1 CONFIGURATION AND READ CHECKED TO MAKE SURE THE LOCATION IS STILL FUNCTIONING PROPERLY, SUBROUTINE ERROR1 IS CALLED IN THE EVENT THE BURST LOCATION FAILS THIS PORTION OF THE TEST, AFTER THE WRITE-READ CHECK ON THE BURST LOCATION, THE REMAINING LOCATIONS IN THE STRING ARE CHECKED FOR -1 DATA CONFIGURATIONS, SUBROUTINE ERROR2 IS CALLED WHENEVER THE PROGRAM FINDS ANY CORE RESET ANYWHERE IN THE STRING,

THE PROGRAM IS DESIGNED SO THAT NO CONSTRAINTS ARE PLACED ON THE STARTING ADDRESS FOR TESTING, I,E, THE OPERATOR DOES NOT HAVE TO SET THE LOW LIMIT TEST BOUNDARY ADDRESS AT THE BEGINNING OF AN OCTAL ADDRESS STRING (E,G, 2300,2400,2500, ETC,), AFTER THE PROGRAM RECEIVES THE LIMIT BOUNDARY ADDRESSES IT REMOVES THE TWO LEAST SIGNIFICANT OCTAL DIGITS FROM THE LOW LIMIT ADDRESS, REPLACES THEM WITH AN OCTAL 76, AND STORES THE MODIFIED ADDRESS AS THE MOST SIGNIFICANT ADDRESS OF THE FIRST OCTAL STRING OF THE TEST, TESTING WILL START WITHIN THE STRING AND TERMINATE AT THE MOST SIGNIFICANT ADDRESS, ANY INPUT LOW LIMIT ADDRESS ENDING IN OCTAL 76 WILL AUTOMATICALLY BE WORD INCREMENTED, THIS FEATURE IS NECESSARY BECAUSE A LOW LIMIT ADDRESS SUCH AS THIS ATTEMPT TO MAKE THE BURST LOCATION AND THE SCAN AREA INTO ONE LOCATION WHICH VIOLATES THE OBJECTIVES OF THE TEST, AFTER A STRING SCAN HAS BEEN COMPLETED, THE SCAN LIMIT ADDRESS (SCANHI) IS WORD INCREMENTED TO THE NEXT ADDRESS, AND STORED AS THE STARTING ADDRESS FOR THE NEXT STRING (TAGGED AS SCANLO), AN OCTAL 76 IS THEN ADDED TO THE CONTENTS OF SCANHI TO PROVIDE THE HIGH ORDER LIMIT ADDRESS FOR THE NEXT STRING SCAN, A SIMILAR MECHANISM IS USED TO TERMINATE THE STRING SCAN AT THE HIGH LIMIT MEMORY BOUNDARY ADDRESS REGARDLESS WHERE IN THE ADDRESS STRING THE SELECTED HIGH LIMIT BOUNDARY MAY HAPPEN TO FALL,
PROGRAM WILL HALT IF SWITCH 12 IS PRESENT, A CONTINUE FROM THE HALT (OR IF SWITCH 12 IS NOT PRESENT) WILL REINITIATE TESTING, THE PROGRAM WILL RING THE TELETYPE BELL ONCE EVERY MINUTE TO INDICATE THAT IT IS RUNNING,

10', LISTING

```
                                ,NLIST  SEQ
                                ,LIST   ME
                                ,TITLE  ONE'S SUSCEPTABILITY TEST       MAINDEC-11-DEMMF-A
                                ;COPYRIGHT 1970,1972 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
          000240                NOP=240
                                        ,ENABL  ABS

                                ;TRAP CATCHER 0-176

          000004                        ,#4
000004    000352                        TLG
          000200                        ,#200
000200    000456                        BR      START1
000202    000406                        BR      START
000204    000000                LOLMT:  0
000206    000000                HILMT:  0
000210    177564                TCSR:   177564
000212    177566                TDBR:   177566
000214    177570                SWREG:  177570
000216    000000                SUMMIT: 0
```

```
000220  012767  177130  001352  START:  MOV     #-650,BELLCT
000226  012767  002362  177750          MOV     #QEFA,LOLMT
000234  012767  017470  177744          MOV     #17470,HILMT
000242  012706  002360                  MOV     #BUFFER,%6
000246  012702  002364                  MOV     #MSG1,%2
000252  004767  001326                  JSR     %7,TOP
000256  000000                          HALT
000260  005777  177730                  TST     @SWREG          ;LOOK FOR LOLMT
000264  001407                          BEQ     HISET           ;DEFERRED
000266  027767  177722  177710          CMP     @SWREG,LOLMT    ;CKN LOLMT IN > QEF
000274  103403                          BLO     HISET           ;LOLMT IN < QEF USE LMT DEFINED
000276  017767  177712  177700          MOV     @SWREG,LOLMT    ;LOLMT IN > QEF STORE INPUT
000304  000000                  HISET:  HALT                    ;WAIT FOR CONTINUE
000306  005777  177702                  TST     @SWREG          ;LOOK FOR HILMT
000312  001407                          BEQ     CONSET          ;DEFERRED
000314  027767  177674  177662          CMP     @SWREG,LOLMT
000322  103403                          BLO     CONSET
000324  017767  177664  177654          MOV     @SWREG,HILMT    ;STORE HILMT
000332  000000                  CONSET: HALT                    ;SETUP CONTROL SWITCHES
000334  000434                          BR      ICAN
000336  012706  002360          START1: MOV     #BUFFER,%6
000342  010603                          MOV     %6,%3           ;TEST POINT IN LOWER BANK
000344  005723                  SEE:    TST     (%3)+           ;TEST
000346  000240                          NOP                     ;PRECAUTIONARY DELAY
000350  000775                          BR      SEE             ;NO TRAP, CONTINUE
000352  162703  000004          TLG:    SUB     #4,%3           ;TRAPPED
000356  005737  000042                  TST     @#42
000362  001407                          BEQ     $1
000364  023727  000042  001006          CMP     @#42,#ENDADR
000372  001405                          BEQ     $2
000374  162703  002734                  SUB     #1500.,%3
000400  000402                          BR      $2
000402  162703  000300          $1:     SUB     #300,%3
000406  010367  177574          $2:     MOV     %3,HILMT
000412  012767  002362  177564          MOV     #QEFA,LOLMT
000420  012767  177130  001152          MOV     #-650,BELLCT
000426  005067  001136          ICAN:   CLR     BSTFLG
000432  005067  001134                  CLR     DSTFLG
000436  005067  001132                  CLR     SCANSW
000442  016767  177536  001126          MOV     LOLMT,SCANLO
000450  016767  177530  001124          MOV     LOLMT,SCANHI    ;SET MASK INTO SCANHI
000456  042767  000077  001116          BIC     #77,SCANHI      ;MASKN LOLMT = 214 OCTAL BITS
000464  062767  000076  001110          ADD     #76,SCANHI      ;PUT 76 IN 214 OCTAL BITS
000472  026767  001104  001076          CMP     SCANHI,SCANLO
000500  001476                          BEQ     EQLYZ
000502  016700  001070          NXSCAN: MOV     SCANLO,%0       ;GET READY TO WRITE
000506  012720  177777          WRSCAN: MOV     #-1,(0)+        ;WRITE 1'S
000512  020067  001064                  CMP     %0,SCANHI       ;CKN END OF SCAN
000516  101773                          BLOS    WRSCAN
000520  016700  001052                  MOV     SCANLO,%0       ;SET R0 BACK TO START OF SCAN
000524  012710  000000                  MOV     #0,@%0          ;AND ZERO OUT LOSCAN
```

```
                                        ,REPT   37
                                        CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
                                        ,ENDR
000530  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000532  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000534  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000536  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000540  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000542  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000544  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000546  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000550  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000552  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000554  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000556  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000560  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000562  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000564  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000566  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000570  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000572  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000574  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000576  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000600  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000602  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000604  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000606  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000610  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000612  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000614  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000616  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000620  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000622  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000624  021010                          CMP     @%0,@%0         ;READ & RESTORE BURST CHAIN
000626  012710  177777                  MOV     #-1,@%0         ;SET LOSCAN TO 1'S
000632  021010                          CMP     @%0,@%0         ;READ 1'S

000634  022710  177777                  CMP     #-1,@%0         ;CK BURST LOC FOR MALFUNCTION
000640  001410                          BEQ     CKDONE             ;BRANCH IF OK
000642  004767  000166                  JSR     %7,ERROR1       ;BURST LOC FAILED
000646  021020                  RDSCAN: CMP     @%0,(0)+        ;INCREMENTING 0
000650  022710  177777                  CMP     #-1,@%0         ;CKN NEXT LOC
000654  001402                          BEQ     .+6             ;BRANCH IF OK
000656  004767  000166                  JSR     %7,ERROR2       ;DISTURBANCE ERROR
000662  026700  000714          CKDONE: CMP     SCANHI,%0       ;LOOKN FOR END OF SCAN
000666  101367                          BHI     RDSCAN          ;CONTINUE SCAN
000670  005767  000700                  TST     SCANSW          ;LOOKN FOR LAST SCAN
000674  100425                          BMI     ITERCT          ;GO INCR ITERATION COUNT
000676  062767  000002  000676  EQLYZ: ADD     #2,SCANHI       ;2 MORE GET NX OCTAL STRING
000704  016767  000672  000664          MOV     SCANHI,SCANLO
000712  062767  000076  000662          ADD     #76,SCANHI      ;LIMIT SET FOR NX OCTAL STRING
000720  026767  000656  177260          CMP     SCANHI,HILMT    ;CKN FOR LAST ADDRESS SCAN
000726  103001                          BHIS    LASCAN
```

```
000730  000664                          BR      NXSCAN          ;NOT LASCAN, SCAN ON
000732  016767  177250  000642  LASCAN: MOV     HILMT,SCANHI    ;SET HISCAN LIMIT
000740  012767  177777  000626          MOV     #-1,SCANSW      ;SET SCANSW NEGATIVE
000746  000655                          BR      NXSCAN          ;TO NXSCAN FOR LASCAN
000750  005267  000624          ITERCT: INC     BELLCT          ;INCR ITERATION COUNTER
000754  001020                          BNE     SW12CK
000756  012767  177130  000614          MOV     #-650,BELLCT
000764  105777  177220                  TSTB    @TCSR           ;CK TTY AVAIL
000770  100375                          BPL     .-4             ;WAIT
000772  012777  000207  177212          MOV     #207,@TDBR      ;RING A DING
001000  013702  000042                  MOV     @#42,X2
001004  001404                          BEQ     SW12CK
001006  004712                  ENDADR: JSR     X7,(2)
001010  000240                          NOP
001012  000240                          NOP
001014  000240                          NOP
001016  032777  010000  177170  SW12CK: BIT     #10000,@SWREG   ;SET UP HALT-CONTINUE OK
001024  001401                          BEQ     .+4             ;NO HALT
001026  000000                          HALT
001030  000167  177372                  JMP     ICAN
001034  012767  177777  000526  ERROR1: MOV     #-1,BSTFLG      ;SET BURST ERROR FLAG
001042  012702  001753                  MOV     #MSG2,X2        ;GET ERROR MESSAGE
001046  000405                          BR      MSGPRT
001050  012767  177777  000514  ERROR2: MOV     #-1,DSTFLG      ;SET DISTURBANCE ERROR FLAG
001056  012702  002020                  MOV     #MSG3,X2        ;GET ERROR MESSAGE
001062  032777  020000  177124  MSGPRT: BIT     #20000,@SWREG   ;CKN PRINT INHIBIT SW
001070  001030                          BNE     SWCHK           ;PRINT INHIBIT UP
001072  004767  000506                  JSR     X7,TOP
001076  010002                  ERRPRT: MOV     X0,X2
001100  004767  000170                  JSR     X7,PRTAB
```

```
001104  012702  001743          SPACE:  MOV     #SPOCK,%2
001110  004767  000470                  JSR     %7,TOP          ;PRINT 6 SPACES
001114  011002                          MOV     @%0,%2          ;GET ERROR DATA
001116  004767  000152                  JSR     %7,PRTAB        ;GO TO PRINT ROUTINE
001122  105777  177062                  TSTB    @TCSR           ;CK TTY
001126  100375                          BPL     .-4
001130  012777  000215  177054          MOV     #215,@TDBR      ;SEND CR
001136  105777  177046                  TSTB    @TCSR           ;CK TTY
001142  100375                          BPL     .-4
001144  012777  000212  177040          MOV     #212,@TDBR      ;SEND LF
001152  032777  140000  177034  SWCHK:  BIT     #140000,@SWREG  ;CK HALT, SCOPE SWITCHES
001160  001005                          BNE     CKSW45          ;REQUEST UP
001162  005067  000402                  CLR     BSTFLG          ;NO REQUEST, CLEAR FLAGS
001166  005067  000400                  CLR     DSTFLG
001172  000207                          RTS     %7              ;RETURN TO READ SCAN
001174  032777  100000  177012  CKSW45: BIT     #100000,@SWREG  ;LOOKN FOR HALT SW
001202  001414                          BEQ     SCOPE           ;NO HALT, CK SCOPE SW
001204  005767  000362                  TST     DSTFLG          ;HALT UP TST DISTURBANCE FLAG
001210  100404                          BMI     SCOPEX          ;FLAG SET, JMP TO SCOPEX FOR EXIT
001212  012702  002120                  MOV     #MSG4,%2        ;SCOPE LOOP INFORMATION
001216  004767  000362                  JSR     %7,TOP          ;GO PRINT IT
001222  000000          SCOPEX: HALT                            ;WAIT FOR CONTINUE
001224  005767  000342                  TST     DSTFLG          ;DISTURBANCE ERROR FILTER
001230  100001                          BPL     .+4             ;SKP NX IF FLAG IS CLEAR
001232  000207                          RTS     %7              ;RETURN TO TEST
001234  032777  040000  176752  SCOPE:  BIT     #40000,@SWREG   ;CKN SCOPE SW
001242  001001                          BNE     LOOPON          ;SCOPE SWITCH UP
001244  000207                          RTS     %7              ;NO - SCOPE, RESUME READCK
001246  012710  177777          LOOPON: MOV     #-1,@%0         ;WRITE
001252  022710  177777                  CMP     #-1,@%0         ;READ
001256  001766                          BEQ     SCOPE           ;NO ERROR, LOOP AGAIN
001260  032777  020000  176726          BIT     #20000,@SWREG   ;CK INHIBIT PRINT SW
001266  001362                          BNE     SCOPE
001270  000167  177602                  JMP     ERRPRT          ;OR PRINT
```

```
001274  005067  000252          PRTAB:  CLR     BINCT
001300  005067  000244                  CLR     WGTCT
001304  012704  001556                  MOV     #LIST,X4        ;GET LIST ADDRESS
001310  142777  000177  176672          BICB    #177,@TCSR      ;CLR INT FLAG
001316  012767  000005  000230          MOV     #5,ASCNT
001324  012767  000007  000212          MOV     #7,SEVEN
001332  012767  000001  000206          MOV     #1,DECML
001340  105777  176644          WAIT1:  TSTB    @TCSR
001344  100375                  BPL     WAIT1
001346  005702                  TST     X2
001350  100404                  BMI     MINUS           ;NEG SIGN PRINT 1
001352  012777  000260  176632          MOV     #260,@TDBR      ;POS SIGN PRINT 0
001360  000403                  BR      STARTX
001362  012777  000261  176622  MINUS:  MOV     #261,@TDBR
001370  016703  000150          STARTX:  MOV     SEVEN,X3        ;PUT MASK IN R3
001374  010267  000142                  MOV     X2,TOODLE       ;GET READY TO DOODLE NUMBER IN TOODLE
001400  005167  000136                  COM     TOODLE          ;COMPENSATES FOR COMPLEMENT DURING BIC
001404  046703  000132                  BIC     TOODLE,X3       ;AND IN OCTAL CHARACTER
001410  001410                  BEQ     WRTOC           ;ZERO, WRITE 0 IN LIST
001412  066767  000130  000130  MKNUM:  ADD     DECML,WGTCT     ;COUNT UP TO
001420  005267  000126                  INC     BINCT           ;AND RECORD
001424  026703  000120                  CMP     WGTCT,X3        ;SAME BINARY WEIGHT
001430  001370                  BNE     MKNUM           ;KEEP COUNTN
001432  062767  000260  000112  WRTOC:  ADD     #260,BINCT      ;ADD ASCII PREFIX
001440  016724  000106                  MOV     BINCT,(4)+      ;WRITE ASCII CHAR IN LIST
001444  066767  000074  000074          ADD     SEVEN,DECML     ;EXPAND BINARY WEIGHT
001452  005067  000072                  CLR     WGTCT
001456  005067  000070                  CLR     BINCT
001462  005367  000066                  DEC     ASCNT
001466  001410                  BEQ     XLIST           ;5 CHAR IN LIST
001470  012703  000003                  MOV     #3,X3           ;SET X3 FOR ADD LOOP
001474  066767  000044  000042  MOADD:  ADD     SEVEN,SEVEN     ;MAKING SEVENTY BY SEVEN
001502  005303                  DEC     X3
001504  001373                  BNE     MOADD
001506  000730                  BR      STARTX          ;NX SEVEN SET GET NX OCTAL
001510  012767  000005  000036  XLIST:  MOV     #5,ASCNT        ;SEND 5 CHAR TO TTY
001516  105777  176466          WAIT2:  TSTB    @TCSR
001522  100375                  BPL     WAIT2
001524  014477  176462                  MOV     -(4),@TDBR
001530  005367  000020                  DEC     ASCNT
001534  001401                  BEQ     HOFHM           ;FINISH PRINTING GET NXT NUM
001536  000767                  BR      WAIT2
001540  000207          HOFHM:  RTS     X7              ;HEAD FOR HOME
001542  000000          TOODLE: 0
001544  000000          SEVEN:  0
001546  000000          DECML:  0
001550  000000          WGTCT:  0
001552  000000          BINCT:  0
001554  000000          ASCNT:  0
001556  000000          LIST:   0
001560  000000                  0
001562  000000                  0
001564  000000                  0
```

001566 000000 0

```
001570  000000                  BSTFLG: 0
001572  000000                  DSTFLG: 0
001574  000000                  SCANSW: 0
001576  000000                  SCANLO: 0
001600  000000                  BELLCT: 0
001602  000000                  SCANHI: 0

001604  142777  000177  176376  TOP:    BICB    #177,@TCSR      ;CLR INT FLAG
001612  105777  176372          TSTB    @TCSR
001616  100375                  BPL     .-4
001620  112777  000215  176364          MOVB    #215,@TDBR      ;SEND CARRIAGE RETURN
001626  105777  176356          TSTB    @TCSR
001632  100375                  BPL     .-4
001634  112777  000212  176350          MOVB    #212,@TDBR      ;SEND LINE FEED
001642  112267  000074          MOVB    (2)+,EOMK       ;MOVE IN EOM MARKER
001646  121267  000070  TOP1:   CMPB    @X2,EOMK        ;COMPARE FOR EOM
001652  001411                  BEQ     ATRATE
001654  121227  000100          CMPB    @X2,#100
001660  001406                  BEQ     ATRATE
001662  105777  176322          TSTB    @TCSR           ;CK TTY
001666  100375                  BPL     .-4             ;WAIT FOR DONE
001670  112277  176316          MOVB    (2)+,@TDBR      ;MOVE CHARACTER
001674  000764                  BR      TOP1            ;BRANCH BACK
001676  105777  176306  ATRATE: TSTB    @TCSR
001702  100375                  BPL     .-4
001704  112777  000215  176300          MOVB    #215,@TDBR      ;SEND CARRIAGE RETURN
001712  105777  176272          TSTB    @TCSR
001716  100375                  BPL     .-4
001720  112777  000212  176264          MOVB    #212,@TDBR      ;SEND LINE FEED
001726  121267  000010          CMPB    @X2,EOMK        ;CKN END MESSAGE MARK
001732  001402                  BEQ     .+6             ;SKP NX2 IF EOMK
001734  105202                  INCB    X2              ;INCR MTN R2
001736  000743                  BR      TOP1            ;NO EOM, SO LOOP
                                                        ;NOT EOM
001740  000207                  RTS     X7
001742     000  EOMK:   .BYTE   0
001743     057  020040  020040 SPOCK:  .ASCII  /       /
001750  020040     057
```

```
001753     054  047514  040503  MSG2:   .ASCII  /,LOCATION FAILURE DUE TO READ BUFFER,
001760  044524  047117  043040
001766  044501  052514  042522
001774  042040  042525  052040
002002  020117  042522  042101
002010  041040  051125  052123
002016  026056
002020  047054  044517  042523  MSG3:   .ASCII  /,NOISE DISTURBANCE ERROR,@,/
002026  042040  051511  052524
002034  041122  047101  042503
002042  042440  051122  051117
002050  040056     054
002053     116  020117  041523          .ASCII  /NO SCOPE LOOP ON DISTURBANCE ERROR,@,/
002060  050117  020105  047514
002066  050117  047440  020116
002074  044504  052123  051125
002102  040502  041516  020105
002110  051105  047522  027122
002116  026100
002120  043054  051117  051440  MSG4:   .ASCII  /,FOR SCOPE-CLEAR HALT SW,=SET SCOPE SW,=CONTINUE,@/
002126  047503  042520  041455
002134  042514  051101  044040
002142  046101  020124  053523
002150  026456  042523  020124
002156  041523  050117  020105
002164  053523  026456  047503
002172  052116  047111  042525
002200  040056
002202  042522  042523  020124          .ASCII  /RESET SCOPE SW,ANYTIME TO RETURN TO PROGRAM.@,/
002210  041523  050117  020105
002216  053523  040456  054516
002224  044524  042515  052040
002232  020117  042522  052524
002240  047122  052040  020117
002246  051120  043517  040522
002254  027115  026100
                                        .EVEN
002260  000000                  QEF:    0
        002360                          .=QEF+100
002360  000000                  BUFFER: 0
002362  000000                  QEFA:   0
002364  051457  052105  046440  MSG1:   .ASCII  /?SET MEMORY ADDRESS LIMITS VIA SWITCH REGISTER@/
002372  046505  051117  020131
002400  042101  051104  051505
002406  020123  044514  044515
002414  051524  053040  040511
002422  051440  044527  041524
002430  020110  042522  044507
002436  052123  051105     100
002443     123  052105  046040          .ASCII  /SET LOWER LIMIT IN SW=REG AND PRESS CONTINUE@/
002450  053517  051105  046040
002456  046511  052111  044440
002464  020116  053523  051055
```

```
002472  043505  040440  042116
002500  050040  042522  051523
002506  041440  047117  044524
002514  052516  040105
002520  042523  020124  050125          ,ASCII  /SET UPPER LIMIT IN SW-REG AND PRESS CONTINUE@/
002526  042520  020122  044514
002534  044515  020124  047111
002542  051440  026527  042522
002550  020107  047101  020104
002556  051120  051505  020123
002564  047503  052116  047111
002572  042525     100
002575     125  042116  043105          ,ASCII  /UNDEFINED LIMITS WILL BE SET TO 2362-17470@/
002602  047111  042105  046040
002610  046511  052111  020123
002616  044527  046114  041040
002624  020105  042523  020124
002632  047524  031040  033063
002640  026462  033461  033464
002646  040060
002650  044514  044515  051524          ,ASCII  /LIMITS BELOW THIS RANGE WILL BE DEFAULTED?/
002656  041040  046105  053517
002664  052040  044510  020123
002672  040522  043516  020105
002700  044527  046114  041040
002706  020105  042504  040506
002714  046125  042524  027504

                                        ,EVEN
        000001                          ,END
```

ASCNT	001554	ATRATE	001676	BELLCT	001600	BINCT	001552
BSTFLG	001570	BUFFER	002360	CKDONE	000662	CKSW45	001174
CONSET	000332	DECML	001546	DSTFLG	001572	ENDADR	001006
EOMK	001742	EQLYZ	000676	ERROR1	001034	ERROR2	001050
ERRPRT	001076	HOFHM	001540	HILMT	000206	HISET	000304
ICAN	000420	ITERCT	000750	LASCAN	000732	LIST	001556
LOLMT	000204	LOOPON	001246	MINUS	001362	MKNUM	001412
MOADD	001474	MSGPRT	001062	MSG1	002364	MSG2	001753
MSG3	002020	MSG4	002120	NOP =	000240	NXSCAN	000502
PRTAB	001274	QEF	002260	QEFA	002362	RDSCAN	000646
SCANHI	001602	SCANLO	001576	SCANSW	001574	SCOPE	001234
SCOPEX	001222	SEE	000344	SEVEN	001544	SPACE	001104
SPOCK	001743	START	000220	STARTX	001370	START1	000336
SUMMIT	000210	SWCHK	001152	SWREG	000214	SWI2CK	001016
TCSR	000210	TOBR	000212	TLG	000352	TOGGLE	001542
TOP	001604	TOP1	001646	WAIT1	001340	WAIT2	001516
WGTCT	001550	WRSCAN	000506	WRTOC	001432	XLIST	001510
$1	000402	$2	000406	. =	002722		

ERRORS DETECTED: 0

```
*DZMMFA,DZMMFA=DZMMFA/SOL
RUN-TIME:  2 3 0 SECONDS
CORE USED:  3K
```