FP11

LDD/STD EXERCISER

MD-11-DCFPR-C

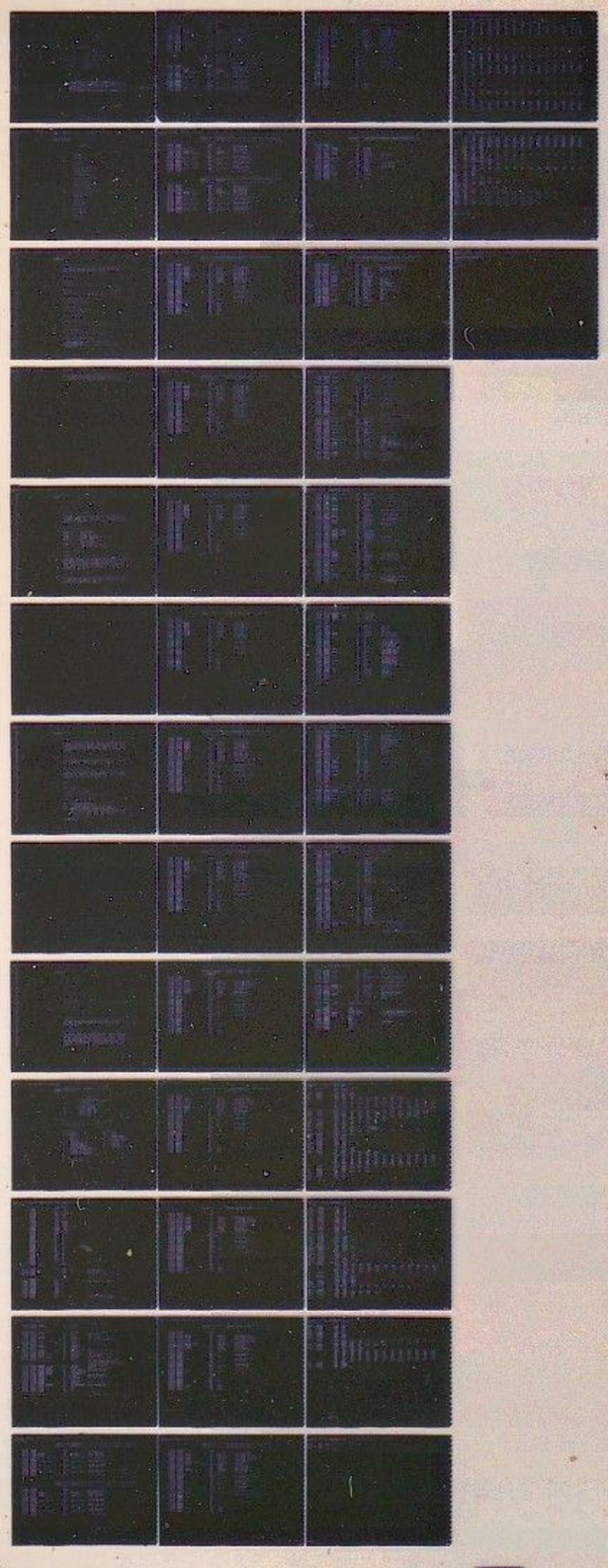
EP-DCFPR-C-DL

FICHE 1 OF 1

MAY 1978

digital

MADE IN USA



```
                    .REPT

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

          PRODUCT CODE:       MAINDEC-11-DCFPR-C D

          PRODUCT NAME:       FP11 LDD/STD EXERCISER

          DATE CREATED:       NOVEMBER 197[illegible]

          MAINTAINER:         DIAGNOSTIC GROUP

          AUTHOR:             BOB BRAIN
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                        DESCRIPTION


                        1.          ABSTRACT

                                    THIS PROGRAM IS AN EXERCISER OF  LDD/STD  INSTRUCTIONS.  IT
                                    USES  RANDOM  NUMBERS,  FLOATING  1'S, AND FLOATING 0'S, AND
                                    CHECKS ALL MEMORY WITH LDF/STF INTO AN AC.


                        2.          REQUIREMENTS


                        2.1         EQUIPMENT

                                    PDP11/45 STANDARD COMPUTER WITH FP11 OPTION


                        2.2         STORAGE

                                    PROGRAM STORAGE - THE ROUTINES USE MEMORY 0 - 17776


                        2.3         PRELIMINARY PROGRAMS

                                    MAINDEC-11-DCFPA TO DCFPL


                        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

                                    THE PROGRAM SHOULD ALWAYS BE STARTED AT 200.


                        4.3         PROGRAM AND/OR OPERATOR ACTION

                                    1) LOAD PROGRAM INTO MEMORY USING ABS LOADER.
                                    2) LOAD ADDRESS 200.
                                    3) SET SWITCHES (SEE SEC 5.1.1) ALL DOWN FOR WORST CASE
                                    4) PRESS START.
```

```
                                        5) THE PROGRAM WILL LOOP AND BELL WILL RING ONCE EVERY PASS
                                        6) A MINIMUM OF TWO PASSES SHOULD ALWAYS BE RUN.
                                        7) 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
```

DESCRIPTION

DATA DISPLAY SWITCH TO THE DISPLAY POSITION.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

AT SA 200 .. ALL SWITCHES DOWN IS WORST CASE TESTING. IF AN ERROR OCCURS, THAT TEST WILL BE LOOPED UPON UNTIL COMPLETION OF 256 CONSECUTIVE PASSES WITH NO ERRORS OF THE SUBTEST IF SW<9> SET TO A 1. THE BELL WILL RING UPON COMPLETION OF A PASS.

5.1.1 SWITCH SETTINGS ARE:

```
SW<15> = 1 ..... HALT ON ERROR
SW<14> = 1 ..... SCOPE LOOP
SW<13> = 1 ..... INHIBIT PRINTOUT
SW<12> = 1 ..... INHIBIT TRACE TRAPPING
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<710>
         0 ..... LOAD SW<7:0> INTO UB REGISTER
```

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.) IF A HLT IS EXECUTED, THE SUBTEST WILL BE LOOPED UPON UNTIL 256 CONSECUTIVE GOOD PASSES ARE COMPLETED IF SW<9> IS ON A 1. TO INHIBIT TYPEOUTS, PUT SW<13> ON A 1.

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5.2.3 TRTRAP

IF SW<12> IS ON A 0, THE T BIT WILL BE SET ON ALTERNATE PASSES. WHEN SET, IT CAUSES A TRAP AFTER EACH INSTRUCTION. THE FIRST INSTRUCTION EXECUTED UPON TRAPPING IS AN "RTT" WHICH RETURNS TO THE INTERRUPTED SEQUENCE OF INSTRUCTIONS. THIS SEQUENCE IS CONTINUED UNTIL THE END OF THE PROGRAM IS REACHED.

5.2.4 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.

5.2.5 FLOATING POINT TRAP (TO 244)

THE FP11 INTERRUPT DISABLE BIT IS ALWAYS SET IN ALL OF THESE TESTS SO NO TRAPS TO 244 SHOULD OCCUR. IF AN INTERRUPT OCCURS, THE PROGRAM WILL HALT AT 766 IN THE ROUTINE CALLED FLTERR AND DISPLAY THE FPS REGISTER IN R3.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

```
ADR  FPS  ANS1 ANS2 ANS3 ANS4 ANS5 ANS6 ANS7 ANS8
  FEC FEA
```

WHERE:

ADR = ADDRESS OF ERROR HLT
FPS = FLOATING POINT STATUS
FEC = FLOATING EXCEPTION CODES (ERROR CODES)
FEA = FLOATING EXCEPTION ADDRESS (ERROR ADDRESS)
ANS1-8 = ERROR DATA READ FROM THE FP11. FROM 2-8 OF THESE MAY BE TYPED DEPENDING ON THE NUMBER FOLLOWING THE HLT; I.E., HLT+3 WOULD TYPE ANS1-ANS3. CHECK LISTING FOR MEANING OF THE DATA.

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

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```
                        DESCRIPTION


                        6.2     ERROR RECOVERY

                                RESTART AT 200


                        7.      RESTRICTIONS

                                NONE


                        8.      MISCELLANEOUS

                        8.1     EXECUTION TIME

                                A BELL WILL RING WITHIN 15 SECONDS WITH ALL SWITCHES DOWN.

                        8.2     STACK POINTER

                                STACK IS INITALLY SET TO 600


                        8.3     POWER FAIL

                                THIS TEST CAN BE POWER FAILED WITH NO ERRORS.  TO USE, START
                                THE  TEST  AS USUAL AND POWER DOWN THEN UP AT ANY TIME.  THE
                                PROGRAM SHOULD TYPE "POWER" AND CONTINUE  TO  RUN  WITH  NO
                                OTHER TYPEOUTS.


                9.      PROGRAM DESCRIPTION

                        THIS PROGRAM TESTS ALL THE FP11 AC'S (AC0 - AC5) WITH RANDOM
                        NUMBERS,  FLOATING 1'S, AND FLOATING 0'S.  IT ALSO TESTS LDF
                        AND STF IN ALL MEMORY LOCATIONS FROM THE END OF THE  PROGRAM
                        TO  THE  BEGINNING  OF  THE  LOADER.   ONE RANDOM NUMBER IS
                        GENERATED PER PASS AND LOADED INTO AC0 - AC5, SO  EACH  BELL
                        SIGNIFIES  THE  COMPLETION  OF  ONE LOAD OF A RANDOM NUMBER,
                        FLOATING 1'S, FLOATING 0'S, AND LDF/STF THROUGHOUT MEMORY.
               .ENDR
```

```
.TITLE  MAINDEC-11-DCFPR-C  EXERCISER OF LDD AND STD
;COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS
;PROGRAM BY BOB BRAIN
.REM*
```

SWITCH	USE
8	0 - LOAD UB REGISTER WITH SW<7:0> 1 - LOOP ON TEST IN SW<7:0>
9	LOOP ON ERROR
10	0 - BELL ON PASS COMPLETE 1 - BELL ON ERROR
11	INHIBIT ITERATIONS
12	INHIBIT TRACE TRAP
13	INHIBIT ERROR TYPEOUTS
14	LOOP ON TEST
15	HALT ON ERROR

OUTPUT FORMS:

```
ACR  FPS  ANS1 ANS2 ANS3 ANS4 ANS5 ANS6 ANS7 ANS8
   FEC  FEA
```

FPS

BIT	REASON
0	CARRY
1	OVERFLOW
2	ZERO
3	NEGATIVE
4	MAINTAINANCE MODE
5	TRUNCATE MODE
6	LONG INTEGER MODE
7	DOUBLE PRECISION MODE
8	INTERUPT ON CONVERSION ERROR
9	INTERUPT ON OVERFLOW
10	INTERUPT ON UNDERFLOW
11	INTERUPT ON UNDEFINED VARIABLE
12	
13	
14	INTERUPT DISABLE
15	ERROR FLAG*

FEC

CODE	ERROR
0	ADDRESS ERROR
2	OPCODE ERROR
4	DIVIDE BY ZERO
6	CONVERSION ERROR
10	OVERFLOW
12	UNDERFLOW
14	UNDEFINED VARIABLE (=8)
16	JBREAK TRAP

```
                                    .ENABL  ABS
                    170003          LDUB=   170203
                    000001          %=      1
                    177776          PS=     177776
                    177570          SWR=    177570
                    104400          SCOPE=  TRAP
                    104000          HLT=    EMT
                    000007          BELL=   7
                    000004          TYPE=   ICT
                    043000          SW14=   42000
                    021000          SW13=   21000
                    010000          SW12=   10000
                    004000          SW11=    4000
                    002000          SW10=    2000
                    001000          SW09=    1000
                    000400          SW08=     400
                    000000          FPS=    %0
                    000000          R0=     %0
                    000001          R1=     %1
                    000002          R2=     %2
                    000003          R3=     %3
                    000004          R4=     %4
                    000005          TTY=    %5
                    000005          R5=     %5
                    000006          SP=     %6
                    000007          PC=     %7
                    000000          AC0=    %0
                    000001          AC1=    %1
                    000002          AC2=    %2
                    000003          AC3=    %3
                    000004          AC4=    %4
                    000005          AC5=    %5
                    000000          .=      0                       ;TRAP CATCHER FROM 0 - 776
                    000200          .=      200
000200  000167  000622                  JMP     BEG

                    000760          .=      760
000760  170200          FLTERR: STFPS   FPS             ;PUT FPS INTO R0
000762  170367  000034          STST    FEC             ;STORE STATUS
000766  000000                  HALT                    ;ERROR TRAP - SOULD NOT BE ENABLED
000770  000002                  RTI

                    001000          .=      1000
001000  000000          ICNT:   0                       ;PASS COUNT - LH   ITERATION COUNT - RH
001002  000000          ANS1:   0                       ;FIRST ANSWER (SEE CODE)
001004  000000          ANS2:   0
001006  000000          ANS3:   0
001010  000000          ANS4:   0
001012  000000          ANS5:   0
001014  000000          ANS6:   0
001016  000000          ANS7:   0
001020  000000          ANS8:   0
001022  000000          FEC:    0                       ;FLOATING EXCEPTION CODES
001024  000000          FEA:    0                       ;FLOATING EXECPTION ADDRESS
```

```
001026  012706  000600          BEG:    MOV     #600,SP         ;** STACK AT 600 **
001032  162701  000006                  SUB     #6,R1
001036  000425                          BR      HAVIT

001040  012737  001106  000004  1$:     MOV     #NEM,@#4
001046  013701  000042                  MOV     @#42,R1         ;GET MONITOR ADDRESS
001052  001405                          BEQ     2$              ;SKIP IF 0
001054  162701  000020                  SUB     #20,R1          ;DROP IT BACK
001060  022701  006042                  CMP     #HICORE,R1      ;IS IT WITHIN THE PROGRAM?
001064  003012                          BGT     HAVIT           ;NO - GOT THE ADDRESS
001066  012701  020000          2$:     MOV     #20000,R1
001072  005711                  TRYAGN: TST     (1)             ;FIND MAX CORE
001074  062701  020000                  ADD     #20000,R1
001100  022701  160000                  CMP     #160000,R1
001104  001372                          BNE     TRYAGN
001106  162701  000306          NEM:    SUB     #20000-17472,R1 ;MOVE IT TO EXISTANT CORE
001112  010167  004722          HAVIT:  MOV     R1,UPLIM        ;SAVE IT
001116  012767  001140  176660          MOV     #BEGIN-6,4      ;FIND OUT WHICH MACHINE THIS IS
001124  005737  177772                  TST     @#177772        ;TEST FOR PIRQ
001130  012767  000006  003316          MOV     #6,YESRT        ;FUDGE IN RTT IF  11/45
001136  000403                          BR      BEGIN
001140  016737  004642  000010          MOV     FPTADR,@#10     ;LOAD THE ILLEGAL INSTR VECTOR
                                                                ; WITH THE ADDRESS OF THE FPU,
                                                                ; THE FPU WILL HANDLE THE BAD OPCODES
001146  012706  000600          BEGIN:  MOV     #600,SP         ;** STACK AT 600 **
001152  012737  000006  000004          MOV     #6,@#4          ;RESET 4
001160  012737  004454  000014          MOV     #YESRT,@#14     ;SET TRACE TRAP VECTOR
001166  012777  005506  004620          MOV     #POWDWN,@DWNVEC ;POWER DOWN VECTOR
001174  012777  000340  004614          MOV     #340,@DWNVEC+2
001202  012737  005706  000020          MOV     #.IOT,@#20      ;SET UP VECTOR 20
001210  012700  000030                  MOV     #30,R0          ;SET R0 TO VECTOR 30
001214  012720  004616                  MOV     #.TRP,(0)+      ;SET TRAP VECTOR
001220  012720  000340                  MOV     #340,(0)+
001224  012720  004456                  MOV     #.EMT,(0)+      ;SET EMT VECTOR
001230  012710  000340                  MOV     #340,(0)
001234  012777  000760  004546          MOV     #FLTERR,@FPVECT ;LOAD INTERUPT VECTOR
001242  012777  000340  004542          MOV     #340,@FPVECT+2  ;LOCK UP PROCESSOR
001250  005067  177524                  CLR     ICNT
001254  005067  004550                  CLR     LAD
001260  170127  000000                  LDFPS   #0

001264  004767  003622                  JSR     7,RAND4         ;GET 4 RANDOM NUMBERS INTO ANS1 - ANS4
```

```
                                ;*****************************************************************************
                                ;TEST 1          USES AC0
                                ;*****************************************************************************

001270  104400                          SCOPE
001272  170011                          SETD                            ;SET DOUBLE MODE
001274  172437  001002                  LDD     @#ANS1,0                ;LOAD INTO AC0
001300  174037  001012                  STD     0,@#ANS5                ;STORE INTO ANS5
001304  023737  001002  001012          CMP     @#ANS1,@#ANS5           ;FIRST WORD OK?
001312  001401                          BEQ     .+4
001314  104010                          HLT+8.                          ;FIRST WORD WRONG
001316  023737  001004  001014          CMP     @#ANS2,@#ANS6           ;SECOND WORD OK?
001324  001401                          BEQ     .+4
001326  104010                          HLT+8.                          ;SECOND WORD WRONG
001330  023737  001006  001016          CMP     @#ANS3,@#ANS7           ;THIRD WORD OK?
001336  001401                          BEQ     .+4
001340  104010                          HLT+8.                          ;THIRD WORD WRONG
001342  023737  001010  001020          CMP     @#ANS4,@#ANS8           ;FOURTH WORD OK?
001350  001401                          BEQ     .+4
001352  104010                          HLT+8.                          ;FOURTH WORD WRONG


                                ;*****************************************************************************
                                ;TEST 2          USES AC1
                                ;*****************************************************************************

001354  104420                          SCOPE
001356  170011                          SETD                            ;SET DOUBLE MODE
001360  172537  001002                  LDD     @#ANS1,1                ;LOAD INTO AC1
001364  174137  001012                  STD     1,@#ANS5                ;STORE INTO ANS5
001370  023737  001002  001012          CMP     @#ANS1,@#ANS5           ;FIRST WORD OK?
001376  001401                          BEQ     .+4
001400  104010                          HLT+8.                          ;FIRST WORD WRONG
001402  023737  001004  001014          CMP     @#ANS2,@#ANS6           ;SECOND WORD OK?
001410  001401                          BEQ     .+4
001412  104010                          HLT+8.                          ;SECOND WORD WRONG
001414  023737  001006  001016          CMP     @#ANS3,@#ANS7           ;THIRD WORD OK?
001422  001401                          BEQ     .+4
001424  104010                          HLT+8.                          ;THIRD WORD WRONG
001426  023737  001010  001020          CMP     @#ANS4,@#ANS8           ;FOURTH WORD OK?
001434  001401                          BEQ     .+4
001436  104010                          HLT+8.                          ;FOURTH WORD WRONG
```

```
                                ;*****************************************************************************
                                ;TEST 3          USES AC2
                                ;*****************************************************************************

001442  104420                          SCOPE
001442  170011                          SETD                    ;SET DOUBLE MODE
001444  172637  001002                  LDD     @#ANS1,2        ;LOAD INTO AC2
001450  174237  001012                  STD     2,@#ANS5        ;STORE INTO ANS5
001454  023737  001002  001012          CMP     @#ANS1,@#ANS5   ;FIRST WORD OK?
001462  001401                          BEQ     .+4
001464  104010                          HLT+8.                  ;FIRST WORD WRONG
001466  023737  001004  001014          CMP     @#ANS2,@#ANS6   ;SECOND WORD OK?
001474  001401                          BEQ     .+4
001476  104010                          HLT+8.                  ;SECOND WORD WRONG
001500  023737  001006  001016          CMP     @#ANS3,@#ANS7   ;THIRD WORD OK?
001506  001401                          BEQ     .+4
001510  104010                          HLT+8.                  ;THIRD WORD WRONG
001512  023737  001010  001020          CMP     @#ANS4,@#ANS8   ;FOURTH WORD OK?
001520  001401                          BEQ     .+4
001522  104010                          HLT+8.                  ;FOURTH WORD WRONG



                                ;*****************************************************************************
                                ;TEST 4          USES AC3
                                ;*****************************************************************************

001524  104430                          SCOPE
001526  170011                          SETD                    ;SET DOUBLE MODE
001530  172737  001002                  LDD     @#ANS1,3        ;LOAD INTO AC3
001534  174337  001012                  STD     3,@#ANS5        ;STORE INTO ANS5
001540  023737  001002  001012          CMP     @#ANS1,@#ANS5   ;FIRST WORD OK?
001546  001401                          BEQ     .+4
001550  104010                          HLT+8.                  ;FIRST WORD WRONG
001552  023737  001004  001014          CMP     @#ANS2,@#ANS6   ;SECOND WORD OK?
001560  001401                          BEQ     .+4
001562  104010                          HLT+8.                  ;SECOND WORD WRONG
001564  023737  001006  001016          CMP     @#ANS3,@#ANS7   ;THIRD WORD OK?
001572  001401                          BEQ     .+4
001574  104010                          HLT+8.                  ;THIRD WORD WRONG
001576  023737  001010  001020          CMP     @#ANS4,@#ANS8   ;FOURTH WORD OK?
001604  001401                          BEQ     .+4
001606  104010                          HLT+8.                  ;FOURTH WORD WRONG
```

```
                                ;*****************************************************************************
                                ;TEST 5          USES AC4
                                ;*****************************************************************************

 001610  104400                         SCOPE
 001612  173011                         SETD                            ;SET DOUBLE MODE
 001614  174004                         STD     0,AC4                   ;PUT INTO AC4
 001616  172404                         LDD     AC4,4                   ;BACK INTO AC0
 001620  174037  001012                 STD     0,@#ANS5                ;NOW INTI ANS5
 001624  023737  001002  001012         CMP     @#ANS1,@#ANS5           ;FIRST WORD OK?
 001632  001401                         BEQ     .+4
 001634  104010                         HLT+8.                          ;FIRST WORD WRONG
 001636  023737  001004  001014         CMP     @#ANS2,@#ANS6           ;SECOND WORD OK?
 001644  001401                         BEQ     .+4
 001646  104010                         HLT+8.                          ;SECOND WORD WRONG
 001650  023737  001006  001016         CMP     @#ANS3,@#ANS7           ;THIRD WORD OK?
 001656  001401                         BEQ     .+4
 001660  104010                         HLT+8.                          ;THIRD WORD WRONG
 001662  023737  001010  001020         CMP     @#ANS4,@#ANS8           ;FOURTH WORD OK?
 001670  001401                         BEQ     .+4
 001672  104010                         HLT+8.                          ;FOURTH WORD WRONG


                                ;*****************************************************************************
                                ;TEST 6          USES AC5
                                ;*****************************************************************************

 001674  104400                         SCOPE
 001676  173011                         SETD                            ;SET DOUBLE MODE
 001700  174005                         STD     0,AC5                   ;PUT INTO AC5
 001702  172405                         LDD     AC5,5                   ;BACK INTO AC0
 001704  174037  001012                 STD     0,@#ANS5                ;NOW INTI ANS5
 001710  023737  001002  001012         CMP     @#ANS1,@#ANS5           ;FIRST WORD OK?
 001716  001401                         BEQ     .+4
 001720  104010                         HLT+8.                          ;FIRST WORD WRONG
 001722  023737  001004  001014         CMP     @#ANS2,@#ANS6           ;SECOND WORD OK?
 001730  001401                         BEQ     .+4
 001732  104010                         HLT+8.                          ;SECOND WORD WRONG
 001734  023737  001006  001016         CMP     @#ANS3,@#ANS7           ;THIRD WORD OK?
 001742  001401                         BEQ     .+4
 001744  104010                         HLT+8.                          ;THIRD WORD WRONG
 001746  023737  001010  001020         CMP     @#ANS4,@#ANS8           ;FOURTH WORD OK?
 001754  001401                         BEQ     .+4
 001756  104010                         HLT+8.                          ;FOURTH WORD WRONG
```

```
                                ;*****************************************************************
                                ;TEST 7          FLOATING 1'S TEST IN AC0
                                ;*****************************************************************

 001760  104400                         SCOPE
 001762  170011                         SETD
 001764  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 001770  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 001774  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002000  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002004  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002010  012767  000020  004020         MOV     #16.,COUNT      ;SET UP COUNT
 002016  172467  176760         LP7:    LDD     ANS1,0          ;LOAD AC0
 002022  174067  176764                 STD     0,ANS5          ;STORE RESULTS
 002026  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 002032  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002034  001401                         BEQ     .+4
 002036  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 002040  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002042  001401                         BEQ     .+4
 002044  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 002046  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002050  001401                         BEQ     .+4
 002052  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 002054  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002056  001401                         BEQ     .+4
 002060  104010                         HLT+8.                  ;LAST WORD IS WRONG
 002062  012701  001002                 MOV     #ANS1,R1
 002066  006321                         ASL     (1)+            ;SHIFT ALL BY 1
 002070  006321                         ASL     (1)+
 002072  006321                         ASL     (1)+
 002074  006321                         ASL     (1)+
 002076  005367  003734                 DEC     COUNT
 002102  001345                         BNE     LP7
 002104  105067  176671                 CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 10                FLOATING 1'S TEST IN AC1
                                ;*****************************************************************

 002110  104400                         SCOPE
 002112  170011                         SETD
 002114  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 002120  012721  000001                 MOV     #1.,(1)+        ;INITIALIZE TO 1
 002124  012721  000001                 MOV     #1.,(1)+        ;INITIALIZE TO 1
 002130  012721  000001                 MOV     #1.,(1)+        ;INITIALIZE TO 1
 002134  012721  000001                 MOV     #1.,(1)+        ;INITIALIZE TO 1
 002140  012767  000020  003670         MOV     #16.,COUNT      ;SET UP COUNT
 002146  172567  176630         LP1B:  LDD     ANS1,1          ;LOAD AC1
 002152  174167  176634                 STD     1,ANS9          ;STORE RESULTS
 002156  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 002162  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002164  001401                         BEQ     .+4
 002166  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 002170  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002172  001401                         BEQ     .+4
 002174  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 002176  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002200  001401                         BEQ     .+4
 002202  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 002204  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002206  001401                         BEQ     .+4
 002210  104010                         HLT+8.                  ;LAST WORD IS WRONG
 002212  012701  001002                 MOV     #ANS1,R1
 002216  006321                         ASL     (1)+            ;SHIFT ALL BY 1
 002220  006321                         ASL     (1)+
 002222  006321                         ASL     (1)+
 002224  006321                         ASL     (1)+
 002226  005367  003604                 DEC     COUNT
 002232  001345                         BNE     LP1B
 002234  105067  176541                 CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 11                FLOATING 1'S TEST IN AC2
                                ;*****************************************************************

002240  104400                          SCOPE
002242  170011                          SETD
002244  012701  001002                  MOV     #ANS1,R1        ;LOAD FIRST WORD
002250  012721  000001                  MOV     #1,(1)+         ;INITIALIZE TO 1
002254  012721  000001                  MOV     #1,(1)+         ;INITIALIZE TO 1
002260  012721  000001                  MOV     #1,(1)+         ;INITIALIZE TO 1
002264  012721  000001                  MOV     #1,(1)+         ;INITIALIZE TO 1
002270  012767  000020  003540          MOV     #16.,COUNT      ;SET UP COUNT
002276  172667  176500          LP11:   LDD     ANS1,2          ;LOAD AC2
002302  174267  176504                  STD     2,ANS5          ;STORE RESULTS
002306  012702  001002                  MOV     #ANS1,R2        ;SET UP FIRST WORD
002312  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
002314  001401                          BEQ     .+4
002316  104010                          HLT+8.                  ;FIRST WORD IS WRONG
002320  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
002322  001401                          BEQ     .+4
002324  104010                          HLT+8.                  ;SECOND WORD IS WRONG
002326  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
002330  001401                          BEQ     .+4
002332  104010                          HLT+8.                  ;THIRD WORD IS WRONG
002334  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
002336  001401                          BEQ     .+4
002340  104010                          HLT+8.                  ;LAST WORD IS WRONG
002342  012701  001002                  MOV     #ANS1,R1
002346  006321                          ASL     (1)+            ;SHIFT ALL BY 1
002350  006321                          ASL     (1)+
002352  006321                          ASL     (1)+
002354  006321                          ASL     (1)+
002356  005367  003454                  DEC     COUNT
002362  001345                          BNE     LP11
002364  105067  176411                  CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 12                FLOATING 1'S TEST IN AC3
                                ;*****************************************************************

 002370  104400                         SCOPE
 002372  170011                         SETD
 002374  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 002400  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002404  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002410  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002414  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002420  012767  000020  003410         MOV     #16.,COUNT      ;SET UP COUNT
 002426  172767  176350         LP12:  LDD     ANS1,3          ;LOAD AC3
 002432  174367  176354                 STD     3,ANS3          ;STORE RESULTS
 002436  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 002442  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002444  001401                         BEQ     .+4
 002446  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 002450  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002452  001401                         BEQ     .+4
 002454  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 002456  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002460  001401                         BEQ     .+4
 002462  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 002464  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002466  001401                         BEQ     .+4
 002470  104010                         HLT+8.                  ;LAST WORD IS WRONG
 002472  012701  001002                 MOV     #ANS1,R1
 002476  006321                         ASL     (1)+            ;SHIFT ALL BY 1
 002500  006321                         ASL     (1)+
 002502  006321                         ASL     (1)+
 002504  006321                         ASL     (1)+
 002506  005367  003324                 DEC     COUNT
 002512  001345                         BNE     LP12
 002514  105067  176261                 CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 13                FLOATING 1'S TEST IN AC4
                                ;*****************************************************************

 002520  104430                        SCOPE
 002522  170011                        SETD
 002524  012701  001002                MOV     #ANS1,R1        ;LOAD FIRST WORD
 002530  012721  000001                MOV     #1,(1)+         ;INITIALIZE TO 1
 002534  012721  000001                MOV     #1,(1)+         ;INITIALIZE TO 1
 002540  012721  000001                MOV     #1,(1)+         ;INITIALIZE TO 1
 002544  012721  000001                MOV     #1,(1)+         ;INITIALIZE TO 1
 002550  012767  000020  003260        MOV     #16.,COUNT      ;SET UP COUNT
 002556  172437  001002        LP13:   LDD     @#ANS1,0        ;LOAD AC0
 002562  174004                        STD     0,AC4           ;PUT INTO AC4
 002564  172404                        LDD     AC4,0           ;BACK INTO AC0
 002566  174037  001012                STD     0,@#ANS5        ;NOW INTO ANS5
 002572  012702  001002                MOV     #ANS1,R2        ;SET UP FIRST WORD
 002576  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 002600  001401                        BEQ     .+4
 002602  104010                        HLT+8.                  ;FIRST WORD IS WRONG
 002604  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 002606  001401                        BEQ     .+4
 002610  104010                        HLT+8.                  ;SECOND WORD IS WRONG
 002612  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 002614  001401                        BEQ     .+4
 002616  104010                        HLT+8.                  ;THIRD WORD IS WRONG
 002620  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 002622  001401                        BEQ     .+4
 002624  104010                        HLT+8.                  ;LAST WORD IS WRONG
 002626  012701  001002                MOV     #ANS1,R1
 002632  006321                        ASL     (1)+            ;SHIFT ALL BY 1
 002634  006321                        ASL     (1)+
 002636  006321                        ASL     (1)+
 002640  006321                        ASL     (1)+
 002642  005367  003170                DEC     COUNT
 002646  001343                        BNE     LP13
 002650  105067  176125                CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 14                FLOATING 1'S TEST IN AC5
                                ;*****************************************************************

 002654  104400                         SCOPE
 002656  170011                         SETD
 002660  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 002664  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002670  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002674  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002700  012721  000001                 MOV     #1,(1)+         ;INITIALIZE TO 1
 002704  012767  000020  003124         MOV     #16.,COUNT      ;SET UP COUNT
 002712  172437  001002         LP14:   LDD     @#ANS1,3        ;LOAD AC3
 002716  174005                         STD     3,AC5           ;PUT INTO AC5
 002720  172405                         LDD     AC5,2           ;BACK INTO AC2
 002722  174037  001012                 STD     3,@#ANS5        ;NOW INTO ANS5
 002726  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 002732  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002734  001401                         BEQ     .+4
 002736  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 002740  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002742  001401                         BEQ     .+4
 002744  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 002746  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002750  001401                         BEQ     .+4
 002752  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 002754  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 002756  001401                         BEQ     .+4
 002760  104010                         HLT+8.                  ;LAST WORD IS WRONG
 002762  112701  001002                 MOV     #ANS1,R1
 002766  006321                         ASL     (1)+            ;SHIFT ALL BY 1
 002770  006321                         ASL     (1)+
 002772  006321                         ASL     (1)+
 002774  006321                         ASL     (1)+
 002776  005367  003034                 DEC     COUNT
 003002  001343                         BNE     LP14
 003004  105067  175771                 CLRB    ICNT+1
```

```
                        ;*****************************************************************
                        ;TEST 15                FLOATING 0'S TEST IN AC0
                        ;*****************************************************************

 003010  104400                        SCOPE
 003012  170011                        SETC
 003014  012701  001002                MOV     #ANS1,R1        ;LOAD FIRST WORD
 003020  012721  177776                MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003024  012721  177776                MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003030  012721  177776                MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003034  012721  177776                MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003040  012767  000020  002770        MOV     #16.,COUNT      ;SET UP COUNT
 003046  172467  175730        LP15:   LDD     ANS1,0          ;LOAD AC0
 003052  174067  175734                STD     0,ANS5          ;STORE RESULTS
 003056  012702  001002                MOV     #ANS1,R2        ;SET UP FIRST WORD
 003062  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 003064  001401                        BEQ     .+4
 003066  104010                        HLT+0.                  ;FIRST WORD IS WRONG
 003070  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 003072  001401                        BEQ     .+4
 003074  104010                        HLT+0.                  ;SECOND WORD IS WRONG
 003076  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 003100  001401                        BEQ     .+4
 003102  104010                        HLT+0.                  ;THIRD WORD IS WRONG
 003104  022122                        CMP     (1)+,(2)+       ;IS DATA OK?
 003106  001401                        BEQ     .+4
 003110  104010                        HLT+0.                  ;LAST WORD IS WRONG
 003112  012701  001002                MOV     #ANS1,R1
 003116  000241                        CLC                     ;SHIFT ALL BY 1 (FLOAT 0)
 003120  006121                        ROL     (1)+
 003122  000241                        CLC
 003124  006121                        ROL     (1)+
 003126  000241                        CLC
 003130  006121                        ROL     (1)+
 003132  000241                        CLC
 003134  006121                        ROL     (1)+
 003136  005367  002674                DEC     COUNT
 003142  001341                        BNE     LP15
 003144  105067  175631                CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 16                  FLOATING 0'S TEST IN AC1
                                ;*****************************************************************

P03150  104420                          SCOPE
P03152  170011                          SETD
P03154  012701  001002                  MOV     #ANS1,R1        ;LOAD FIRST WORD
P03160  012721  177776                  MOV     #-2,(1)+        ;INITIALIZE TO 177776
P03164  012721  177776                  MOV     #-2,(1)+        ;INITIALIZE TO 177776
P03170  012721  177776                  MOV     #-2,(1)+        ;INITIALIZE TO 177776
P03174  012721  177776                  MOV     #-2,(1)+        ;INITIALIZE TO 177776
P03200  012767  000020  002630          MOV     #16.,COUNT      ;SET UP COUNT
P03206  172567  175572          LP16:   LDD     ANS1,1          ;LOAD AC1
P03212  174167  175574                  STD     1,ANS0          ;STORE RESULTS
P03216  012702  001002                  MOV     #ANS1,R2        ;SET UP FIRST WORD
P03222  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
P03224  001401                          BEQ     .+4
P03226  104010                          HLT+8.                  ;FIRST WORD IS WRONG
P03230  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
P03232  001401                          BEQ     .+4
P03234  104010                          HLT+8.                  ;SECOND WORD IS WRONG
P03236  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
P03240  001401                          BEQ     .+4
P03242  104010                          HLT+8.                  ;THIRD WORD IS WRONG
P03244  022122                          CMP     (1)+,(2)+       ;IS DATA OK?
P03246  001401                          BEQ     .+4
P03250  104010                          HLT+8.                  ;LAST WORD IS WRONG
P03252  012701  001002                  MOV     #ANS1,R1
P03256  000241                          CLC                     ;SHIFT ALL BY 1 (FLOAT 0)
P03260  006121                          ROL     (1)+
P03262  000241                          CLC
P03264  006121                          ROL     (1)+
P03266  000241                          CLC
P03270  006121                          ROL     (1)+
P03272  000241                          CLC
P03274  006121                          ROL     (1)+
P03276  005367  002534                  DEC     COUNT
P03302  001341                          BNE     LP16
P03304  105067  175471                  CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 17                FLOATING 0'S TEST IN AC2
                                ;*****************************************************************

 003310  104400                         SCOPE
 003312  170011                         SETC
 003314  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 003320  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003324  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003330  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003334  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003340  012767  000020  002470         MOV     #16.,COUNT      ;SET UP COUNT
 003346  172667  175430         LP17:   LDD     ANS1,2          ;LOAD AC2
 003352  174267  175434                 STD     2,ANS9          ;STORE RESULTS
 003356  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 003362  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003364  001401                         BEQ     .+4
 003366  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 003370  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003372  001401                         BEQ     .+4
 003374  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 003376  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003400  001401                         BEQ     .+4
 003402  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 003404  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003406  001401                         BEQ     .+4
 003410  104010                         HLT+8.                  ;LAST WORD IS WRONG
 003412  012701  001002                 MOV     #ANS1,R1
 003416  000241                         CLC                     ;SHIFT ALL BY 1 (FLOAT 0)
 003420  006121                         ROL     (1)+
 003422  000241                         CLC
 003424  006121                         ROL     (1)+
 003426  000241                         CLC
 003430  006121                         ROL     (1)+
 003432  000241                         CLC
 003434  006121                         ROL     (1)+
 003436  005367  002374                 DEC     COUNT
 003442  001341                         BNE     LP17
 003444  105067  175331                 CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 28                FLOATING 0'S TEST IN AC3
                                ;*****************************************************************

 003450  104400                         SCOPE
 003452  170011                         SETD
 003454  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 003460  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003464  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003470  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003474  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003500  012767  000020  002330         MOV     #16.,COUNT      ;SET UP COUNT
 003506  172767  175270         LP28:   LDD     ANS1,3          ;LOAD AC3
 003512  174367  175274                 STD     3,ANS3          ;STORE RESULTS
 003516  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 003522  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003524  001401                         BEQ     .+4
 003526  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 003530  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003532  001401                         BEQ     .+4
 003534  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 003536  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003540  001401                         BEQ     .+4
 003542  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 003544  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003546  001401                         BEQ     .+4
 003550  104010                         HLT+8.                  ;LAST WORD IS WRONG
 003552  012701  001002                 MOV     #ANS1,R1
 003556  000241                         CLC                     ;SHIFT ALL BY 1 (FLOAT 3)
 003560  006121                         ROL     (1)+
 003562  000241                         CLC
 003564  006121                         ROL     (1)+
 003566  000241                         CLC
 003570  006121                         ROL     (1)+
 003572  000241                         CLC
 003574  006121                         RCL     (1)+
 003576  005367  002234                 DEC     COUNT
 003602  001341                         BNE     LP28
 003604  105067  175171                 CLRB    ICNT+1
```

```
                                ;*****************************************************************
                                ;TEST 21                FLOATING 0'S TEST IN AC4
                                ;*****************************************************************

 003610  104400                         SCOPE
 003612  170011                         SETD
 003614  012701  001002                 MOV     #ANS1,R1        ;LOAD FIRST WORD
 003620  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003624  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003630  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003634  012721  177776                 MOV     #-2,(1)+        ;INITIALIZE TO 177776
 003640  012767  000020  002170         MOV     #16.,COUNT      ;SET UP COUNT
 003646  172437  001002         LP21:   LDD     @#ANS1,0        ;LOAD AC0
 003652  174004                         STD     0,AC4           ;PUT INTO AC4
 003654  172404                         LDD     AC4,0           ;BACK INTO AC0
 003656  174037  001012                 STD     0,@#ANS5        ;NOW INTO ANS5
 003662  012702  001002                 MOV     #ANS1,R2        ;SET UP FIRST WORD
 003666  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003670  001401                         BEQ     .+4
 003672  104010                         HLT+8.                  ;FIRST WORD IS WRONG
 003674  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003676  001401                         BEQ     .+4
 003700  104010                         HLT+8.                  ;SECOND WORD IS WRONG
 003702  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003704  001401                         BEQ     .+4
 003706  104010                         HLT+8.                  ;THIRD WORD IS WRONG
 003710  022122                         CMP     (1)+,(2)+       ;IS DATA OK?
 003712  001401                         BEQ     .+4
 003714  104010                         HLT+8.                  ;LAST WORD IS WRONG
 003716  012701  001002                 MOV     #ANS1,R1
 003722  000241                         CLC                     ;SHIFT ALL BY 1 (FLOAT 0)
 003724  006121                         ROL     (1)+
 003726  000241                         CLC
 003730  006121                         ROL     (1)+
 003732  000241                         CLC
 003734  006121                         ROL     (1)+
 003736  000241                         CLC
 003740  006121                         ROL     (1)+
 003742  005367  002370                 DEC     COUNT
 003746  001337                         BNE     LP21
 003750  105367  175025                 CLRB    ICNT+1
```

```
                                            ;*************************************************************
                                            ;TEST 22                      FLOATING 0'S TEST IN AC5
                                            ;*************************************************************

        033754  104400                                SCOPE
        033756  170211                                SETD
        033760  012701  001002                        MOV     #ANS1,R1            ;LOAD FIRST WORD
        033764  012721  177776                        MOV     #-2,(1)+            ;INITIALIZE TO 177776
        033770  012721  177776                        MOV     #-2,(1)+            ;INITIALIZE TO 177776
        033774  012721  177776                        MOV     #-2,(1)+            ;INITIALIZE TO 177776
        034000  012721  177776                        MOV     #-2,(1)+            ;INITIALIZE TO 177776
        034004  012767  000020  002024                MOV     #16.,COUNT          ;SET UP COUNT
        034012  172437  001002          LP22:         LDD     @#ANS1,0            ;LOAD AC0
        034016  174005                                STD     0,AC5               ;PUT INTO AC5
        034020  172405                                LDD     AC5,0               ;BACK INTO AC0
        034022  174037  001012                        STD     0,@#ANS5            ;NOW INTO ANS5
        034026  012702  001002                        MOV     #ANS1,R2            ;SET UP FIRST WORD
        034032  022122                                CMP     (1)+,(2)+           ;IS DATA OK?
        034034  001401                                BEQ     .+4
        034036  104010                                HLT+8.                      ;FIRST WORD IS WRONG
        034040  022122                                CMP     (1)+,(2)+           ;IS DATA OK?
        034042  001401                                BEQ     .+4
        034044  104010                                HLT+8.                      ;SECOND WORD IS WRONG
        034046  022122                                CMP     (1)+,(2)+           ;IS DATA OK?
        034050  001401                                BEQ     .+4
        034052  104010                                HLT+8.                      ;THIRD WORD IS WRONG
        034054  022122                                CMP     (1)+,(2)+           ;IS DATA OK?
        034056  001401                                BEQ     .+4
        034060  104010                                HLT+8.                      ;LAST WORD IS WRONG
        034062  012701  001002                        MOV     #ANS1,R1
        034066  000241                                CLC                         ;SHIFT ALL BY 1 (FLOAT 0)
        034070  006121                                ROL     (1)+
        034072  000241                                CLC
        034074  006121                                ROL     (1)+
        034076  000241                                CLC
        034100  006121                                ROL     (1)+
        034102  000241                                CLC
        034104  006121                                ROL     (1)+
        034106  005367  001724                        DEC     COUNT
        034112  001337                                BNE     LP22
        034114  105067  174661                        CLRB    ICNT+1
```

2.   H3

```
                                ;*****************************************************************
                                ;TEST 23        MEMORY TEST 1 (MEMORY INTO ITSELF) USING STF (1)+
                                ;*****************************************************************

 034120  104400                         SCOPE
 034122  170001                         SETF
 034124  012701  006042                 MOV     #HICORE,R1      ;GET END OF PROGRAM
 034130  010167  174646         LP23:   MOV     R1,ANS1
 034134  010167  174644                 MOV     R1,ANS2
 034140  062767  000002  174636         ADD     #2,ANS2
 034146  172467  174630                 LDF     ANS1,AC0        ;GET THE DATA
 034152  174021                         STF     AC0,(1)+        ;STORE INTO MEMORY
 034154  026701  001660                 CMP     UPLIM,R1        ;END YET?
 034160  101363                         BHI     LP23
 034162  012701  006042                 MOV     #HICORE,%1
 034166  020111                 LP23A:  CMP     %1,(1)          ;CHECK THE RESULTS
 034170  001005                         BNE     NG23
 034172  005721                 LP23B:  TST     (1)+            ;GO TO THE NEXT
 034174  026701  001640                 CMP     UPLIM,R1        ;CHECK FOR END
 034200  101372                         BHI     LP23A
 034202  000406                         BR      NXT23
 034204  010167  174572         NG23:   MOV     %1,ANS1
 034210  011167  174570                 MOV     (1),ANS2
 034214  104002                         HLT+2                   ;DATA WRONG
 034216  000755                         BR      LP23B
 034220  105067  174555         NXT23:  CLRB    ICNT+1          ;ONLY ONCE
```

```
                                ;*****************************************************************
                                ;TEST 24        MEMORY TEST 2 USING LDF (1)
                                ;*****************************************************************

 004224  104430                         SCOPE
 004226  170001                         SETF
 004230  012701  006042                 MOV     #HICORE,R1      ;GET END OF PROGRAM
 004234  011101                 LP24:   MOV     (1),R1          ;PUT ADDRESS INTO ITSELF
 004236  005721                         TST     (1)+            ;KLUDGE IT FOR 11/20
 004240  026701  001574                 CMP     UPLIM,R1        ;END?
 004244  101373                         BHI     LP24
 004246  012701  006042                 MOV     #HICORE,R1
 004252  016702  001562                 MOV     UPLIM,R2
 004256  011167  174520         LP24A:  MOV     (1),ANS1        ;GET FOR
 004262  016167  000002  174514         MOV     2(1),ANS2       ;TYPING
 004270  172411                         LDF     (1),AC2         ;LOAD FROM CORE
 004272  174067  174518                 STF     AC0,ANS3        ;GET IT BACK
 004276  021167  174504                 CMP     (1),ANS3        ;FIRST WORD RIGHT
 004302  001011                         BNE     NG24            ;NO
 004304  026167  000002  174476         CMP     2(1),ANS4       ;SECOND WORD RIGHT
 004312  001005                         BNE     NG24            ;NO
 004314  022121                         CMP     (1)+,(1)+       ;GET TO NEXT
 004316  026701  001516         LP24B:  CMP     UPLIM,R1        ;END?
 004322  101355                         BHI     LP24A           ;NO
 004324  000406                         BR      NXT24           ;YES
 004326  012167  174454         NG24:   MOV     (1)+,ANS3       ;ERROR
 004332  012167  174452                 MOV     (1)+,ANS4
 004336  104004                         HLT+4                   ;DATA WRONG
 004340  000766                         BR      LP24B
 004342  105067  174433         NXT24:  CLRB    ICNT+1          ;ONLY ONCE
```

```
034346  104400                          DONE:   SCOPE
034352  032737  002000  177570                  BIT     #SW10,@#SWR             ;RING THE BELL?
034356  001005                                  BNE     1$                      ;NO!
034360  012767  000007  001436                  MOV     #BELL,.TYPE             ;TYPE A BELL
034366  000004  006024                          TYPE    ,.TYPE

034372  005046                          1$:     CLR     -(6)                    ;CLEAR TRACE TRAP
034374  032737  010000  177570                  BIT     #SW12,@#SWR             ;RUN WITH TRT?
034402  001010                                  BNE     2$
034404  005167  001416                          COM     TRPB
034410  100005                                  BPL     2$
034412  052716  000020                          BIS     #20,(6)                 ;SET TRACE TRAP
034416  012746  001146                          MOV     #BEGIN,-(6)
034422  000414                                  BR      YESRT
034424  012746  034432                  2$:     MOV     #4$,-(6)                ;JUMP TO 4$
034430  000002                                  RTI
034432  013700  000042                  4$:     MOV     @#42,%0                 ;GET MONITOR ADDRESS
034436  001404                                  BEQ     3$                      ;NONE
034440  004710                                  JSR     7,(0)                   ;GO TO IT
034442  000240                                  NOP
034444  000240                                  NOP
034446  000240                                  NOP
034450  000167  174472                  3$:     JMP     BEGIN
034454  000002                          YESRT:  RTI                             ;RETURN TO PROGRAM FROM TRAP

034456  032737  000400  177570          .EMT:   BIT     #SW08,@#SWR             ;KILL LDUB OR LOOP ON SPEC. TEST
034464  001404                                  BEQ     1$
034466  123767  177570  174324                  CMPB    @#SWR,ICNT              ;ON RIGHT TEST?
034474  001437                                  BEQ     OVER
034476  113703  177570                  1$:     MOVB    @#SWR,%3                ;GET UB BITS
034502  170003                                  LDUB
034504  032737  040000  177570                  BIT     #SW14,@#SWR             ;LOOP ON TEST
034512  001026                                  BNE     KIT
034514  032737  004000  177570                  BIT     #SW11,@#SWR             ;KILL ITERATIONS
034522  001012                                  BNE     SAVLAD
034524  105767  174251                          TSTB    ICNT+1
034530  001404                                  BEQ     2$                      ;BRANCH IF FIRST
034532  126767  001276  174241                  CMPB    TIMES,ICNT+1            ;DONE?
034540  001013                                  BNE     KIT                     ;BRANCH IF NOT
034542  112767  000001  174231          2$:     MOVB    #1,ICNT+1               ;FIRST ITERATION
034550  105267  174224                  SAVLAD: INCB    ICNT                    ;COUNT TEST NUMBERS
034554  011667  001250                          MOV     (6),LAD                 ;SAVE LOOP ADDRESS
034560  016737  174214  177570                  MOV     ICNT,@#SWR              ;DESPLAY TEST NO. AND ITERATION COUNT
034566  000002                                  RTI                             ;RETURN

034570  105267  174205                  KIT:    INCB    ICNT+1
034574  016737  174200  177570          OVER:   MOV     ICNT,@#SWR              ;SET UP DISPLAY
034602  005767  001222                          TST     LAD                     ;FIRST ONE?
034606  001760                                  BEQ     SAVLAD
034610  016716  001214                          MOV     LAD,(6)                 ;FUDGE RETURN ADDRESS
034614  000002                                  RTI                             ;FIXES PS
```

```
P04616  032737  002000  177570  .TRP:  BIT     #SW13,@#SWR
P04624  001405                         BEQ     1$
P04626  012767  000007  001170         MOV     #BELL,,TYPE     ;TYPE A BELL
P04634  000004  006024                 TYPE    ,,TYPE
P04640  004767  000600          1$:    JSR     PC,ERROR        ;COUNT THE NUMBER OF ERRORS
P04644  010446                         MOV     R4,-(6)
P04646  032737  020000  177570         BIT     #SW13,@#SWR     ;SKIP TYPEOUT IF SET
P04654  001072                         BNE     4$
P04656  000004  005772                 TYPE    ,RETURN
P04662  016646  000002                 MOV     2(6),-(6)       ;PUT ADDRESS OF INSTRUCTION ON STACK
P04666  162716  000002                 SUB     #2,(6)
P04672  011605                         MOV     (6),TTY         ;TYPE (6) IN OCTAL
P04674  004767  000404                 JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
P04700  000004  006000                 TYPE    ,SPACE+3
P04704  010005                         MOV     %0,TTY          ;TYPE %0 IN OCTAL
P04706  004767  000372                 JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
P04712  000004  006001                 TYPE    ,SPACE+4
P04716  012703  001002                 MOV     #ANS1,%3        ;ADDRESS OF DATA
P04722  113604                         MOVB    @(6)+,R4        ;AMOUNT OF DATA IN TABLE
P04724  001426                         BEQ     3$
P04726  100016                         BPL     2$              ;TYPE STACK?
P04730  016667  000006  174044         MOV     6(6),ANS1
P04736  016667  000010  174040         MOV     10(6),ANS2
P04744  016667  000012  174034         MOV     12(6),ANS3
P04752  016667  000014  174030         MOV     14(6),ANS4
P04760  042704  177000                 BIC     #177000,R4      ;CLEAR SIGN
P04764  000004  006001          2$:    TYPE    ,SPACE+4
P04770  012305                         MOV     (3)+,TTY        ;TYPE (3)+ IN OCTAL
P04772  004767  000306                 JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
P04776  005304                         DEC     R4
P05000  001371                         BNE     2$
P05002  005700                  3$:    TST     FPS
P05004  100016                         BPL     4$
P05006  000004  005775                 TYPE    ,SPACE
P05012  170367  174004                 STST    FEC
P05016  016705  174000                 MOV     FEC,TTY         ;TYPE FEC IN OCTAL
P05022  004767  000256                 JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
P05026  000004  006000                 TYPE    ,SPACE+3
P05032  016705  173766                 MOV     FEA,TTY         ;TYPE FEA IN OCTAL
P05036  004767  000242                 JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
P05042  012604                  4$:    MOV     (6)+,R4
P05044  005737  177570                 TST     @#SWR
P05050  100001                         BPL     .+4
P05052  000000                         HALT
P05054  032737  001000  177570         BIT     #SW09,@#SWR     ;CHECK FOR INHIBIT LOOP ON ERROR
P05062  001001                         BNE     .+4
P05064  000002                         RTI
P05066  105067  173707                 CLRB    ICNT+1
P05072  032737  000400  177570         BIT     #SW08,@#SWR     ;CHECK FOR LOAD MICROBREAK
P05100  001233                         BNE     KIT             ;BRANCH IF NOT
P05102  113703  177570                 MOVB    @#SWR,%3        ;PUT MICROBREAK ADDRESS IN R3
P05106  170003                         LDUB                    ;LOAD MICROBREAK
P05110  000627                         BR      KIT             ;LOOP ON TEST UNTIL NO ERRORS
```

```
P05112  004767  000036          RAND4:  JSR     7,RANDOM
P05116  016767  000160  173656          MOV     HINUM,ANS1
P05124  016767  000150  173652          MOV     LONUM,ANS2
P05132  004767  000016                  JSR     7,RANDOM
P05136  016767  000140  173642          MOV     HINUM,ANS3
P05144  016767  000130  173636          MOV     LONUM,ANS4
P05152  000207                          RTS     7

P05154  010046                  RANDOM: MOV     %0,-(6)         ;SAVE R0
P05156  010146                          MOV     %1,-(6)         ;SAVE R1
P05160  010246                          MOV     %2,-(6)         ;SAVE R2
P05162  010446                          MOV     R4,-(6)         ;SAVE R4
P05164  016700  000110                  MOV     LONUM,%0        ;SET R0 WITH LOW
P05170  016701  000106                  MOV     HINUM,%1        ;SET R1 WITH HIGH
P05174  012704  177771                  MOV     #-7,R4          ;SET SHIFT COUNT
P05200  005002                          CLR     %2
P05202  006300                  SHIFT:  ASL     %0              ;SHIFT R0 LEFT AND
P05204  006101                          ROL     %1              ;ROTATE CARRY INTO R1 AND
P05206  006102                          ROL     %2              ;ROTATE CARRY INTO R2
P05210  005204                          INC     R4              ;CHECK FOR DONE
P05212  001373                          BNE     SHIFT           ;CONTINUE SHIFT LOOP
P05214  066702  000060                  ADD     LONUM,%2        ;ADD NUMBER TO MAKE X 129
P05220  005501                          ADC     %1              ;PROPOGATE CARRY
P05222  066701  000054                  ADD     HINUM,%1        ;ADD NUMBER TO MAKE X 129
P05226  005502                          ADC     %2              ;PROPOGATE CARRY
P05230  062700  001057                  ADD     #1057,%0        ;ADD LOW CONSTANT
P05234  005501                          ADC     %1              ;PROPOGATE CARRY
P05236  005502                          ADC     %2              ;PROPOGATE CARRY
P05240  062701  047401                  ADD     #47421,%1       ;ADD HIGH CONSTANT
P05244  005502                          ADC     %2              ;PROPOGATE CARRY
P05246  062702  000006                  ADD     #6,%2           ;ADD HIGHEST CONSTANT
P05252  060200                          ADD     %2,%0           ;REPRIME R0 WITH HIGHEST DIGIT
P05254  005501                          ADC     %1              ;PROPOGATE CARRY
P05256  010067  000016                  MOV     %0,LONUM        ;SAVE R0
P05262  010167  000014                  MOV     %1,HINUM        ;SAVE R1
P05266  012604                          MOV     (6)+,R4         ;RESTORE R4
P05270  012602                          MOV     (6)+,%2         ;RESTORE R2
P05272  012601                          MOV     (6)+,%1         ;RESTORE R1
P05274  012600                          MOV     (6)+,%0         ;RESTORE R0
P05276  000207                          RTS     PC              ;RETURN

P05300  123456          LONUM:  123456
P05302  176543          HINUM:  176543
```

```
 035324  112767  000001  000130  PRINTR: MOVB    #1,PRS          ;SET ZERO FILL SWITCH
 035332  000402                  RR      .+6
 035334  005067  000122          PRINTS: CLR     PRS             ;SUPRESS LEADING ZERO'S
 035340  112767  177772  000115          MOVB    #-6,PRS+1       ;SET COUNT
 035346  010446                          MOV     R4,-(6)         ;SAVE R4
 035350  012704  035432                  MOV     #3$,R4          ;SET POINTER TO FIRST ASCII CHAR.
 035354  105014                          CLRB    (4)             ;CLEAR FIRST BYTE
 035356  000405                  RR      2$                      ;ROTATE FIRST BIT
 035360  105014                  1$:     CLRB    (4)             ;CLEAR BYTE OF CHARACTER
 035362  006105                          ROL     TTY             ;ROTATE BIT INTO C
 035364  106114                          ROLB    (4)             ;PACK IT
 035366  006105                          ROL     TTY             ;ROTATE BIT INTO C
 035370  106114                          ROLB    (4)             ;PACK IT
 035372  006105                  2$:     ROL     TTY             ;ROTATE BIT INTO C
 035374  106114                          RCLB    (4)             ;PACK IT
 035376  105714                          TSTB    (4)
 035400  001402                          BEQ     .+6
 035402  105267  000054                  INCB    PRS
 035406  105767  000050                  TSTB    PRS             ;CHECK FILL SWITCH
 035412  001402                          BEQ     .+6
 035414  152724  000060                  BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
 035420  105267  000037                  INCB    PRS+1
 035424  001355                          BNE     1$              ;REPEAT
 035426  022704  035432                  CMP     #3$,R4
 035432  001002                          BNE     .+6
 035434  112724  000060                  MOVB    #'0,(4)+
 035440  105014                          CLRB    (4)
 035442  000004  035432                  TYPE    ,3$             ;TYPE IT
 035446  012604                          MOV     (6)+,R4         ;RESTORE R4
 035452  000207                          RTS     PC

 035454  000004                  3$:     .BLKW   4
 035464  000000                  PRS:    0

 035466  005267  000362          ERROR:  INC     ERRORS          ;COUNT ERRORS
 035472  132737  000001  000041          BITB    #1,@#41         ;AUTO MODE?
 035500  001412                          BEQ     1$              ;NO!
 035502  022767  000010  000344          CMP     #10,ERRORS      ;TOO MANY?
 035510  001006                          BNE     1$              ;NOT YET
 035512  013700  000042                  MOV     @#42,R0         ;GET ADDRESS
 035516  001403                          BEQ     1$              ;FORGET IT IF ZERO
 035520  005037  000042                  CLR     @#42            ;ZAP 42
 035524  004710                          JSR     PC,(2)          ;CALL THE MONITOR
 035530  000207                  1$:     RTS     PC              ;RETURN
```

```
035506  012777  005702  000324  POWDWN: MOV     #ILLUP,@UPVEC   ;SET FOR FAST UP
035514  012777  000340  000320          MOV     #340,@UPVEC+2   ;PRIO:7
035522  170246                          STFPS   -(6)            ;GET THE FPS
035524  170011                          SETD
035526  174046                          STD     AC0,-(6)        ;SAVE AC'S
035530  174146                          STD     AC1,-(6)
035532  174246                          STD     AC2,-(6)
035534  174346                          STD     AC3,-(6)
035536  172404                          LDD     AC4,AC0
035540  174046                          STD     AC0,-(6)
035542  172405                          LDD     AC5,AC0
035544  174046                          STD     AC0,-(6)
035546  010046                          MOV     R0,-(6)         ;SAVE REGISTERS
035550  010146                          MOV     R1,-(6)
035552  010246                          MOV     R2,-(6)
035554  010346                          MOV     R3,-(6)
035556  010446                          MOV     R4,-(6)
035560  010546                          MOV     R5,-(6)
035562  010667  000216                  MOV     SP,SAVE6        ;SAVE SP
035566  012777  005576  000224          MOV     #POWUP,@UPVEC   ;SET UP VECTOR
035574  000000                          HALT

035576  016706  000202          POWUP:  MOV     SAVE6,SP        ;GET SP
035602  005001                          CLR     R1              ;WAIT LOOP FOR THE TTY
035604  005201                  1$:     INC     R1
035606  001376                          BNE     1$
035610  012605                          MOV     (6)+,R5         ;GET THE REGISTERS
035612  012604                          MOV     (6)+,R4
035614  012603                          MOV     (6)+,R3
035616  012602                          MOV     (6)+,R2
035620  012601                          MOV     (6)+,R1
035622  012600                          MOV     (6)+,R0
035624  170011                          SETD
035626  172426                          LDD     (6)+,AC0        ;RESTORE THE AC'S
035630  174005                          STD     AC0,AC5
035632  172426                          LDD     (6)+,AC0
035634  174004                          STD     AC0,AC4
035636  172726                          LDD     (6)+,AC3
035640  172626                          LDD     (6)+,AC2
035642  172526                          LDD     (6)+,AC1
035644  172426                          LDD     (6)+,AC0
035646  170126                          LDFPS   (6)+            ;RESTORE FPS
035650  012777  005506  000136          MOV     #POWDWN,@DWNVEC ;SET UP THE POWER DOWN VECTOR
035656  012777  000340  000132          MOV     #340,@DWNVEC+2
035664  000004  005670                  TYPE    ,.+2            ;.ASCIZ <15><12>"POWER"
035672  000002                          RTI

035674  000000                  ILLUP:  HALT                    ;THE POWER UP SEQUENCE WAS STARTED
035676  000776                          BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE
```

```
P35700  013546                  .IOT:   MOV     TTY,-(6)        ;SAVE TTY
P35712  017605  000002                  MOV     @2(6),TTY       ;GET ADDRESS TO BE TYPED
P35714  105715                  1$:     TSTB    (TTY)           ;TERMINATOR?
P35716  001406                          BEQ     2$
P35720  112537  177566                  MOVB    (TTY)+,@#177566 ;LOAD AND TYPE THE CHARACTER
P35724  105737  177564                  TSTB    @#177564        ;IS THE PRINTER READY
P35730  100375                          BPL     .-4
P35732  000770                          BR      1$              ;GET THE NEXT CHARACTER

P35734  017646  000002          2$:     MOV     @2(6),-(6)      ;GET ADDRESS TO BE TYPED
P35740  062766  000002  000004          ADD     #2,4(6)         ;ADD 2 TO THE ADDRESS
P35746  022666  000002                  CMP     (6)+,2(6)       ;IS IT .+2?
P35752  001005                          BNE     3$              ;NO
P35754  005725                          TST     (TTY)+          ;ADD 2 TO THE ADDRESS
P35756  042705  000001                  BIC     #1,TTY          ;BACK UP TO AN EVEN BYTE
P35762  010566  000002                  MOV     TTY,2(6)        ;RESTORE ADDRESS
P35766  012605                  3$:     MOV     (6)+,TTY        ;RESTORE TTY
P35770  000002                          RTI                     ;RETURN

P35772  005015      000         RETURN: .ASCIZ  <15><12>
P35775      015  020012  020040 SPACE:  .ASCIZ  <15><12>"    "
P36002      000
            000004                  .EVEN
P36004  000000                  SAVE6:  0
P36006  172160                  FPTADR: 172160                  ;FLOATING POINT ADDRESS ON THE 11/20
P36010  000244  000246          FPVECT: 244,246                 ;FLOATING POINT VECTOR ADDRESS
P36014  000024  000026          DWNVEC: 24,26                   ;POWER DOWN VECTOR ADDRESS
P36020  000024  000026          UPVEC:  24,26                   ;POWER UP VECTOR ADDRESS
P36024  000000                  .TYPE:  0
P36026  000000                  TRPB:   0
P36030  000000                  LAD:    0                       ;LOOP ADDRESS
P36032  000000                  ERRORS: 0                       ;ERROR COUNT
P36034  000377                  TIMES:  377                     ;ITERATION COUNT
P36036  000000                  COUNT:  0
P36040  000000                  UPLIM:  0
P36042  000000                  HICORE: 0

            000001              .END
```

```
LP12      000426            697#    718
LP13      000556            732#    755
LP14      000712            769#    792
LP15      000846            806#    831
LP16      001006            845#    870
LP17      001146            884#    909
LP20      001306            923#    948
LP21      001446            962#    989
LP22      001612           1003#   1030
LP23      001736           1039#   1045
LP23A     002006           1047#   1051
LP23B     002172           1049#   1056
LP24      002234           1065#   1068
LP24A     002456           1071#   1081
LP24B     002616           1088#   1086
LP7       000716            592#    613
.         = 000001          355#
NEM       001136            411     422#
NG23      002284           1048    1053#
NG24      002326           1076    1078    1083#
NXT23     002420           1052    1057#
NXT24     002542           1082    1087#
OVER      002574           1116    1134#
PC      =%000007            378#   1143*   1231*   1264*   1277*   1278*
POWDWN    003536            434    1279#   1321
POWUP     003576           1298    1301#
PRINTR    003634           1151    1154    1167    1175    1178    1235#
PRINTS    003714           1237#
PRS       003442           1235*   1237*   1238*   1252*   1253    1256*   1267#
PS      = 177776            356#
RANDOM    003154           1192    1195    1200#
RAND4     003112            448    1192#
RETURN    003772           1147    1347#
R0      =%000000            370#    437*   1274*   1291    1313*
R1      =%000001            371#    408*    412*    414*    415     417*    419*    421     422*    423     586*    687*    821*
                            642*    656*    677*    691*    712*    726*    749*    763*    786*    807*    821*    839*    868*
                            878*    899*    917*    938*    956*    979*    997*   1027*   1038*   1039     104    1044    1257
                           1067    1080    1292    1302*   1303*   1309*
R2      =%000002            372#    594*    629*    664*    699*    736*    773*    808*    847*    886*    925*    966*   1007*
                           1293    1308*
R3      =%000003            373#   1294    1307*
R4      =%000004            374#   1144    1157*   1164*   1168*   1179*   1203    1206*   1211*   1227*   1239    1240*   1258
                           1263*   1295    1306*
R5      =%000005            376#   1296    1305*
SAVE6     000604           1297*   1301    1351#
SAVLAD    004550           1122    1128#   1136
SCOPE   = 104400            358#    453     476     496     519     539     563     584     619     654     689     724     761
                            798     837     876     915     954     995    1036    1062    1085
SHIFT     005202           1208#   1212
SP      =%000006            377#    407*    431*   1297    1301*
SPACE     005775           1152    1155    1165    1172    1176    1348#
SWR     = 177570            357#   1089    1095    1113    1115    1117    1119    1121    1130*   1134*   1139    1145    1187
                           1183    1187    1189
SW08    = 000400            368#   1113    1187
```

```
SW09    = 001000            367#   1183
SW10    = 002000            366#   1089    1139
SW11    = 004000            365#   1121
SW12    = 010000            364#   1095
SW13    = 020000            363#   1145
SW14    = 040000            362#   1119
TIMES     006034           1125    1360#
TRPR      006026           1097*   1357#
TRYAGN    001072            418#    421
TTY     =%000035            375#   1150*   1153*   1166*   1174*   1177*   1244*   1246*   1248*   1328    1329*   1330    1332
                           1341    1342*   1343    1344*
TYPE    = 003004            361#   1092    1142    1147    1152    1155    1165    1172    1176    1202    1323
UPLIM     006040            423*   1044    1050    1067    1070    1080    1362#
UPVEC     006002           1279*   1288*   1298*   1355#
YESRT     004454            426*    433    1101    1111#
.       = 006044            385#    386#    389#    395#    458     461     464     467     481     484     487     490     501
                            504     507     510     524     527     530     533     549     548     551     554     569     572
                            575     578     596     599     602     605     631     634     637     642     666     669     672
                            675     701     704     707     710     738     741     744     747     775     778     781     784
                            810     813     816     819     849     852     855     858     888     891     894     897     927
                            930     933     936     968     971     974     977    1009    1212    1215    1018    1181    1184
                           1236    1251    1254    1259    1266#   1323    1327    1334    1359#
.EMT      004456            440    1113#
.IOT      005706            436    1328#
.TRP      004616            438    1139#
.TYPE     006024           1091*   1092    1141*   1142    1356#
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ASL	628	629	610	611	643	644	645	646	676	679	682	681	713	714	715
	716	750	751	752	753	787	788	789	790	1220					
BEQ	413	458	461	464	467	481	484	487	490	521	524	527	51	524	527
	530	533	545	548	551	554	569	572	575	578	595	599	602	605	631
	634	637	640	666	669	672	675	721	724	727	712	738	741	744	747
	775	778	781	784	812	813	816	819	849	852	855	858	888	891	864
	897	927	930	933	936	968	971	974	977	1009	1012	1015	1019	1105	1114
	1115	1124	1136	1140	1158	1251	1254	1271	1275	1331					
BGT	416														
BHI	1045	1051	1060	1081											
BIC	1164	1342													
BIS	1009														
BISB	1255														
BIT	1089	1095	1113	1119	1121	1139	1145	1183	1187						
BITB	1270														
BNE	421	613	648	683	718	755	792	831	870	909	948	989	103	1048	1076
	1078	1090	1096	1120	1122	1126	1146	1169	1184	1188	1212	1257	1259	1273	1324
	1340														
BPL	1098	1159	1171	1181	1334										
BR	409	427	1052	1356	1082	1286	1101	1191	1236	1242	1327	1335			
CLC	822	824	826	828	861	863	865	867	900	902	934	906	939	941	943
	945	980	982	984	986	1021	1023	1025	1027						
CLR	444	445	1094	1207	1237	1276	1302								
CLRB	614	649	684	719	756	793	832	871	910	949	990	1031	1057	1087	1186
	1241	1243	1261												
CMP	415	420	457	460	463	466	482	483	486	489	500	503	506	529	523
	526	529	532	544	547	550	553	568	571	574	577	595	598	601	604
	632	633	636	639	665	668	671	674	700	703	706	709	737	740	743
	746	774	777	782	783	829	812	815	818	848	851	854	857	887	852
	893	896	926	929	932	935	967	970	973	976	1005	1011	1014	1017	1044
	1047	1050	1067	1075	1077	1079	1082	1250	1272	1339					
CMPB	1115	1125													
COM	1097														
DEC	612	647	682	717	754	791	832	869	908	947	989	1029	1168		
EMT	359														
HALT	386	392	1182	1299	1326										
INC	1211	1269	1303												
INCB	1128	1133	1252	1256											
IOT	361														
JMP	387	1113													
JSR	448	1105	1143	1151	1154	1167	1175	1178	1192	1195	1277				
LDD	455	476	498	521	542	566	592	627	662	697	732	734	769	771	806
	845	884	923	962	964	1023	1305	1287	1289	1312	1314	1316	1317	1318	1319
LDF	1042	1073													
LDFPS	446	1320													
LDUB	1118	1190													
MOV	407	411	412	417	423	424	426	428	431	432	433	434	435	436	437
	438	439	440	441	442	443	586	587	588	589	590	591	594	607	621
	622	623	624	625	626	629	642	656	657	658	659	660	661	664	677
	691	692	693	694	695	696	699	712	726	727	728	729	73.	731	736
	749	763	764	765	766	767	768	773	786	800	801	802	803	804	805
	808	821	839	840	841	842	843	844	847	860	878	879	88.	881	882

A4

ERRORS DETECTED: 0

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.DCFPR,DCFPR/SOL/CRF=DCFPR,P11
RUN-TIME:  5  9  1 SECONDS
CORE USED:  7K
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