FP11

MULF, MULD

MD-11-DCFPF-B

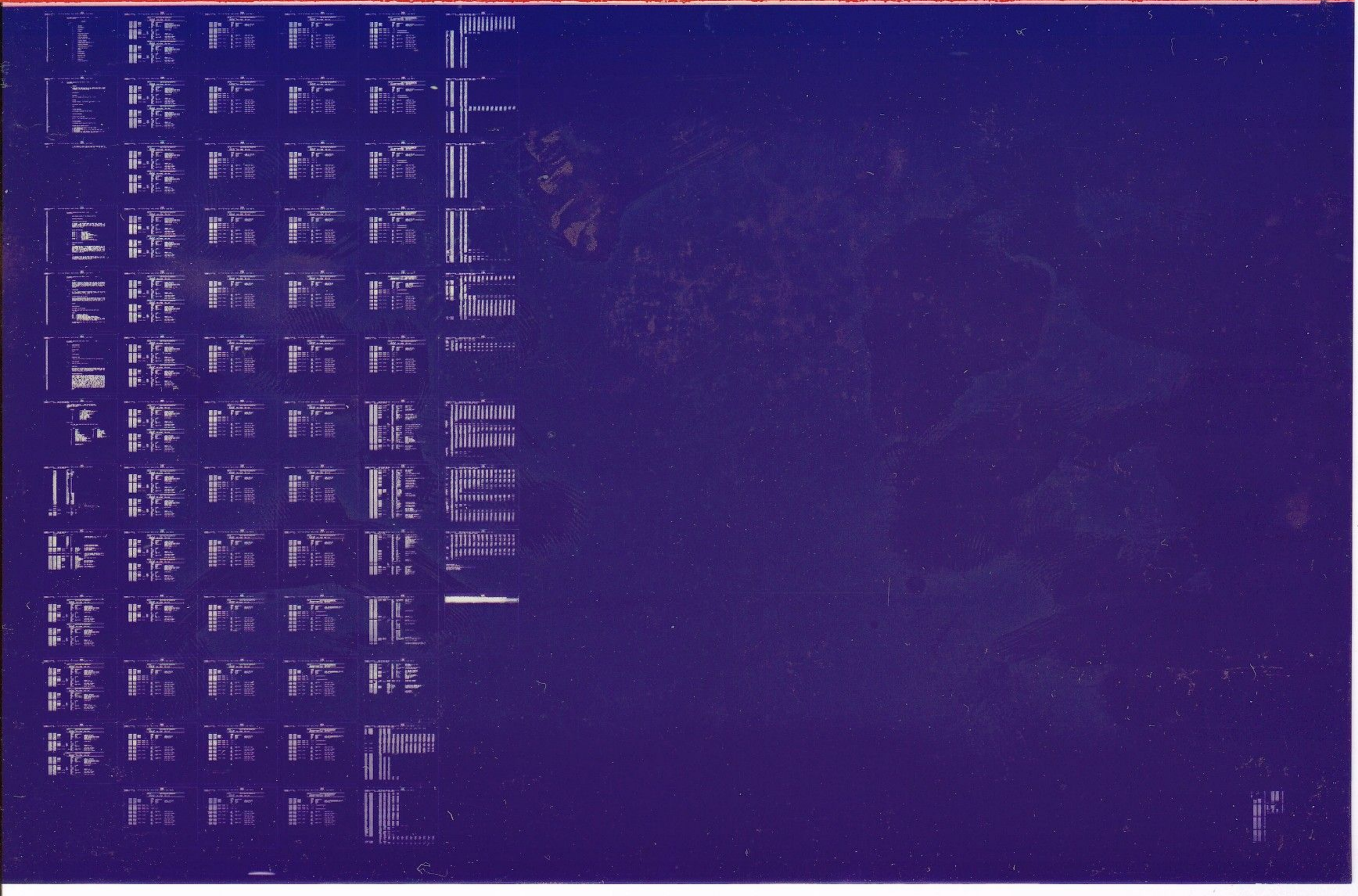
EP-DCFPF-B-DL-A

OCT 1976

FICHE 1 OF 1

digital

Made in U.S.A.



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DESCRIPTION

1. ABSTRACT

THESE PROGRAMS TEST THE FP11 IN ALL MODES WITH FIXED NUMBER PATTERNS. THE PROGRAMS SHOULD BE RUN IN ORDER FOR AT LEAST 2 PASSES WITH ALL SWITCHES DOWN.

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

NONE

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR ABS TAPES.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5.1.1 (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

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<7:0>
         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.

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 (EXCEPT DCFPA) 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 R0.

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 0-8  OF  THESE
         MAY  BE TYPED DEPENDING ON THE NUMBER FOLLOWING THE
         HLT; I.E., HLT+3 WOULD TYPE ANS1-ANS3.
```

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

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

EACH TEST CAN BE POWER FAILED WITH NO ERRORS EXCEPT ON THE FEC AND FEA. 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

THESE PROGRAMS TEST ALL THE INSTRUCTIONS ON THE FP11 IN ALL MODES. EACH PROGRAM HAS MANY SUBTESTS (THE CODE BETWEEN 2 SCOPE STATEMENTS) WHICH ARE RUN 256 TIMES BEFORE CONTINUING TO THE NEXT. SW<11> ON A 1 CAUSES EACH SUBTEST TO BE RUN ONLY ONCE. SW<9> ON A 1 ENABLES LOOP ON ERROR. THE ADDRESS ICNT (LOC 1000) AND DISPLAY REGISTER ON THE 11/45 EACH CONTAIN THE ITERATION COUNT IN THE LEFT BYTE AND THE TEST NUMBER IN THE RIGHT BYTE. ALL THE SUBTESTS SHOULD BE RUN SEQUENTIALLY BY STARTING AT 200 NOT BY STARTING AT THE BEGINNING OF THE SUBTEST. TO LOOP ON A PARTICULAR SUBTEST, PUT THE TEST NUMBER (SEE LISTING) IN THE RIGHT BYTE OF THE SWITCH REGISTER AND SW<8> ON A 1. THIS TEST WILL BE LOOPED UPON UNTIL SW<8> IS PUT ON A 0 OR THE RIGHT BYTE IS CHANGED. IF THE TEST IS NON-EXISTANT, THE PROGRAM WILL BE RUN AS USUAL.

.ENDR .

```
.TITLE  MAINDEC-11-DCFPF-B      TEST OF MULF AND MULD
;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 FORM:

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


              FPS                                   FEC
        BIT     REASON                      CODE      ERROR
        ---     ------                      ----      -----
         0      CARRY                         0       ADDRESS ERROR
         1      OVERFLOW                      2       OPCODE ERROR
         2      ZERO                          4       DIVIDE BY ZERO
         3      NEGATIVE                      6       CONVERSION ERROR
         4      MAINTAINANCE MODE            10       OVERFLOW
         5      TRUNCATE MODE                12       UNDERFLOW
         6      LONG INTEGER MODE            14       UNDEFINED VARIABLE (-0)
         7      DOUBLE PRECISION MODE        16       UBREAK TRAP
         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*
```

```
                                .ENABL  ABS
000001                          N=      1
177776                          PS=     177776
177570                          SWR=    177570
177570                          DISPLAY=SWR
104400                          SCOPE=  TRAP
104000                          HLT=    EMT
000004                          TYPE=   IOT
000007                          BELL=   7
000000                          FPS=    %0
000000                          R0=     %0
000001                          R1=     %1
000002                          R2=     %2
000003                          R3=     %3
000004                          R4=     %4
000005                          R5=     %5
000005                          TTY=    %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
100000                          SW15=   100000
040000                          SW14=    40000
020000                          SW13=    20000
010000                          SW12=    10000
004000                          SW11=     4000
002000                          SW10=     2000
001000                          SW09=     1000
000400                          SW08=      400
170003                          LDUB=   170003
170005                          STAD=   170005
170007                          STQD=   170007
170006                          MRS=    170006
170004                          LDSC=   170004

000000                          .=      0                       ;TRAP CATCHER FROM 0 - 776

000200                          .=      200

000200  000167  000622                  JMP     BEG

000760                          .=      760
000760  170200                  FLTERR: STFPS   FPS
000762  170367  000034                  STST    FEC
000766  000000                          HALT
000770  000002                          RTI
```

```
                001000                          .=      1000

001000  000000                          ICNT:   0               ;ITERATION COUNT - LH   TEST NO. - 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  012737  001054  000004                  MOV     #M1120,@#4      ;FIND OUT WHICH MACHINE THIS IS
001040  005737  177772                        TST     @#177772        ;IS PIRQ THERE?
001044  012767  000006  011042                MOV     #6,YESRT        ;FUDGE IN RTT IF 11/45
001052  000403                              BR      BEGIN

001054  016737  012176  000010  M1120:  MOV     FPTADR,@#10     ;LOAD THE ILLEGAL INSTRUCTION VECTOR
                                                                ; WITH THE ADDRESS OF THE FPU.
                                                                ; THE FPU WILL HANDLE THE BAD OPCODES
001062  012737  000006  000004  BEGIN:  MOV     #6,@#4          ;RESET 4
001070  012706  000600                  MOV     #600,SP
001074  012737  012114  000014          MOV     #YESRT,@#14     ;SET TRACE TRAP VECTOR
001102  012777  012754  012154          MOV     #POWDWN,@DWNVEC
001110  012777  000340  012150          MOV     #340,@DWNVEC+2
001116  012737  013154  000020          MOV     #.IOT,@#20      ;SET UP VECTOR 20
001124  012700  000030                  MOV     #30,R0          ;SET R0 TO VECTOR 30
001130  012720  012256                  MOV     #.TRP,(0)+      ;SET EMT VECTOR
001134  012720  000340                  MOV     #340,(0)+
001140  012720  012116                  MOV     #.EMT,(0)+      ;SET TRAP VECTOR
001144  012710  000340                  MOV     #340,(0)
001150  012777  000760  012102          MOV     #FLTERR,@FPVECT ;LOAD INTERUPT VECTOR
001156  012777  000340  012076          MOV     #340,@FPVECT+2  ;LOCK UP PROCESSOR
001164  005067  177610                  CLR     ICNT
001170  005067  012104                  CLR     LAD
```

```
                                        ;*****************************************************************
                                        ;TEST 1          TEST OF MULF FPU INSTRUCTION
                                        ;     0 * 0 = 0
                                        ;     USING AC0     FPS = 47404     FEC = N/A
                                        ;*****************************************************************
001174  104400                                  SCOPE
001176  170127  047400                          LDFPS   #47404&57760
001202  172467  000024                          LDF     N1,0            ;LOAD 0 INTO AC1
001206  171067  000024                          MULF    M1,0            ;MULTIPLY 0 BY 0
001212  170200                                  STFPS   FPS             ;STORE FLOATING POINT STATUS
001214  022700  047404                          CMP     #47404,FPS      ;CHECK FLOATING POINT STATUS
001220  001401                                  BEQ     .+4             ;BRANCH IF OK
001222  104000                                  HLT                     ;FPS NOT EQUAL TO 47404

001224  174067  177552                          STF     0,ANS1          ;STORE RESULT
001230  000406                                  BR      01
001232  000000  000000          N1:     .FLT2   0
001236  000000  000000          M1:     .FLT2   0
001242  000000  000000          AN1:    .FLT2   0               ;RESULT = 0
001246  026767  177770  177526  01:     CMP     AN1,ANS1        ;CHECK LEFT HALF
001254  001401                          BEQ     .+4
001256  104002                          HLT+2                   ;LEFT HALF IS WRONG
001260  026767  177760  177516          CMP     AN1+2,ANS2      ;CHECK RIGHT HALF
001266  001401                          BEQ     .+4
001270  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************
                                        ;TEST 2          TEST OF MULF FPU INSTRUCTION
                                        ;     0 * 1. = 0
                                        ;     USING AC0     FPS = 47404     FEC = N/A
                                        ;*****************************************************************
001272  104400                                  SCOPE
001274  170127  047400                          LDFPS   #47404&57760
001300  172467  000024                          LDF     N2,0            ;LOAD 0 INTO AC2
001304  171067  000024                          MULF    M2,0            ;MULTIPLY 0 BY 1.
001310  170200                                  STFPS   FPS             ;STORE FLOATING POINT STATUS
001312  022700  047404                          CMP     #47404,FPS      ;CHECK FLOATING POINT STATUS
001316  001401                                  BEQ     .+4             ;BRANCH IF OK
001320  104000                                  HLT                     ;FPS NOT EQUAL TO 47404

001322  174067  177454                          STF     0,ANS1          ;STORE RESULT
001326  000406                                  BR      02
001330  000000  000000          N2:     .FLT2   0
001334  040200  000000          M2:     .FLT2   1.
001340  000000  000000          AN2:    .FLT2   0               ;RESULT = 0
001344  026767  177770  177430  02:     CMP     AN2,ANS1        ;CHECK LEFT HALF
001352  001401                          BEQ     .+4
001354  104002                          HLT+2                   ;LEFT HALF IS WRONG
001356  026767  177760  177420          CMP     AN2+2,ANS2      ;CHECK RIGHT HALF
001364  001401                          BEQ     .+4
001366  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 3          TEST OF MULF FPU INSTRUCTION
                                ;     1. * 1. = 1.
                                ;     USING AC0     FPS = 47400     FEC = N/A
                                ;*****************************************************************
001370  104400                          SCOPE
001372  170127  047400                  LDFPS   #47400&57760
001376  172467  000024                  LDF     N3,0            ;LOAD 1. INTO AC3
001402  171067  000024                  MULF    M3,0            ;MULTIPLY 1. BY 1.
001406  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
001410  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
001414  001401                          BEQ     .+4             ;BRANCH IF OK
001416  104000                          HLT                     ;FPS NOT EQUAL TO 47400

001420  174067  177356                  STF     0,ANS1          ;STORE RESULT
001424  000406                          BR      03
001426  040200  000000          N3:     .FLT2   1.
001432  040200  000000          M3:     .FLT2   1.
001436  040200  000000          AN3:    .FLT2   1.              ;RESULT = 1.
001442  026767  177770  177332  03:     CMP     AN3,ANS1        ;CHECK LEFT HALF
001450  001401                          BEQ     .+4
001452  104002                          HLT+2                   ;LEFT HALF IS WRONG
001454  026767  177760  177322          CMP     AN3+2,ANS2      ;CHECK RIGHT HALF
001462  001401                          BEQ     .+4
001464  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 4          TEST OF MULF FPU INSTRUCTION
                                ;    -1. * 1. = -1.
                                ;    USING AC0     FPS = 47410     FEC = N/A
                                ;*****************************************************************
001466  104400                          SCOPE
001470  170127  047400                  LDFPS   #47410&57760
001474  172467  000024                  LDF     N4,0            ;LOAD -1. INTO AC4
001500  171067  000024                  MULF    M4,0            ;MULTIPLY -1. BY 1.
001504  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
001506  022700  047410                  CMP     #47410,FPS      ;CHECK FLOATING POINT STATUS
001512  001401                          BEQ     .+4             ;BRANCH IF OK
001514  104000                          HLT                     ;FPS NOT EQUAL TO 47410

001516  174067  177260                  STF     0,ANS1          ;STORE RESULT
001522  000406                          BR      04
001524  140200  000000          N4:     .FLT2   -1.
001530  040200  000000          M4:     .FLT2   1.
001534  140200  000000          AN4:    .FLT2   -1.             ;RESULT = -1.
001540  026767  177770  177234  04:     CMP     AN4,ANS1        ;CHECK LEFT HALF
001546  001401                          BEQ     .+4
001550  104002                          HLT+2                   ;LEFT HALF IS WRONG
001552  026767  177760  177224          CMP     AN4+2,ANS2      ;CHECK RIGHT HALF
001560  001401                          BEQ     .+4
001562  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 5         TEST OF MULF FPU INSTRUCTION
                                ;     1. * -1. = -1.
                                ;     USING AC0    FPS = 47410    FEC = N/A
                                ;*****************************************************************
001564  104400                          SCOPE
001566  170127  047400                  LDFPS   #47410&57760
001572  172467  000024                  LDF     N5,0            ;LOAD 1. INTO AC5
001576  171067  000024                  MULF    M5,0            ;MULTIPLY 1. BY -1.
001602  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
001604  022700  047410                  CMP     #47410,FPS      ;CHECK FLOATING POINT STATUS
001610  001401                          BEQ     .+4             ;BRANCH IF OK
001612  104000                          HLT                     ;FPS NOT EQUAL TO 47410

001614  174067  177162                  STF     0,ANS1          ;STORE RESULT
001620  000406                          BR      O5
001622  040200  000000          N5:     .FLT2   1.
001626  140200  000000          M5:     .FLT2   -1.
001632  140200  000000          ANS:    .FLT2   -1.             ;RESULT = -1.
001636  026767  177770  177136  O5:     CMP     ANS,ANS1        ;CHECK LEFT HALF
001644  001401                          BEQ     .+4
001646  104002                          HLT+2                   ;LEFT HALF IS WRONG
001650  026767  177760  177126          CMP     ANS+2,ANS2      ;CHECK RIGHT HALF
001656  001401                          BEQ     .+4
001660  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 6         TEST OF MULF FPU INSTRUCTION
                                ;    -1. * -1. = 1.
                                ;    USING AC0    FPS = 47400    FEC = N/A
                                ;*****************************************************************
001662  104400                          SCOPE
001664  170127  047400                  LDFPS   #47400&57760
001670  172467  000024                  LDF     N6,0            ;LOAD -1. INTO AC6
001674  171067  000024                  MULF    M6,0            ;MULTIPLY -1. BY -1.
001700  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
001702  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
001706  001401                          BEQ     .+4             ;BRANCH IF OK
001710  104000                          HLT                     ;FPS NOT EQUAL TO 47400

001712  174067  177064                  STF     0,ANS1          ;STORE RESULT
001716  000406                          BR      O6
001720  140200  000000          N6:     .FLT2   -1.
001724  140200  000000          M6:     .FLT2   -1.
001730  040200  000000          AN6:    .FLT2   1.              ;RESULT = 1.
001734  026767  177770  177040  O6:     CMP     AN6,ANS1        ;CHECK LEFT HALF
001742  001401                          BEQ     .+4
001744  104002                          HLT+2                   ;LEFT HALF IS WRONG
001746  026767  177760  177030          CMP     AN6+2,ANS2      ;CHECK RIGHT HALF
001754  001401                          BEQ     .+4
001756  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************
                                        ;TEST 7          TEST OF MULF FPU INSTRUCTION
                                        ;    2 * 1 = 2
                                        ;    USING AC0    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
001760  104400                                  SCOPE
001762  170127  047400                         LDFPS   #47400&57760
001766  172467  000024                         LDF     N7,0            ;LOAD 2 INTO AC7
001772  171067  000024                         MULF    M7,0            ;MULTIPLY 2 BY 1
001776  170200                                 STFPS   FPS             ;STORE FLOATING POINT STATUS
002000  022700  047400                         CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002004  001401                                 BEQ     .+4             ;BRANCH IF OK
002006  104000                                 HLT                     ;FPS NOT EQUAL TO 47400

002010  174067  176766                         STF     0,ANS1          ;STORE RESULT
002014  000406                                 BR      07
002016  040400  000000          N7:            .FLT2   2
002022  040200  000000          M7:            .FLT2   1
002026  040400  000000          AN7:           .FLT2   2               ;RESULT = 2
002032  026767  177770  176742  07:            CMP     AN7,ANS1        ;CHECK LEFT HALF
002040  001401                                 BEQ     .+4
002042  104002                                 HLT+2                   ;LEFT HALF IS WRONG
002044  026767  177760  176732                 CMP     AN7+2,ANS2      ;CHECK RIGHT HALF
002052  001401                                 BEQ     .+4
002054  104002                                 HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************
                                        ;TEST 10                 TEST OF MULF FPU INSTRUCTION
                                        ;    3 * 1 = 3
                                        ;    USING AC0    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
002056  104400                                  SCOPE
002060  170127  047400                         LDFPS   #47400&57760
002064  172467  000024                         LDF     N10,0           ;LOAD 3 INTO AC10
002070  171067  000024                         MULF    M10,0           ;MULTIPLY 3 BY 1
002074  170200                                 STFPS   FPS             ;STORE FLOATING POINT STATUS
002076  022700  047400                         CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002102  001401                                 BEQ     .+4             ;BRANCH IF OK
002104  104000                                 HLT                     ;FPS NOT EQUAL TO 47400

002106  174067  176670                         STF     0,ANS1          ;STORE RESULT
002112  000406                                 BR      010
002114  040500  000000          N10:           .FLT2   3
002120  040200  000000          M10:           .FLT2   1
002124  040500  000000          AN10:          .FLT2   3               ;RESULT = 3
002130  026767  177770  176644  010:           CMP     AN10,ANS1       ;CHECK LEFT HALF
002136  001401                                 BEQ     .+4
002140  104002                                 HLT+2                   ;LEFT HALF IS WRONG
002142  026767  177760  176634                 CMP     AN10+2,ANS2     ;CHECK RIGHT HALF
002150  001401                                 BEQ     .+4
002152  104002                                 HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************************
                                        ;TEST 11                TEST OF MULF FPU INSTRUCTION
                                        ;    4 * 1 = 4
                                        ;    USING AC0    FPS = 47400    FEC = N/A
                                        ;*****************************************************************************
002154  104400                                  SCOPE
002156  170127  047400                          LDFPS   #47400&57760
002162  172467  000024                          LDF     N11,0           ;LOAD 4 INTO AC11
002166  171067  000024                          MULF    M11,0           ;MULTIPLY 4 BY 1
002172  170200                                  STFPS   FPS             ;STORE FLOATING POINT STATUS
002174  022700  047400                          CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002200  001401                                  BEQ     .+4             ;BRANCH IF OK
002202  104000                                  HLT                     ;FPS NOT EQUAL TO 47400

002204  174067  176572                          STF     0,ANS1          ;STORE RESULT
002210  000406                                  BR      011
002212  040600  000000              N11:        .FLT2   4
002216  040200  000000              M11:        .FLT2   1
002222  040600  000000              AN11:       .FLT2   4               ;RESULT = 4
002226  026767  177770  176546      011:        CMP     AN11,ANS1       ;CHECK LEFT HALF
002234  001401                                  BEQ     .+4
002236  104002                                  HLT+2                   ;LEFT HALF IS WRONG
002240  026767  177760  176536                  CMP     AN11+2,ANS2     ;CHECK RIGHT HALF
002246  001401                                  BEQ     .+4
002250  104002                                  HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************************
                                        ;TEST 12                TEST OF MULF FPU INSTRUCTION
                                        ;    5 * 1 = 5
                                        ;    USING AC0    FPS = 47400    FEC = N/A
                                        ;*****************************************************************************
002252  104400                                  SCOPE
002254  170127  047400                          LDFPS   #47400&57760
002260  172467  000024                          LDF     N12,0           ;LOAD 5 INTO AC12
002264  171067  000024                          MULF    M12,0           ;MULTIPLY 5 BY 1
002270  170200                                  STFPS   FPS             ;STORE FLOATING POINT STATUS
002272  022700  047400                          CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002276  001401                                  BEQ     .+4             ;BRANCH IF OK
002300  104000                                  HLT                     ;FPS NOT EQUAL TO 47400

002302  174067  176474                          STF     0,ANS1          ;STORE RESULT
002306  000406                                  BR      012
002310  040640  000000              N12:        .FLT2   5
002314  040200  000000              M12:        .FLT2   1
002320  040640  000000              AN12:       .FLT2   5               ;RESULT = 5
002324  026767  177770  176450      012:        CMP     AN12,ANS1       ;CHECK LEFT HALF
002332  001401                                  BEQ     .+4
002334  104002                                  HLT+2                   ;LEFT HALF IS WRONG
002336  026767  177760  176440                  CMP     AN12+2,ANS2     ;CHECK RIGHT HALF
002344  001401                                  BEQ     .+4
002346  104002                                  HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 13                TEST OF MULF FPU INSTRUCTION
                                ;    6 * 1 = 6
                                ;    USING AC1    FPS = 47400    FEC = N/A
                                ;*****************************************************************
002350  104400                          SCOPE
002352  170127  047400                  LDFPS   #47400&57760
002356  172567  000024                  LDF     N13,1           ;LOAD 6 INTO AC13
002362  171167  000024                  MULF    M13,1           ;MULTIPLY 6 BY 1
002366  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
002370  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002374  001401                          BEQ     .+4             ;BRANCH IF OK
002376  104000                          HLT                     ;FPS NOT EQUAL TO 47400

002400  174167  176376                  STF     1,ANS1          ;STORE RESULT
002404  000406                          BR      013
002406  040700  000000          N13:    .FLT2   6
002412  040200  000000          M13:    .FLT2   1
002416  040700  000000          AN13:   .FLT2   6               ;RESULT = 6
002422  026767  177770  176352  013:    CMP     AN13,ANS1       ;CHECK LEFT HALF
002430  001401                          BEQ     .+4
002432  104002                          HLT+2                   ;LEFT HALF IS WRONG
002434  026767  177760  176342          CMP     AN13+2,ANS2     ;CHECK RIGHT HALF
002442  001401                          BEQ     .+4
002444  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 14                TEST OF MULF FPU INSTRUCTION
                                ;    7 * 1 = 7
                                ;    USING AC3    FPS = 47400    FEC = N/A
                                ;*****************************************************************
002446  104400                          SCOPE
002450  170127  047400                  LDFPS   #47400&57760
002454  172767  000024                  LDF     N14,3           ;LOAD 7 INTO AC14
002460  171367  000024                  MULF    M14,3           ;MULTIPLY 7 BY 1
002464  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
002466  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002472  001401                          BEQ     .+4             ;BRANCH IF OK
002474  104000                          HLT                     ;FPS NOT EQUAL TO 47400

002476  174367  176300                  STF     3,ANS1          ;STORE RESULT
002502  000406                          BR      014
002504  040740  000000          N14:    .FLT2   7
002510  040200  000000          M14:    .FLT2   1
002514  040740  000000          AN14:   .FLT2   7               ;RESULT = 7
002520  026767  177770  176254  014:    CMP     AN14,ANS1       ;CHECK LEFT HALF
002526  001401                          BEQ     .+4
002530  104002                          HLT+2                   ;LEFT HALF IS WRONG
002532  026767  177760  176244          CMP     AN14+2,ANS2     ;CHECK RIGHT HALF
002540  001401                          BEQ     .+4
002542  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************
                                        ;TEST 15                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 2 = 14.
                                        ;    USING AC1    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
002544  104400                          SCOPE
002546  170127  047400                  LDFPS   #47400&57760
002552  172567  000024                  LDF     N15,1           ;LOAD 7 INTO AC15
002556  171167  000024                  MULF    M15,1           ;MULTIPLY 7 BY 2
002562  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
002564  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002570  001401                          BEQ     .+4             ;BRANCH IF OK
002572  104000                          HLT                     ;FPS NOT EQUAL TO 47400

002574  174167  176202                  STF     1,ANS1          ;STORE RESULT
002600  000406                          BR      O15
002602  040740  000000          N15:    .FLT2   7
002606  040400  000000          M15:    .FLT2   2
002612  041140  000000          AN15:   .FLT2   14.
002616  026767  177770  176156  O15:    CMP     AN15,ANS1       ;CHECK LEFT HALF
002624  001401                          BEQ     .+4
002626  104002                          HLT+2                   ;LEFT HALF IS WRONG
002630  026767  177760  176146          CMP     AN15+2,ANS2     ;CHECK RIGHT HALF
002636  001401                          BEQ     .+4
002640  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************
                                        ;TEST 16                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 3 = 21.
                                        ;    USING AC1    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
002642  104400                          SCOPE
002644  170127  047400                  LDFPS   #47400&57760
002650  172567  000024                  LDF     N16,1           ;LOAD 7 INTO AC16
002654  171167  000024                  MULF    M16,1           ;MULTIPLY 7 BY 3
002660  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
002662  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002666  001401                          BEQ     .+4             ;BRANCH IF OK
002670  104000                          HLT                     ;FPS NOT EQUAL TO 47400

002672  174167  176104                  STF     1,ANS1          ;STORE RESULT
002676  000406                          BR      O16
002700  040740  000000          N16:    .FLT2   7
002704  040500  000000          M16:    .FLT2   3
002710  041250  000000          AN16:   .FLT2   21.
002714  026767  177770  176060  O16:    CMP     AN16,ANS1       ;CHECK LEFT HALF
002722  001401                          BEQ     .+4
002724  104002                          HLT+2                   ;LEFT HALF IS WRONG
002726  026767  177760  176050          CMP     AN16+2,ANS2     ;CHECK RIGHT HALF
002734  001401                          BEQ     .+4
002736  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************
                                        ;TEST 17                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 4 = 28.
                                        ;    USING AC2    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
002740  104400                                SCOPE
002742  170127  047400                        LDFPS   #47400&57760
002746  172667  000024                        LDF     N17,2           ;LOAD 7 INTO AC17
002752  171267  000024                        MULF    M17,2           ;MULTIPLY 7 BY 4
002756  170200                                STFPS   FPS             ;STORE FLOATING POINT STATUS
002760  022700  047400                        CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
002764  001401                                BEQ     .+4             ;BRANCH IF OK
002766  104000                                HLT                     ;FPS NOT EQUAL TO 47400

002770  174267  176006                        STF     2,ANS1          ;STORE RESULT
002774  000406                                BR      017
002776  040740  000000              N17:      .FLT2   7
003002  040600  000000              M17:      .FLT2   4
003006  041340  000000              AN17:     .FLT2   28.             ;RESULT = 28.
003012  026767  177770  175762      017:      CMP     AN17,ANS1       ;CHECK LEFT HALF
003020  001401                                BEQ     .+4
003022  104002                                HLT+2                   ;LEFT HALF IS WRONG
003024  026767  177760  175752                CMP     AN17+2,ANS2     ;CHECK RIGHT HALF
003032  001401                                BEQ     .+4
003034  104002                                HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************
                                        ;TEST 20                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 5 = 35.
                                        ;    USING AC1    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
003036  104400                                SCOPE
003040  170127  047400                        LDFPS   #47400&57760
003044  172567  000024                        LDF     N20,1           ;LOAD 7 INTO AC20
003050  171167  000024                        MULF    M20,1           ;MULTIPLY 7 BY 5
003054  170200                                STFPS   FPS             ;STORE FLOATING POINT STATUS
003056  022700  047400                        CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003062  001401                                BEQ     .+4             ;BRANCH IF OK
003064  104000                                HLT                     ;FPS NOT EQUAL TO 47400

003066  174167  175710                        STF     1,ANS1          ;STORE RESULT
003072  000406                                BR      020
003074  040740  000000              N20:      .FLT2   7
003100  040640  000000              M20:      .FLT2   5
003104  041414  000000              AN20:     .FLT2   35.             ;RESULT = 35.
003110  026767  177770  175664      020:      CMP     AN20,ANS1       ;CHECK LEFT HALF
003116  001401                                BEQ     .+4
003120  104002                                HLT+2                   ;LEFT HALF IS WRONG
003122  026767  177760  175654                CMP     AN20+2,ANS2     ;CHECK RIGHT HALF
003130  001401                                BEQ     .+4
003132  104002                                HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************
                                        ;TEST 21                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 6 = 42.
                                        ;    USING AC3    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
003134  104400                          SCOPE
003136  170127  047400                  LDFPS   #47400&57760
003142  172767  000024                  LDF     N21,3           ;LOAD 7 INTO AC21
003146  171367  000024                  MULF    M21,3           ;MULTIPLY 7 BY 6
003152  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003154  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003160  001401                          BEQ     .+4             ;BRANCH IF OK
003162  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003164  174367  175612                  STF     3,ANS1          ;STORE RESULT
003170  000406                          BR      021
003172  040740  000000          N21:    .FLT2   7
003176  040700  000000          M21:    .FLT2   6
003202  041450  000000          AN21:   .FLT2   42.             ;RESULT = 42.
003206  026767  177770  175566  021:    CMP     AN21,ANS1       ;CHECK LEFT HALF
003214  001401                          BEQ     .+4
003216  104002                          HLT+2                   ;LEFT HALF IS WRONG
003220  026767  177760  175556          CMP     AN21+2,ANS2     ;CHECK RIGHT HALF
003226  001401                          BEQ     .+4
003230  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                        ;*****************************************************************
                                        ;TEST 22                TEST OF MULF FPU INSTRUCTION
                                        ;    7 * 7 = 49.
                                        ;    USING AC1    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
003232  104400                          SCOPE
003234  170127  047400                  LDFPS   #47400&57760
003240  172567  000024                  LDF     N22,1           ;LOAD 7 INTO AC22
003244  171167  000024                  MULF    M22,1           ;MULTIPLY 7 BY 7
003250  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003252  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003256  001401                          BEQ     .+4             ;BRANCH IF OK
003260  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003262  174167  175514                  STF     1,ANS1          ;STORE RESULT
003266  000406                          BR      022
003270  040740  000000          N22:    .FLT2   7
003274  040740  000000          M22:    .FLT2   7
003300  041504  000000          AN22:   .FLT2   49.             ;RESULT = 49.
003304  026767  177770  175470  022:    CMP     AN22,ANS1       ;CHECK LEFT HALF
003312  001401                          BEQ     .+4
003314  104002                          HLT+2                   ;LEFT HALF IS WRONG
003316  026767  177760  175460          CMP     AN22+2,ANS2     ;CHECK RIGHT HALF
003324  001401                          BEQ     .+4
003326  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 23                TEST OF MULF FPU INSTRUCTION
                                ;    5 * 6 = 30.
                                ;    USING AC1    FPS = 47400    FEC = N/A
                                ;*****************************************************************
003330  104400                          SCOPE
003332  170127  047400                  LDFPS   #47400&57760
003336  172567  000024                  LDF     N23,1           ;LOAD 5 INTO AC23
003342  171167  000024                  MULF    M23,1           ;MULTIPLY 5 BY 6
003346  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003350  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003354  001401                          BEQ     .+4             ;BRANCH IF OK
003356  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003360  174167  175416                  STF     1,ANS1          ;STORE RESULT
003364  000406                          BR      023
003366  040640  000000          N23:    .FLT2   5
003372  040700  000000          M23:    .FLT2   6
003376  041360  000000          AN23:   .FLT2   30.             ;RESULT = 30.
003402  026767  177770  175372  023:    CMP     AN23,ANS1       ;CHECK LEFT HALF
003410  001401                          BEQ     .+4
003412  104002                          HLT+2                   ;LEFT HALF IS WRONG
003414  026767  177760  175362          CMP     AN23+2,ANS2     ;CHECK RIGHT HALF
003422  001401                          BEQ     .+4
003424  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 24                TEST OF MULF FPU INSTRUCTION
                                ;    4 * 6 = 24.
                                ;    USING AC1    FPS = 47400    FEC = N/A
                                ;*****************************************************************
003426  104400                          SCOPE
003430  170127  047400                  LDFPS   #47400&57760
003434  172567  000024                  LDF     N24,1           ;LOAD 4 INTO AC24
003440  171167  000024                  MULF    M24,1           ;MULTIPLY 4 BY 6
003444  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003446  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003452  001401                          BEQ     .+4             ;BRANCH IF OK
003454  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003456  174167  175320                  STF     1,ANS1          ;STORE RESULT
003462  000406                          BR      024
003464  040600  000000          N24:    .FLT2   4
003470  040700  000000          M24:    .FLT2   6
003474  041300  000000          AN24:   .FLT2   24.             ;RESULT = 24.
003500  026767  177770  175274  024:    CMP     AN24,ANS1       ;CHECK LEFT HALF
003506  001401                          BEQ     .+4
003510  104002                          HLT+2                   ;LEFT HALF IS WRONG
003512  026767  177760  175264          CMP     AN24+2,ANS2     ;CHECK RIGHT HALF
003520  001401                          BEQ     .+4
003522  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 25                TEST OF MULF FPU INSTRUCTION
                                ;    3 * 6 = 18.
                                ;    USING AC2    FPS = 47400    FEC = N/A
                                ;*****************************************************************
003524  104400                          SCOPE
003526  170127  047400                  LDFPS   #47400&57760
003532  172667  000024                  LDF     N25,2           ;LOAD 3 INTO AC25
003536  171267  000024                  MULF    M25,2           ;MULTIPLY 3 BY 6
003542  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003544  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003550  001401                          BEQ     .+4             ;BRANCH IF OK
003552  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003554  174267  175222                  STF     2,ANS1          ;STORE RESULT
003560  000406                          BR      025
003562  040500  000000          N25:    .FLT2   3
003566  040700  000000          M25:    .FLT2   6
003572  041220  000000          AN25:   .FLT2   18.             ;RESULT = 18.
003576  026767  177770  175176  025:    CMP     AN25,ANS1       ;CHECK LEFT HALF
003604  001401                          BEQ     .+4
003606  104002                          HLT+2                   ;LEFT HALF IS WRONG
003610  026767  177760  175166          CMP     AN25+2,ANS2     ;CHECK RIGHT HALF
003616  001401                          BEQ     .+4
003620  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 26                TEST OF MULF FPU INSTRUCTION
                                ;    6 * 2 = 12.
                                ;    USING AC3    FPS = 47400    FEC = N/A
                                ;*****************************************************************
003622  104400                          SCOPE
003624  170127  047400                  LDFPS   #47400&57760
003630  172767  000024                  LDF     N26,3           ;LOAD 6 INTO AC26
003634  171367  000024                  MULF    M26,3           ;MULTIPLY 6 BY 2
003640  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003642  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003646  001401                          BEQ     .+4             ;BRANCH IF OK
003650  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003652  174367  175124                  STF     3,ANS1          ;STORE RESULT
003656  000406                          BR      026
003660  040700  000000          N26:    .FLT2   6
003664  040400  000000          M26:    .FLT2   2
003670  041100  000000          AN26:   .FLT2   12.             ;RESULT = 12.
003674  026767  177770  175100  026:    CMP     AN26,ANS1       ;CHECK LEFT HALF
003702  001401                          BEQ     .+4
003704  104002                          HLT+2                   ;LEFT HALF IS WRONG
003706  026767  177760  175070          CMP     AN26+2,ANS2     ;CHECK RIGHT HALF
003714  001401                          BEQ     .+4
003716  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                ;*****************************************************************
                                ;TEST 27                TEST OF MULF FPU INSTRUCTION
                                ;    5 * 2 = 10.
                                ;    USING AC3    FPS = 47400    FEC = N/A
                                ;*****************************************************************
003720  104400                          SCOPE
003722  170127  047400                  LDFPS   #47400&57760
003726  172767  000024                  LDF     N27,3           ;LOAD 5 INTO AC27
003732  171367  000024                  MULF    M27,3           ;MULTIPLY 5 BY 2
003736  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
003740  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
003744  001401                          BEQ     .+4             ;BRANCH IF OK
003746  104000                          HLT                     ;FPS NOT EQUAL TO 47400

003750  174367  175026                  STF     3,ANS1          ;STORE RESULT
003754  000406                          BR      027
003756  040640  000000          N27:    .FLT2   5
003762  040400  000000          M27:    .FLT2   2
003766  041040  000000          AN27:   .FLT2   10.             ;RESULT = 10.
003772  026767  177770  175002  027:    CMP     AN27,ANS1       ;CHECK LEFT HALF
004000  001401                          BEQ     .+4
004002  104002                          HLT+2                   ;LEFT HALF IS WRONG
004004  026767  177760  174772          CMP     AN27+2,ANS2     ;CHECK RIGHT HALF
004012  001401                          BEQ     .+4
004014  104002                          HLT+2                   ;RIGHT HALF IS WRONG

                                ;*****************************************************************
                                ;TEST 30                TEST OF MULF FPU INSTRUCTION
                                ;    5 * 3 = 15.
                                ;    USING AC2    FPS = 47400    FEC = N/A
                                ;*****************************************************************
004016  104400                          SCOPE
004020  170127  047400                  LDFPS   #47400&57760
004024  172667  000024                  LDF     N30,2           ;LOAD 5 INTO AC30
004030  171267  000024                  MULF    M30,2           ;MULTIPLY 5 BY 3
004034  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
004036  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
004042  001401                          BEQ     .+4             ;BRANCH IF OK
004044  104000                          HLT                     ;FPS NOT EQUAL TO 47400

004046  174267  174730                  STF     2,ANS1          ;STORE RESULT
004052  000406                          BR      030
004054  040640  000000          N30:    .FLT2   6
004060  040500  000000          M30:    .FLT2   3
004064  041160  000000          AN30:   .FLT2   15.             ;RESULT = 15.
004070  026767  177770  174704  030:    CMP     AN30,ANS1       ;CHECK LEFT HALF
004076  001401                          BEQ     .+4
004100  104002                          HLT+2                   ;LEFT HALF IS WRONG
004102  026767  177760  174674          CMP     AN30+2,ANS2     ;CHECK RIGHT HALF
004110  001401                          BEQ     .+4
004112  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                                        ;*****************************************************************
                                        ;TEST 31                TEST OF MULF FPU INSTRUCTION
                                        ;    5 * 4 = 20.
                                        ;    USING AC1    FPS = 47400    FEC = N/A
                                        ;*****************************************************************
004114  104400                          SCOPE
004116  170127  047400                  LDFPS   #47400&57760
004122  172567  000024                  LDF     N31,1           ;LOAD 5 INTO AC31
004126  171167  000024                  MULF    M31,1           ;MULTIPLY 5 BY 4
004132  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
004134  022700  047400                  CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
004140  001401                          BEQ     .+4             ;BRANCH IF OK
004142  104000                          HLT                     ;FPS NOT EQUAL TO 47400

004144  174167  174632                  STF     1,ANS1          ;STORE RESULT
004150  000406                          BR      031
004152  040640  000000          N31:    .FLT2   5
004156  040600  000000          M31:    .FLT2   4
004162  041240  000000          AN31:   .FLT2   20.             ;RESULT = 20.
004166  026767  177770  174606  031:    CMP     AN31,ANS1       ;CHECK LEFT HALF
004174  001401                          BEQ     .+4
004176  104002                          HLT+2                   ;LEFT HALF IS WRONG
004200  026767  177760  174576          CMP     AN31+2,ANS2     ;CHECK RIGHT HALF
004206  001401                          BEQ     .+4
004210  104002                          HLT+2                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 32                TEST OF MULD FPU INSTRUCTION
                        ;    0 * 0 = 0
                        ;    USING AC0    FPS = 47604    FEC = N/A
                        ;*****************************************************************************

004212  104400                          SCOPE
004214  170127  047600                  LDFPS   #47604&57760
004220  172467  000012                  LDD     N32,0           ;LOAD 0 INTO AC0
004224  171067  000016                  MULD    M32,0           ;MULTIPLY 0 BY 0
004230  174067  174546                  STD     0,ANS1          ;STORE RESULT
004234  000414                          BR      .32

004236  000000  000000  000000  N32:    .FLT4   0
004244  000000
004246  000000  000000  000000  M32:    .FLT4   0
004254  000000
004256  000000  000000  000000  AN32:   .FLT4   0
004264  000000

004266  026767  177764  174506  032:    CMP     AN32,ANS1       ;CHECK LEFT HALF
004274  001401                          BEQ     .+4
004276  104004                          HLT+4                   ;LEFT HALF IS WRONG

004300  026767  177754  174476          CMP     AN32+2,ANS2     ;CHECK LEFT HALF
004306  001401                          BEQ     .+4
004310  104004                          HLT+4                   ;LEFT HALF IS WRONG

004312  026767  177744  174466          CMP     AN32+4,ANS3     ;CHECK RIGHT HALF
004320  001401                          BEQ     .+4
004322  104004                          HLT+4                   ;RIGHT HALF IS WRONG

004324  026767  177734  174456          CMP     AN32+6,ANS4     ;CHECK RIGHT HALF
004332  001401                          BEQ     .+4
004334  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 33                TEST OF MULD FPU INSTRUCTION
                        ;    0 * 1. = 0
                        ;    USING AC0    FPS = 47604    FEC = N/A
                        ;*****************************************************************

004336  104400                          SCOPE
004340  170127  047600                  LDFPS   #47604&57760
004344  172467  000012                  LDD     N33,0           ;LOAD 0 INTO AC0
004350  171067  000016                  MULD    M33,0           ;MULTIPLY 0 BY 1.
004354  174067  174422                  STD     0,ANS1          ;STORE RESULT
004360  000414                          BR      033

004362  000000  000000  000000  N33:    .FLT4   0
004370  000000
004372  040200  000000  000000  M33:    .FLT4   1.
004400  000000
004402  000000  000000  000000  AN33:   .FLT4   0
004410  000000

004412  026767  177764  174362  033:    CMP     AN33,ANS1       ;CHECK LEFT HALF
004420  001401                          BEQ     .+4
004422  104004                          HLT+4                   ;LEFT HALF IS WRONG

004424  026767  177754  174352          CMP     AN33+2,ANS2     ;CHECK LEFT HALF
004432  001401                          BEQ     .+4
004434  104004                          HLT+4                   ;LEFT HALF IS WRONG

004436  026767  177744  174342          CMP     AN33+4,ANS3     ;CHECK RIGHT HALF
004444  001401                          BEQ     .+4
004446  104004                          HLT+4                   ;RIGHT HALF IS WRONG

004450  026767  177734  174332          CMP     AN33+6,ANS4     ;CHECK RIGHT HALF
004456  001401                          BEQ     .+4
004460  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 34                TEST OF MULD FPU INSTRUCTION
                        ;    1. * 1. = 1.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

004462  104400                          SCOPE
004464  170127  047600                  LDFPS   #47600&57760
004470  172467  000012                  LDD     N34,0           ;LOAD 1. INTO AC0
004474  171067  000016                  MULD    M34,0           ;MULTIPLY 1. BY 1.
004500  174067  174276                  STD     0,ANS1          ;STORE RESULT
004504  000414                          BR      034

004506  040200  000000  000000  N34:    .FLT4   1.
004514  000000
004516  040200  000000  000000  M34:    .FLT4   1.
004524  000000
004526  040200  000000  000000  AN34:   .FLT4   1.
004534  000000

004536  026767  177764  174236  034:    CMP     AN34,ANS1       ;CHECK LEFT HALF
004544  001401                          BEQ     .+4
004546  104004                          HLT+4                   ;LEFT HALF IS WRONG

004550  026767  177754  174226          CMP     AN34+2,ANS2     ;CHECK LEFT HALF
004556  001401                          BEQ     .+4
004560  104004                          HLT+4                   ;LEFT HALF IS WRONG

004562  026767  177744  174216          CMP     AN34+4,ANS3     ;CHECK RIGHT HALF
004570  001401                          BEQ     .+4
004572  104004                          HLT+4                   ;RIGHT HALF IS WRONG

004574  026767  177734  174206          CMP     AN34+6,ANS4     ;CHECK RIGHT HALF
004602  001401                          BEQ     .+4
004604  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 35                TEST OF MULD FPU INSTRUCTION
                        ;   -1. * 1. = -1.
                        ;   USING AC0    FPS = 47610    FEC = N/A
                        ;*****************************************************************

004606  104400                    SCOPE
004610  170127  047600            LDFPS   #47610&57760
004614  172467  000012            LDD     N35,0           ;LOAD -1. INTO AC0
004620  171067  000016            MULD    M35,0           ;MULTIPLY -1. BY 1.
004624  174067  174152            STD     0,ANS1          ;STORE RESULT
004630  000414                    BR      .35

004632  140200  000000  000000  N35:    .FLT4   -1.
004640  000000
004642  040200  000000  000000  M35:    .FLT4   1.
004650  000000
004652  140200  000000  000000  AN35:   .FLT4   -1.
004660  000000

004662  026767  177764  174112  035:    CMP     AN35,ANS1       ;CHECK LEFT HALF
004670  001401                    BEQ     .+4
004672  104004                    HLT+4                   ;LEFT HALF IS WRONG

004674  026767  177754  174102          CMP     AN35+2,ANS2     ;CHECK LEFT HALF
004702  001401                    BEQ     .+4
004704  104004                    HLT+4                   ;LEFT HALF IS WRONG

004706  026767  177744  174072          CMP     AN35+4,ANS3     ;CHECK RIGHT HALF
004714  001401                    BEQ     .+4
004716  104004                    HLT+4                   ;RIGHT HALF .S WRONG

004720  026767  177734  174062          CMP     AN35+6,ANS4     ;CHECK RIGHT HALF
004726  001401                    BEQ     .+4
004730  104004                    HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 36                TEST OF MULD FPU INSTRUCTION
                        ;     1. * -1. = -1.
                        ;     USING ACD    FPS = 47610    FEC = N/A
                        ;*****************************************************************

004732  104400                        SCOPE
004734  170127  047600                LDFPS   #47610&57760
004740  172467  000012                LDD     N36,0           ;LOAD 1. INTO ACD
004744  171067  000016                MULD    M36,0           ;MULTIPLY 1. BY -1.
004750  174067  174026                STD     0,ANS1          ;STORE RESULT
004754  000414                        BR      036

004756  040200  000000  000000  N36:  .FLT4   1.
004764  000000
004766  140200  000000  000000  M36:  .FLT4   -1.
004774  000000
004776  140200  000000  000000  AN36: .FLT4   -1.
005004  000000

005006  026767  177764  173766  036:  CMP     AN36,ANS1       ;CHECK LEFT HALF
005014  001401                        BEQ     .+4
005016  104004                        HLT+4                   ;LEFT HALF IS WRONG

005020  026767  177754  173756        CMP     AN36+2,ANS2     ;CHECK LEFT HALF
005026  001401                        BEQ     .+4
005030  104004                        HLT+4                   ;LEFT HALF IS WRONG

005032  026767  177744  173746        CMP     AN36+4,ANS3     ;CHECK RIGHT HALF
005040  001401                        BEQ     .+4
005042  104004                        HLT+4                   ;RIGHT HALF IS WRONG

005044  026767  177734  173736        CMP     AN36+6,ANS4     ;CHECK RIGHT HALF
005052  001401                        BEQ     .+4
005054  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 37                TEST OF MULD FPU INSTRUCTION
                        ;    -1. * -1. = 1.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005056  104400                    SCOPE
005060  170127  047600            LDFPS   #47600B57760
005064  172467  000012            LDD     N37,0           ;LOAD -1. INTO AC0
005070  171067  000016            MULD    M37,0           ;MULTIPLY -1. BY -1.
005074  174067  173702            STD     0,ANS1          ;STORE RESULT
005100  000414                    BR      037

005102  140200  000000  000000  N37:    .FLT4   -1.
005110  000000
005112  140200  000000  000000  M37:    .FLT4   -1.
005120  000000
005122  040200  000000  000000  AN37:   .FLT4   1.
005130  000000

005132  026767  177764  173642  037:    CMP     AN37,ANS1       ;CHECK LEFT HALF
005140  001401                    BEQ     .+4
005142  104004                    HLT+4                   ;LEFT HALF IS WRONG

005144  026767  177754  173632            CMP     AN37+2,ANS2     ;CHECK LEFT HALF
005152  001401                    BEQ     .+4
005154  104004                    HLT+4                   ;LEFT HALF IS WRONG

005156  026767  177744  173622            CMP     AN37+4,ANS3     ;CHECK RIGHT HALF
005164  001401                    BEQ     .+4
005166  104004                    HLT+4                   ;RIGHT HALF IS WRONG

005170  026767  177734  173612            CMP     AN37+6,ANS4     ;CHECK RIGHT HALF
005176  001401                    BEQ     .+4
005200  104004                    HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 40                TEST OF MULD FPU INSTRUCTION
                        ;    2 * 1 = 2
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005202  104400                          SCOPE
005204  170127  047600                  LDFPS   #47600&57760
005210  172467  000012                  LDD     N40,0           ;LOAD 2 INTO AC0
005214  171067  000016                  MULD    M40,0           ;MULTIPLY 2 BY 1
005220  174067  173556                  STD     0,ANS1          ;STORE RESULT
005224  000414                          BR      040

005226  040400  000000  000000  N40:    .FLT4   2
005234  000000
005236  040200  000000  000000  M40:    .FLT4   1
005244  000000
005246  040400  000000  000000  AN40:   .FLT4   2
005254  000000

005256  026767  177764  173516  040:    CMP     AN40,ANS1       ;CHECK LEFT HALF
005264  001401                          BEQ     .+4
005266  104004                          HLT+4                   ;LEFT HALF IS WRONG

005270  026767  177754  173506          CMP     AN40+2,ANS2     ;CHECK LEFT HALF
005276  001401                          BEQ     .+4
005300  104004                          HLT+4                   ;LEFT HALF IS WRONG

005302  026767  177744  173476          CMP     AN40+4,ANS3     ;CHECK RIGHT HALF
005310  001401                          BEQ     .+4
005312  104004                          HLT+4                   ;RIGHT HALF IS WRONG

005314  026767  177734  173466          CMP     AN40+6,ANS4     ;CHECK RIGHT HALF
005322  001401                          BEQ     .+4
005324  104004                          HLT+4                   ;RIGHT HALF IS WRONG
...
```

```
                        ;*****************************************************************
                        ;TEST 41                    TEST OF MULD FPU INSTRUCTION
                        ;    3 * 1 = 3
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005326  104400                        SCOPE
005330  170127  047600                LDFPS   #47600&57760
005334  172467  000012                LDD     N41,0           ;LOAD 3 INTO AC0
005340  171067  000016                MULD    M41,0           ;MULTIPLY 3 BY 1
005344  174067  173432                STD     0,ANS1          ;STORE RESULT
005350  000414                        BR      041

005352  040500  000000  000000  N41:  .FLT4   3
005360  000000
005362  040200  000000  000000  M41:  .FLT4   1
005370  000000
005372  040500  000000  000000  AN41: .FLT4   3
005400  000000

005402  026767  177764  173372  041:  CMP     AN41,ANS1       ;CHECK LEFT HALF
005410  001401                        BEQ     .+4
005412  104004                        HLT+4                   ;LEFT HALF IS WRONG

005414  026767  177754  173362        CMP     AN41+2,ANS2     ;CHECK LEFT HALF
005422  001401                        BEQ     .+4
005424  104004                        HLT+4                   ;LEFT HALF IS WRONG

005426  026767  177744  173352        CMP     AN41+4,ANS3     ;CHECK RIGHT HALF
005434  001401                        BEQ     .+4
005436  104004                        HLT+4                   ;RIGHT HALF IS WRONG

005440  026767  177734  173342        CMP     AN41+6,ANS4     ;CHECK RIGHT HALF
005446  001401                        BEQ     .+4
005450  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 42                    TEST OF MULD FPU INSTRUCTION
                        ;    4 * 1 = 4
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005452  104400                    SCOPE
005454  170127  047600            LDFPS   #47600&57760
005460  172467  000012            LDD     N42,0           ;LOAD 4 INTO AC0
005464  171067  000016            MULD    M42,0           ;MULTIPLY 4 BY 1
005470  174067  173306            STD     0,ANS1          ;STORE RESULT
005474  000414                    BR      042

005476  040600  000000  000000  N42:    .FLT4   4
005504  000000
005506  040200  000000  000000  M42:    .FLT4   1
005514  000000
005516  040600  000000  000000  AN42:   .FLT4   4
005524  000000

005526  026767  177764  173246  042:    CMP     AN42,ANS1       ;CHECK LEFT HALF
005534  001401                   BEQ     .+4
005536  104004                   HLT+4                   ;LEFT HALF IS WRONG

005540  026767  177754  173236           CMP     AN42+2,ANS2     ;CHECK LEFT HALF
005546  001401                   BEQ     .+4
005550  104004                   HLT+4                   ;LEFT HALF IS WRONG

005552  026767  177744  173226           CMP     AN42+4,ANS3     ;CHECK RIGHT HALF
005560  001401                   BEQ     .+4
005562  104004                   HLT+4                   ;RIGHT HALF IS WRONG

005564  026767  177734  173216           CMP     AN42+6,ANS4     ;CHECK RIGHT HALF
005572  001401                   BEQ     .+4
005574  104004                   HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 43                TEST OF MULD FPU INSTRUCTION
                        ;    5 * 1 = 5
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005576  104400                          SCOPE
005600  170127  047600                  LDFPS   #47600&57760
005604  172467  000012                  LDD     N43,0           ;LOAD 5 INTO AC0
005610  171067  000016                  MULD    M43,0           ;MULTIPLY 5 BY 1
005614  174067  173162                  STD     0,ANS1          ;STORE RESULT
005620  000414                          BR      043

005622  040640  000000  000000  N43:    .FLT4   5
005630  000000
005632  040200  000000  000000  M43:    .FLT4   1
005640  000000
005642  040640  000000  000000  AN43:   .FLT4   5
005650  000000

005652  026767  177764  173122  043:    CMP     AN43,ANS1       ;CHECK LEFT HALF
005660  001401                          BEQ     .+4
005662  104004                          HLT+4                   ;LEFT HALF IS WRONG

005664  026767  177754  173112          CMP     AN43+2,ANS2     ;CHECK LEFT HALF
005672  001401                          BEQ     .+4
005674  104004                          HLT+4                   ;LEFT HALF IS WRONG

005676  026767  177744  173102          CMP     AN43+4,ANS3     ;CHECK RIGHT HALF
005704  001401                          BEQ     .+4
005706  104004                          HLT+4                   ;RIGHT HALF IS WRONG

005710  026767  177734  173072          CMP     AN43+6,ANS4     ;CHECK RIGHT HALF
005716  001401                          BEQ     .+4
005720  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 44                TEST OF MULD FPU INSTRUCTION
                        ;    6 * 1 = 6
                        ;    USING AC1    FPS = 47600    FEC = N/A
                        ;*****************************************************************

005722  104400                        SCOPE
005724  170127  047600                LDFPS   #47600&57760
005730  172567  000012                LDD     N44,1           ;LOAD 6 INTO AC1
005734  171167  000016                MULD    M44,1           ;MULTIPLY 6 BY 1
005740  174167  173036                STD     1,ANS1          ;STORE RESULT
005744  000414                        BR      044

005746  040700  000000  000000  N44:  .FLT4   6
005754  000000
005756  040200  000000  000000  M44:  .FLT4   1
005764  000000
005766  040700  000000  000000  AN44: .FLT4   6
005774  000000

005776  026767  177764  172776  044:  CMP     AN44,ANS1       ;CHECK LEFT HALF
006004  001401                        BEQ     .+4
006006  104004                        HLT+4                   ;LEFT HALF IS WRONG

006010  026767  177754  172766        CMP     AN44+2,ANS2     ;CHECK LEFT HALF
006016  001401                        BEQ     .+4
006020  104004                        HLT+4                   ;LEFT HALF IS WRONG

006022  026767  177744  172756        CMP     AN44+4,ANS3     ;CHECK RIGHT HALF
006030  001401                        BEQ     .+4
006032  104004                        HLT+4                   ;RIGHT HALF IS WRONG

006034  026767  177734  172746        CMP     AN44+6,ANS4     ;CHECK RIGHT HALF
006042  001401                        BEQ     .+4
006044  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 45                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 1 = 7
                        ;    USING AC3    FPS = 47600    FEC = N/A
                        ;*****************************************************************

006046  104400                          SCOPE
006050  170127  047600                  LDFPS   #47600&57760
006054  172767  000012                  LDD     N45,3           ;LOAD 7 INTO AC3
006060  171367  000016                  MULD    M45,3           ;MULTIPLY 7 BY 1
006064  174367  172712                  STD     3,ANS1          ;STORE RESULT
006070  000414                          BR      045

006072  040740  000000  000000  N45:    .FLT4   7
006100  000000
006102  040200  000000  000000  M45:    .FLT4   1
006110  000000
006112  040740  000000  000000  AN45:   .FLT4   7
006120  000000

006122  026767  177764  172652  045:    CMP     AN45,ANS1       ;CHECK LEFT HALF
006130  001401                          BEQ     .+4
006132  104004                          HLT+4                   ;LEFT HALF IS WRONG

006134  026767  177754  172642          CMP     AN45+2,ANS2     ;CHECK LEFT HALF
006142  001401                          BEQ     .+4
006144  104004                          HLT+4                   ;LEFT HALF IS WRONG

006146  026767  177744  172632          CMP     AN45+4,ANS3     ;CHECK RIGHT HALF
006154  001401                          BEQ     .+4
006156  104004                          HLT+4                   ;RIGHT HALF IS WRONG

006160  026767  177734  172622          CMP     AN45+6,ANS4     ;CHECK RIGHT HALF
006166  001401                          BEQ     .+4
006170  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 46                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 2 = 14.
                        ;    USING AC2    FPS = 47600    FEC = N/A
                        ;*****************************************************************

006172  104400                      SCOPE
006174  170127  047600              LDFPS   #47600&57760
006200  172667  000012              LDD     N46,2           ;LOAD 7 INTO AC2
006204  171267  000016              MULD    M46,2           ;MULTIPLY 7 BY 2
006210  174267  172566              STD     2,ANS1          ;STORE RESULT
006214  000414                      BR      046

006216  040740  000000  000000  N46:    .FLT4   7
006224  000000
006226  040400  000000  000000  M46:    .FLT4   2
006234  000000
006236  041140  000000  000000  AN46:   .FLT4   14.
006244  000000

006246  026767  177764  172526  046:    CMP     AN46,ANS1       ;CHECK LEFT HALF
006254  001401                      BEQ     .+4
006256  104004                      HLT+4                   ;LEFT HALF IS WRONG

006260  026767  177754  172516          CMP     AN46+2,ANS2     ;CHECK LEFT HALF
006266  001401                      BEQ     .+4
006270  104004                      HLT+4                   ;LEFT HALF IS WRONG

006272  026767  177744  172506          CMP     AN46+4,ANS3     ;CHECK RIGHT HALF
006300  001401                      BEQ     .+4
006302  104004                      HLT+4                   ;RIGHT HALF IS WRONG

006304  026767  177734  172476          CMP     AN46+6,ANS4     ;CHECK RIGHT HALF
006312  001401                      BEQ     .+4
006314  104004                      HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 47                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 3 = 21.
                        ;    USING AC2    FPS = 47600    FEC = N/A
                        ;*****************************************************************************

006316  104400                        SCOPE
006320  170127  047600                LDFPS   #47600&57760
006324  172667  000012                LDD     N47,2           ;LOAD 7 INTO AC2
006330  171267  000016                MULD    M47,2           ;MULTIPLY 7 BY 3
006334  174267  172442                STD     2,ANS1          ;STORE RESULT
006340  000414                        BR      047

006342  040740  000000  000000  N47:  .FLT4   7
006350  000000
006352  040500  000000  000000  M47:  .FLT4   3
006360  000000
006362  041250  000000  000000  AN47: .FLT4   21.
006370  000000

006372  026767  177764  172402  047:  CMP     AN47,ANS1       ;CHECK LEFT HALF
006400  001401                        BEQ     .+4
006402  104004                        HLT+4                   ;LEFT HALF IS WRONG

006404  026767  177754  172372        CMP     AN47+2,ANS2     ;CHECK LEFT HALF
006412  001401                        BEQ     .+4
006414  104004                        HLT+4                   ;LEFT HALF IS WRONG

006416  026767  177744  172362        CMP     AN47+4,ANS3     ;CHECK RIGHT HALF
006424  001401                        BEQ     .+4
006426  104004                        HLT+4                   ;RIGHT HALF IS WRONG

006430  026767  177734  172352        CMP     AN47+6,ANS4     ;CHECK RIGHT HALF
006436  001401                        BEQ     .+4
006440  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 50                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 4 = 28.
                        ;    USING AC3    FPS = 47600    FEC = N/A
                        ;*****************************************************************

006442  104400                        SCOPE
006444  170127  047600                LDFPS   #47600&57760
006450  172767  000012                LDD     N50,3           ;LOAD 7 INTO AC3
006454  171367  000016                MULD    M50,3           ;MULTIPLY 7 BY 4
006460  174367  172316                STD     3,ANS1          ;STORE RESULT
006464  000414                        BR      050

006466  040740  000000  000000  N50:  .FLT4   7
006474  000000
006476  040600  000000  000000  M50:  .FLT4   4
006504  000000
006506  041340  000000  000000  AN50: .FLT4   28.
006514  000000

006516  026767  177764  172256  050:  CMP     AN50,ANS1       ;CHECK LEFT HALF
006524  001401                        BEQ     .+4
006526  104004                        HLT+4                   ;LEFT HALF IS WRONG

006530  026767  177754  172246        CMP     AN50+2,ANS2     ;CHECK LEFT HALF
006536  001401                        BEQ     .+4
006540  104004                        HLT+4                   ;LEFT HALF IS WRONG

006542  026767  177744  172236        CMP     AN50+4,ANS3     ;CHECK RIGHT HALF
006550  001401                        BEQ     .+4
006552  104004                        HLT+4                   ;RIGHT HALF IS WRONG

006554  026767  177734  172226        CMP     AN50+6,ANS4     ;CHECK RIGHT HALF
006562  001401                        BEQ     .+4
006564  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 51                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 5 = 35.
                        ;    USING AC1    FPS = 47600    FEC = N/A
                        ;*****************************************************************

006566  104400                        SCOPE
006570  170127  047600                LDFPS   #47600&57760
006574  172567  000012                LDD     N51,1           ;LOAD 7 INTO AC1
006600  171167  000016                MULD    M51,1           ;MULTIPLY 7 BY 5
006604  174167  172172                STD     1,ANS1          ;STORE RESULT
006610  000414                        BR      051

006612  040740  000000  000000  N51:  .FLT4   7
006620  000000
006622  040640  000000  000000  M51:  .FLT4   5
006630  000000
006632  041414  000000  000000  ANS1: .FLT4   35.
006640  000000

006642  026767  177764  172132  051:  CMP     AN51,ANS1       ;CHECK LEFT HALF
006650  001401                        BEQ     .+4
006652  104004                        HLT+4                   ;LEFT HALF IS WRONG

006654  026767  177754  172122        CMP     AN51+2,ANS2     ;CHECK LEFT HALF
006662  001401                        BEQ     .+4
006664  104004                        HLT+4                   ;LEFT HALF IS WRONG

006666  026767  177744  172112        CMP     AN51+4,ANS3     ;CHECK RIGHT HALF
006674  001401                        BEQ     .+4
006676  104004                        HLT+4                   ;RIGHT HALF IS WRONG

006700  026767  177734  172102        CMP     AN51+6,ANS4     ;CHECK RIGHT HALF
006706  001401                        BEQ     .+4
006710  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 52                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 6 = 42.
                        ;    USING AC1    FPS = 47600    FEC = N/A
                        ;*****************************************************************

006712  104400                        SCOPE
006714  170127  047600                LDFPS   #47600&57760
006720  172567  000012                LDD     N52,1           ;LOAD 7 INTO AC1
006724  171167  000016                MULD    M52,1           ;MULTIPLY 7 BY 6
006730  174167  172046                STD     1,ANS1          ;STORE RESULT
006734  000414                        BR      052

006736  040740  000000  000000  N52:  .FLT4   7
006744  000000
006746  040700  000000  000000  M52:  .FLT4   6
006754  000000
006756  041450  000000  000000  ANS2: .FLT4   42.
006764  000000

006766  026767  177764  172006  052:  CMP     ANS2,ANS1       ;CHECK LEFT HALF
006774  001401                        BEQ     .+4
006776  104004                        HLT+4                   ;LEFT HALF IS WRONG

007000  026767  177754  171776        CMP     ANS2+2,ANS2     ;CHECK LEFT HALF
007006  001401                        BEQ     .+4
007010  104004                        HLT+4                   ;LEFT HALF IS WRONG

007012  026767  177744  171766        CMP     ANS2+4,ANS3     ;CHECK RIGHT HALF
007020  001401                        BEQ     .+4
007022  104004                        HLT+4                   ;RIGHT HALF IS WRONG

007024  026767  177734  171756        CMP     ANS2+6,ANS4     ;CHECK RIGHT HALF
007032  001401                        BEQ     .+4
007034  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 53                TEST OF MULD FPU INSTRUCTION
                        ;    7 * 7 = 49.
                        ;    USING AC3    FPS = 4760D    FEC = N/A
                        ;*****************************************************************

007036  104400                    SCOPE
007040  170127  047600            LDFPS   #47600&57760
007044  172767  000012            LDD     N53,3           ;LOAD 7 INTO AC3
007050  171367  000016            MULD    M53,3           ;MULTIPLY 7 BY 7
007054  174367  171722            STD     3,ANS1          ;STORE RESULT
007060  000414                    BR      053

007062  040740  000000  000000  N53:    .FLT4   7
007070  000000
007072  040740  000000  000000  M53:    .FLT4   7
007100  000000
007102  041504  000000  000000  AN53:   .FLT4   49.
007110  000000

007112  026767  177764  171662  053:    CMP     AN53,ANS1       ;CHECK LEFT HALF
007120  001401                    BEQ     .+4
007122  104004                    HLT+4                   ;LEFT HALF IS WRONG

007124  026767  177754  171652          CMP     AN53+2,ANS2     ;CHECK LEFT HALF
007132  001401                    BEQ     .+4
007134  104004                    HLT+4                   ;LEFT HALF IS WRONG

007136  026767  177744  171642          CMP     AN53+4,ANS3     ;CHECK RIGHT HALF
007144  001401                    BEQ     .+4
007146  104004                    HLT+4                   ;RIGHT HALF IS WRONG

007150  026767  177734  171632          CMP     AN53+6,ANS4     ;CHECK RIGHT HALF
007156  001401                    BEQ     .+4
007160  104004                    HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 54                    TEST OF MULD FPU INSTRUCTION
                        ;    5 * 6 = 30.
                        ;    USING AC1    FPS = 47600    FEC = N/A
                        ;*****************************************************************

007162  104400                        SCOPE
007164  170127  047600                LDFPS   #47600&57760
007170  172567  000012                LDD     N54,1           ;LOAD 5 INTO AC1
007174  171167  000016                MULD    M54,1           ;MULTIPLY 5 BY 6
007200  174157  171576                STD     1,ANS1          ;STORE RESULT
007204  000414                        BR      054

007206  040640  000000  000000  N54:  .FLT4   5
007214  000000
007216  040700  000000  000000  M54:  .FLT4   6
007224  000000
007226  041360  000000  000000  AN54: .FLT4   30.
007234  000000

007236  026767  177764  171536  054:  CMP     AN54,ANS1       ;CHECK LEFT HALF
007244  001401                        BEQ     .+4
007246  104004                        HLT+4                   ;LEFT HALF IS WRONG

007250  026767  177754  171526        CMP     AN54+2,ANS2     ;CHECK LEFT HALF
007256  001401                        BEQ     .+4
007260  104004                        HLT+4                   ;LEFT HALF IS WRONG

007262  026767  177744  171516        CMP     AN54+4,ANS3     ;CHECK RIGHT HALF
007270  001401                        BEQ     .+4
007272  104004                        HLT+4                   ;RIGHT HALF IS WRONG

007274  026767  177734  171506        CMP     AN54+6,ANS4     ;CHECK RIGHT HALF
007302  001401                        BEQ     .+4
007304  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 55                TEST OF MULD FPU INSTRUCTION
                        ;    4 * 6 = 24.
                        ;    USING AC3    FPS = 47600    FEC = N/A
                        ;*****************************************************************

007306  104400                          SCOPE
007310  170127  047600                  LDFPS   #47600&57760
007314  172767  000012                  LDD     N55,3           ;LOAD 4 INTO AC3
007320  171367  000016                  MULD    M55,3           ;MULTIPLY 4 BY 6
007324  174367  171452                  STD     3,ANS1          ;STORE RESULT
007330  000414                          BR      055

007332  040600  000000  000000  N55:    .FLT4   4
007340  000000
007342  040700  000000  000000  M55:    .FLT4   6
007350  000000
007352  041300  000000  000000  ANS5:   .FLT4   24.
007360  000000

007362  026767  177764  171412  055:    CMP     ANS5,ANS1       ;CHECK LEFT HALF
007370  001401                          BEQ     .+4
007372  104004                          HLT+4                   ;LEFT HALF IS WRONG

007374  026767  177754  171402          CMP     ANS5+2,ANS2     ;CHECK LEFT HALF
007402  001401                          BEQ     .+4
007404  104004                          HLT+4                   ;LEFT HALF IS WRONG

007406  026767  177744  171372          CMP     ANS5+4,ANS3     ;CHECK RIGHT HALF
007414  001401                          BEQ     .+4
007416  104004                          HLT+4                   ;RIGHT HALF IS WRONG

007420  026767  177734  171362          CMP     ANS5+6,ANS4     ;CHECK RIGHT HALF
007426  001401                          BEQ     .+4
007430  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 56                TEST OF MULD FPU INSTRUCTION
                        ;    3 * 6 = 18.
                        ;    USING AC1    FPS = 47600    FEC = N/A
                        ;*****************************************************************

007432  104400                  SCOPE
007434  170127  047600          LDFPS   #47600&57760
007440  172567  000012          LDD     N56,1           ;LOAD 3 INTO AC1
007444  171167  000016          MULD    M56,1           ;MULTIPLY 3 BY 6
007450  174167  171326          STD     1,ANS1          ;STORE RESULT
007454  000414                  BR      .56

007456  040500  000000  000000  N56:    .FLT4   3
007464  000000
007466  040700  000000  000000  M56:    .FLT4   6
007474  000000
007476  041220  000000  000000  AN56:   .FLT4   18.
007504  000000

007506  026767  177764  171266  056:    CMP     AN56,ANS1       ;CHECK LEFT HALF
007514  001401                  BEQ     .+4
007516  104004                  HLT+4                   ;LEFT HALF IS WRONG

007520  026767  177754  171256          CMP     AN56+2,ANS2     ;CHECK LEFT HALF
007526  001401                  BEQ     .+4
007530  104004                  HLT+4                   ;LEFT HALF IS WRONG

007532  026767  177744  171246          CMP     AN56+4,ANS3     ;CHECK RIGHT HALF
007540  001401                  BEQ     .+4
007542  104004                  HLT+4                   ;RIGHT HALF IS WRONG

007544  026767  177734  171236          CMP     AN56+6,ANS4     ;CHECK RIGHT HALF
007552  001401                  BEQ     .+4
007554  104004                  HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 57                TEST OF MULD FPU INSTRUCTION
                        ;    6 * 2 = 12.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

007556  104400                    SCOPE
007560  170127  047600            LDFPS   #47600&57760
007564  172467  000012            LDD     N57,0           ;LOAD 6 INTO AC0
007570  171067  000016            MULD    M57,0           ;MULTIPLY 6 BY 2
007574  174067  171202            STD     0,ANS1          ;STORE RESULT
007600  000414                    BR      .+32

007602  040700  000000  000000  N57:    .FLT4   6
007610  000000
007612  040400  000000  000000  M57:    .FLT4   2
007620  000000
007622  041100  000000  000000  ANS7:   .FLT4   12.
007630  000000

007632  026767  177764  171142  .57:    CMP     ANS7,ANS1       ;CHECK LEFT HALF
007640  001401                  BEQ     .+4
007642  104004                  HLT+4                   ;LEFT HALF IS WRONG

007644  026767  177754  171132          CMP     ANS7+2,ANS2     ;CHECK LEFT HALF
007652  001401                  BEQ     .+4
007654  104004                  HLT+4                   ;LEFT HALF IS WRONG

007656  026767  177744  171122          CMP     ANS7+4,ANS3     ;CHECK RIGHT HALF
007664  001401                  BEQ     .+4
007666  104004                  HLT+4                   ;RIGHT HALF IS WRONG

007670  026767  177734  171112          CMP     ANS7+6,ANS4     ;CHECK RIGHT HALF
007676  001401                  BEQ     .+4
007700  104004                  HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 60                    TEST OF MULD FPU INSTRUCTION
                        ;    5 * 2 = 10.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************************

007702  104400                        SCOPE
007704  170127  047600                LDFPS   #47600&57760
007710  172467  000012                LDD     N60,0           ;LOAD 5 INTO AC0
007714  171067  000016                MULD    M60,0           ;MULTIPLY 5 BY 2
007720  174067  171056                STD     0,ANS1          ;STORE RESULT
007724  000414                        BR      060

007726  040640  000000  000000  N60:  .FLT4   5
007734  000000
007736  040400  000000  000000  M60:  .FLT4   2
007744  000000
007746  041040  000000  000000  AN60: .FLT4   10.
007754  000000

007756  026767  177764  171016  060:  CMP     AN60,ANS1       ;CHECK LEFT HALF
007764  001401                        BEQ     .+4
007766  104004                        HLT+4                   ;LEFT HALF IS WRONG

007770  026767  177754  171006        CMP     AN60+2,ANS2     ;CHECK LEFT HALF
007776  001401                        BEQ     .+4
010000  104004                        HLT+4                   ;LEFT HALF IS WRONG

010002  026767  177744  170776        CMP     AN60+4,ANS3     ;CHECK RIGHT HALF
010010  001401                        BEQ     .+4
010012  104004                        HLT+4                   ;RIGHT HALF IS WRONG

010014  026767  177734  170766        CMP     AN60+6,ANS4     ;CHECK RIGHT HALF
010022  001401                        BEQ     .+4
010024  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 61                TEST OF MULD FPU INSTRUCTION
                        ;    5 * 3 = 15.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

010026  104400                          SCOPE
010030  170127  047600                  LDFPS   #47600&57760
010034  172467  000012                  LDD     N61,0           ;LOAD 5 INTO AC0
010040  171067  000016                  MULD    M61,0           ;MULTIPLY 5 BY 3
010044  174067  170732                  STD     0,ANS1          ;STORE RESULT
010050  000414                          BR      061

010052  040640  000000  000000  N61:    .FLT4   5
010060  000000
010062  040500  000000  000000  M61:    .FLT4   3
010070  000000
010072  041160  000000  000000  AN61:   .FLT4   15.
010100  000000

010102  026767  177764  170672  061:    CMP     AN61,ANS1       ;CHECK LEFT HALF
010110  001401                          BEQ     .+4
010112  104004                          HLT+4                   ;LEFT HALF IS WRONG

010114  026767  177754  170662          CMP     AN61+2,ANS2     ;CHECK LEFT HALF
010122  001401                          BEQ     .+4
010124  104004                          HLT+4                   ;LEFT HALF IS WRONG

010126  026767  177744  170652          CMP     AN61+4,ANS3     ;CHECK RIGHT HALF
010134  001401                          BEQ     .+4
010136  104004                          HLT+4                   ;RIGHT HALF IS WRONG

010140  026767  177734  170642          CMP     AN61+6,ANS4     ;CHECK RIGHT HALF
010146  001401                          BEQ     .+4
010150  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 62                TEST OF MULD FPU INSTRUCTION
                        ;    5 * 4 = 20.
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

010152  104400                        SCOPE
010154  170127  047600                LDFPS   #47600&57760
010160  172467  000012                LDD     N62,0           ;LOAD 5 INTO AC0
010164  171067  000016                MULD    M62,0           ;MULTIPLY 5 BY 4
010170  174067  170606                STD     0,ANS1          ;STORE RESULT
010174  000414                        BR      062

010176  040640  000000  000000  N62:  .FLT4   5
010204  000000
010206  040600  000000  000000  M62:  .FLT4   4
010214  000000
010216  041240  000000  000000  AN62: .FLT4   20.
010224  000000

010226  026767  177764  170546  062:  CMP     AN62,ANS1       ;CHECK LEFT HALF
010234  001401                        BEQ     .+4
010236  104004                        HLT+4                   ;LEFT HALF IS WRONG

010240  026767  177754  170536        CMP     AN62+2,ANS2     ;CHECK LEFT HALF
010246  001401                        BEQ     .+4
010250  104004                        HLT+4                   ;LEFT HALF IS WRONG

010252  026767  177744  170526        CMP     AN62+4,ANS3     ;CHECK RIGHT HALF
010260  001401                        BEQ     .+4
010262  104004                        HLT+4                   ;RIGHT HALF IS WRONG

010264  026767  177734  170516        CMP     AN62+6,ANS4     ;CHECK RIGHT HALF
010272  001401                        BEQ     .+4
010274  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 63                TEST OF MULD FPU INSTRUCTION
                        ;    .33333333333333333 * 2 = .66666666666666666666667
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

010276  104400                        SCOPE
010300  170127  047600                LDFPS   #47600&57760
010304  172467  000012                LDD     N63,0           ;LOAD .33333333333333333 INTO AC0
010310  171067  000016                MULD    M63,0           ;MULTIPLY .33333333333333333 BY 2
010314  174067  170462                STD     0,ANS1          ;STORE RESULT
010320  000414                        BR      063

010322  037652  125252  125252  N63:  .FLT4  .33333333333333333
010330  125253
010332  040400  000000  000000  M63:  .FLT4  2
010340  000000
010342  040052  125252  125252  AN63: .FLT4  .66666666666666666666667
010350  125253

010352  026767  177764  170422  063:  CMP     AN63,ANS1       ;CHECK LEFT HALF
010360  001401                        BEQ     .+4
010362  104004                        HLT+4                   ;LEFT HALF IS WRONG

010364  026767  177754  170412        CMP     AN63+2,ANS2     ;CHECK LEFT HALF
010372  001401                        BEQ     .+4
010374  104004                        HLT+4                   ;LEFT HALF IS WRONG

010376  026767  177744  170402        CMP     AN63+4,ANS3     ;CHECK RIGHT HALF
010404  001401                        BEQ     .+4
010406  104004                        HLT+4                   ;RIGHT HALF IS WRONG

010410  026767  177734  170372        CMP     AN63+6,ANS4     ;CHECK RIGHT HALF
010416  001401                        BEQ     .+4
010420  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 64                TEST OF MULD FPU INSTRUCTION
                        ;    .6666666666666667 * 2 = 1.3333333333333333
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

010422  104400                        SCOPE
010424  170127  047600                LDFPS   #47600&57760
010430  172467  000012                LDD     N64,0           ;LOAD .6666666666666667 INTO AC0
010434  171067  000016                MULD    M64,0           ;MULTIPLY .6666666666666667 BY 2
010440  174067  170336                STD     0,ANS1          ;STORE RESULT
010444  000414                        BR      .64

010446  040052  125252  125252  N64:  .FLT4   .6666666666666667
010454  125253
010456  040400  000000  000000  M64:  .FLT4   2
010464  000000
010466  040252  125252  125252  AN64: .FLT4   1.3333333333333333
010474  125253

010476  026767  177764  170276  064:  CMP     AN64,ANS1       ;CHECK LEFT HALF
010504  001401                        BEQ     .+4
010506  104004                        HLT+4                   ;LEFT HALF IS WRONG

010510  026767  177754  170266        CMP     AN64+2,ANS2     ;CHECK LEFT HALF
010516  001401                        BEQ     .+4
010520  104004                        HLT+4                   ;LEFT HALF IS WRONG

010522  026767  177744  170256        CMP     AN64+4,ANS3     ;CHECK RIGHT HALF
010530  001401                        BEQ     .+4
010532  104004                        HLT+4                   ;RIGHT HALF IS WRONG

010534  026767  177734  170246        CMP     AN64+6,ANS4     ;CHECK RIGHT HALF
010542  001401                        BEQ     .+4
010544  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 65                    TEST OF MULD FPU INSTRUCTION
                        ;    .6666666666666667 * .5 = .3333333333333333
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************************

010546  104400                        SCOPE
010550  170127  047600                LDFPS   #47600&57760
010554  172467  000012                LDD     N65,0           ;LOAD .6666666666666667 INTO AC0
010560  171067  000016                MULD    M65,0           ;MULTIPLY .6666666666666667 BY .5
010564  174067  170212                STD     0,ANS1          ;STORE RESULT
010570  000414                        BR      065

010572  040052  125252  125252  N65:  .FLT4   .6666666666666667
010600  125253
010602  040000  000000  000000  M65:  .FLT4   .5
010610  000000
010612  037652  125252  125252  AN65: .FLT4   .3333333333333333
010620  125253

010622  026767  177764  170152  065:  CMP     AN65,ANS1       ;CHECK LEFT HALF
010630  001401                        BEQ     .+4
010632  104004                        HLT+4                   ;LEFT HALF IS WRONG

010634  026767  177754  170142        CMP     AN65+2,ANS2     ;CHECK LEFT HALF
010642  001401                        BEQ     .+4
010644  104004                        HLT+4                   ;LEFT HALF IS WRONG

010646  026767  177744  170132        CMP     AN65+4,ANS3     ;CHECK RIGHT HALF
010654  001401                        BEQ     .+4
010656  104004                        HLT+4                   ;RIGHT HALF IS WRONG

010660  026767  177734  170122        CMP     AN65+6,ANS4     ;CHECK RIGHT HALF
010666  001401                        BEQ     .+4
010670  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 66                TEST OF MULD FPU INSTRUCTION
                        ;    1.3333333333333333 * .5 = .6666666666666667
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

010672  104400                        SCOPE
010674  170127  047600                LDFPS   #47600&57760
010700  172467  000012                LDD     N66,0           ;LOAD 1.3333333333333333 INTO AC0
010704  171067  000016                MULD    M66,0           ;MULTIPLY 1.3333333333333333 BY .5
010710  174067  170066                STD     0,ANS1          ;STORE RESULT
010714  000414                        BR      066

010716  040252  125252  125252  N66:  .FLT4   1.3333333333333333
010724  125253
010726  040000  000000  000000  M66:  .FLT4   .5
010734  000000
010736  040052  125252  125252  AN66: .FLT4   .6666666666666667
010744  125253

010746  026767  177764  170026  066:  CMP     AN66,ANS1       ;CHECK LEFT HALF
010754  001401                        BEQ     .+4
010756  104004                        HLT+4                   ;LEFT HALF IS WRONG

010760  026767  177754  170016        CMP     AN66+2,ANS2     ;CHECK LEFT HALF
010766  001401                        BEQ     .+4
010770  104004                        HLT+4                   ;LEFT HALF IS WRONG

010772  026767  177744  170006        CMP     AN66+4,ANS3     ;CHECK RIGHT HALF
011000  001401                        BEQ     .+4
011002  104004                        HLT+4                   ;RIGHT HALF IS WRONG

011004  026767  177734  167776        CMP     AN66+6,ANS4     ;CHECK RIGHT HALF
011012  001401                        BEQ     .+4
011014  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 67                    TEST OF MULD FPU INSTRUCTION
                        ;    2 * .3333333333333333 = .666666666666666666667
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************************

011016  104400                          SCOPE
011020  170127  047600                  LDFPS   #47600&57760
011024  172467  000012                  LDD     N67,0           ;LOAD 2 INTO AC0
011030  171067  000016                  MULD    M67,0           ;MULTIPLY 2 BY .3333333333333333
011034  174067  167742                  STD     0,ANS1          ;STORE RESULT
011040  000414                          BR      067

011042  040400  000000  000000  N67:    .FLT4   2
011050  000000
011052  037652  125252  125252  M67:    .FLT4   .3333333333333333
011060  125253
011062  040052  125252  125252  AN67:   .FLT4   .666666666666666666667
011070  125253

011072  026767  177764  167702  067:    CMP     AN67,ANS1       ;CHECK LEFT HALF
011100  001401                          BEQ     .+4
011102  104004                          HLT+4                   ;LEFT HALF IS WRONG

011104  026767  177754  167672          CMP     AN67+2,ANS2     ;CHECK LEFT HALF
011112  001401                          BEQ     .+4
011114  104004                          HLT+4                   ;LEFT HALF IS WRONG

011116  026767  177744  167662          CMP     AN67+4,ANS3     ;CHECK RIGHT HALF
011124  001401                          BEQ     .+4
011126  104004                          HLT+4                   ;RIGHT HALF IS WRONG

011130  026767  177734  167652          CMP     AN67+6,ANS4     ;CHECK RIGHT HALF
011136  001401                          BEQ     .+4
011140  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 70                TEST OF MULD FPU INSTRUCTION
                        ;    2 * .6666666666666667 = 1.3333333333333333333
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

011142  104400                        SCOPE
011144  170127  047600                LDFPS   #47600B57760
011150  172467  000012                LDD     N70,0           ;LOAD 2 INTO AC0
011154  171067  000016                MULD    M70,0           ;MULTIPLY 2 BY .6666666666666666667
011160  174067  167616                STD     0,ANS1          ;STORE RESULT
011164  000414                        BR      .+70

011166  040400  000000  000000  N70:  .FLT4   2
011174  000000
011176  040052  125252  125252  M70:  .FLT4   .6666666666666666667
011204  125253
011206  040252  125252  125252  AN70: .FLT4   1.3333333333333333333
011214  125253

011216  026767  177764  167556  070:  CMP     AN70,ANS1       ;CHECK LEFT HALF
011224  001401                        BEQ     .+4
011226  104004                        HLT+4                   ;LEFT HALF IS WRONG

011230  026767  177754  167546        CMP     AN70+2,ANS2     ;CHECK LEFT HALF
011236  001401                        BEQ     .+4
011240  104004                        HLT+4                   ;LEFT HALF IS WRONG

011242  026767  177744  167536        CMP     AN70+4,ANS3     ;CHECK RIGHT HALF
011250  001401                        BEQ     .+4
011252  104004                        HLT+4                   ;RIGHT HALF IS WRONG

011254  026767  177734  167526        CMP     AN70+6,ANS4     ;CHECK RIGHT HALF
011262  001401                        BEQ     .+4
011264  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************************
                        ;TEST 71                    TEST OF MULD FPU INSTRUCTION
                        ;    .5 * .6666666666666667 = .3333333333333333
                        ;   USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************************

011266  104400                        SCOPE
011270  170127  047600                LDFPS   #47600&57760
011274  172467  000012                LDD     N71,0           ;LOAD .5 INTO AC0
011300  171067  000016                MULD    M71,0           ;MULTIPLY .5 BY .6666666666666667
011304  174067  167472                STD     0,ANS1          ;STORE RESULT
011310  000414                        BR      071

011312  040000  000000  000000  N71:  .FLT4   .5
011320  000000
011322  040052  125252  125252  M71:  .FLT4   .6666666666666667
011330  125253
011332  037652  125252  125252  AN71: .FLT4   .3333333333333333
011340  125253

011342  026767  177764  167432  071:  CMP     AN71,ANS1       ;CHECK LEFT HALF
011350  001401                        BEQ     .+4
011352  104004                        HLT+4                   ;LEFT HALF IS WRONG

011354  026767  177754  167422        CMP     AN71+2,ANS2     ;CHECK LEFT HALF
011362  001401                        BEQ     .+4
011364  104004                        HLT+4                   ;LEFT HALF IS WRONG

011366  026767  177744  167412        CMP     AN71+4,ANS3     ;CHECK RIGHT HALF
011374  001401                        BEQ     .+4
011376  104004                        HLT+4                   ;RIGHT HALF IS WRONG

011400  026767  177734  167402        CMP     AN71+6,ANS4     ;CHECK RIGHT HALF
011406  001401                        BEQ     .+4
011410  104004                        HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*************************************************************************
                        ;TEST 72                TEST OF MULD FPU INSTRUCTION
                        ;    .5 * 1.3333333333333333 = .6666666666666667
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*************************************************************************

011412  104400                    SCOPE
011414  170127  047600            LDFPS   #47600&57760
011420  172467  000012            LDD     N72,0           ;LOAD .5 INTO AC0
011424  171067  000016            MULD    M72,0           ;MULTIPLY .5 BY 1.3333333333333333
011430  174067  167346            STD     0,ANS1          ;STORE RESULT
011434  000414                    BR      072

011436  040000  000000  000000  N72:    .FLT4   .5
011444  000000
011446  040252  125252  125252  M72:    .FLT4   1.33333333333333333
011454  125253
011456  040052  125252  125252  AN72:   .FLT4   .66666666666666667
011464  125253

011466  026767  177764  167306  072:    CMP     AN72,ANS1       ;CHECK LEFT HALF
011474  001401                    BEQ     .+4
011476  104004                    HLT+4                   ;LEFT HALF IS WRONG

011500  026767  177754  167276            CMP     AN72+2,ANS2     ;CHECK LEFT HALF
011506  001401                    BEQ     .+4
011510  104004                    HLT+4                   ;LEFT HALF IS WRONG

011512  026767  177744  167266            CMP     AN72+4,ANS3     ;CHECK RIGHT HALF
011520  001401                    BEQ     .+4
011522  104004                    HLT+4                   ;RIGHT HALF IS WRONG

011524  026767  177734  167256            CMP     AN72+6,ANS4     ;CHECK RIGHT HALF
011532  001401                    BEQ     .+4
011534  104004                    HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 73                TEST OF MULD FPU INSTRUCTION
                        ;    .33333333333333333 * 2 = .666666666666666666666667
                        ;    USING AC0 & AC4    FPS = 47600    FEC = N/A
                        ;*****************************************************************

011536  104400                          SCOPE
011540  170227  047600                  STFPS   #47600&57760
011544  172467  000016                  LDD     N73,0           ;LOAD .33333333333333333 INTO AC0
011550  174004                          STD     0,%4            ;LOAD INTO AC4
011552  172467  000020                  LDD     M73,0           ;LOAD 2 INTO 0
011556  171004                          MULD    %4,0            ;MULTIPLY .33333333333333333 BY 2
011560  174067  167216                  STD     0,ANS1          ;STORE RESULT
011564  000414                          BR      073

011566  037652  125252  125252  N73:    .FLT4   .33333333333333333
011574  125253
011576  040400  000000  000000  M73:    .FLT4   2
011604  000000
011606  040052  125252  125252  AN73:   .FLT4   .666666666666666666666667
011614  125253

011616  026767  177764  167156  073:    CMP     AN73,ANS1       ;CHECK LEFT HALF
011624  001401                          BEQ     .+4
011626  104004                          HLT+4                   ;LEFT HALF IS WRONG

011630  026767  177754  167146          CMP     AN73+2,ANS2     ;CHECK LEFT HALF
011636  001401                          BEQ     .+4
011640  104004                          HLT+4                   ;LEFT HALF IS WRONG

011642  026767  177744  167136          CMP     AN73+4,ANS3     ;CHECK RIGHT HALF
011650  001401                          BEQ     .+4
011652  104004                          HLT+4                   ;RIGHT HALF IS WRONG

011654  026767  177734  167126          CMP     AN73+6,ANS4     ;CHECK RIGHT HALF
011662  001401                          BEQ     .+4
011664  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
                        ;*****************************************************************
                        ;TEST 74                TEST OF MULD FPU INSTRUCTION
                        ;    1 * -0 = 1
                        ;    USING AC0    FPS = 47600    FEC = N/A
                        ;*****************************************************************

011666  104400                          SCOPE
011670  170127  047600                  LDFPS   #47600&57760
011674  172467  000012                  LDD     N74,0           ;LOAD 1 INTO AC0
011700  171067  000016                  MULD    M74,0           ;MULTIPLY 1 BY -0
011704  174067  167072                  STD     0,ANS1          ;STORE RESULT
011710  000414                          BR      074

011712  040200  000000  000000  N74:    .FLT4   1
011720  000000
011722  100000  000000  000000  M74:    .FLT4   -0
011730  000000
011732  040200  000000  000000  AN74:   .FLT4   1
011740  000000

011742  026767  177764  167032  074:    CMP     AN74,ANS1       ;CHECK LEFT HALF
011750  001401                          BEQ     .+4
011752  104004                          HLT+4                   ;LEFT HALF IS WRONG

011754  026767  177754  167022          CMP     AN74+2,ANS2     ;CHECK LEFT HALF
011762  001401                          BEQ     .+4
011764  104004                          HLT+4                   ;LEFT HALF IS WRONG

011766  026767  177744  167012          CMP     AN74+4,ANS3     ;CHECK RIGHT HALF
011774  001401                          BEQ     .+4
011776  104004                          HLT+4                   ;RIGHT HALF IS WRONG

012000  026767  177734  167002          CMP     AN74+6,ANS4     ;CHECK RIGHT HALF
012006  001401                          BEQ     .+4
012010  104004                          HLT+4                   ;RIGHT HALF IS WRONG
```

```
012012  104400                  DONE:   SCOPE
012014  032737  002000  177570          BIT     #SW10,@#SWR     ;RING THE BELL?
012022  001005                          BNE     1$              ;NO!
012024  012767  000007  001242          MOV     #BELL,.TYPE     ;TYPE A BELL
012032  000004  013274                  TYPE    .TYPE
012036  005046                  1$:     CLR     -(6)            ;CLEAR TRACE TRAP
012040  032737  010000  177570          BIT     #SW12,@#SWR     ;RUN WITH TRT?
012046  001010                          BNE     2$
012050  005167  001222                  COM     TRPB
012054  100005                          BPL     2$
012056  052716  000020                  BIS     #20,(6)         ;SET TRACE TRAP
012062  012746  001062                  MOV     #BEGIN,-(6)     ;JUMP TO START OF TEST
012066  000412                          BR      YESRT
012070  012746  001062          2$:     MOV     #BEGIN,-(6)     ;JUMP TO START OF TEST
012074  013700  000042                  MOV     @#42,R0         ;GET MONITOR ADDRESS
012100  001404                          BEQ     3$              ;IF NONE
012102  004710                          JSR     7,(0)           ;GO TO MONITOR
012104  000240                          NOP
012106  000240                          NOP
012110  000240                          NOP
012112  000002                  3$:     RTI
012114  000002                  YESRT:  RTI                     ;RETURN TO PROGRAM FROM TRAP

012116  032737  000400  177570  .EMT:   BIT     #SW08,@#SWR     ;KILL LDUB OR LOOP ON SPEC. TEST
012124  001404                          BEQ     1$
012126  123767  177570  166644          CMPB    @#SWR,ICNT      ;ON RIGHT TEST?   *SW7-0*
012134  001437                          BEQ     OVER
012136  113703  177570          1$:     MOVB    @#SWR,R3        ;GET UB BITS
012142  170003                          LDUB
012144  032737  040000  177570          BIT     #SW14,@#SWR     ;LOOP ON TEST
012152  001026                          BNE     KIT
012154  032737  004000  177570          BIT     #SW11,@#SWR     ;KILL ITERATIONS
012162  001012                          BNE     SAVLAD
012164  105767  166611                  TSTB    ICNT+1
012170  001404                          BEQ     2$              ;BRANCH IF FIRST
012172  126767  001106  166601          CMPB    TIMES,ICNT+1    ;DONE?
012200  001013                          BNE     KIT             ;BRANCH IF NOT
012202  112767  000001  166571  2$:     MOVB    #1,ICNT+1       ;FIRST ITERATION
012210  105267  166564          SAVLAD: INCB    ICNT            ;COUNT TEST NUMBERS
012214  011667  001060                  MOV     (6),LAD         ;SAVE LOOP ADDRESS
012220  016737  166554  177570          MOV     ICNT,@#DISPLAY  ;DISPLAY TEST NO. AND ITERATION COUNT
012226  000002                          RTI                     ;RETURN

012230  105267  166545          KIT:    INCB    ICNT+1
012234  016737  166540  177570  OVER:   MOV     ICNT,@#DISPLAY  ;SET UP DISPLAY
012242  005767  001032                  TST     LAD             ;FIRST ONE?
012246  001760                          BEQ     SAVLAD
012250  016716  001024                  MOV     LAD,(6)         ;FUDGE RETURN ADDRESS
012254  000002                          RTI                     ;FIXES PS
```

```
012256  032737  002000  177570  .TRP:   BIT     #SW10,@#SWR     ;BELL ON ERROR?
012264  001405                          BEQ     1$              ;NO - SKIP
012266  012767  000007  001000          MOV     #BELL,.TYPE     ;TYPE A BELL
012274  000004  013274                  TYPE    .TYPE
012300  004767  000406          1$:     JSR     PC,ERROR        ;COUNT THE NUMBER OF ERRORS
012304  010446                          MOV     R4,-(6)
012306  032737  020000  177570          BIT     #SW13,@#SWR     ;SKIP TYPEOUT IF SET
012314  001072                          BNE     4$
012316  000004  013242                  TYPE    ,RETURN
012322  016646  000002                  MOV     2(6),-(6)       ;PUT ADDRESS OF INSTRUCTION ON STACK
012326  162715  000002                  SUB     #2,(6)
012332  011605                          MOV     (6),TTY         ;TYPE (6) IN OCTAL
012334  004767  000212                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012340  000004  013250                  TYPE    ,SPACE+3
012344  010005                          MOV     R0,TTY          ;TYPE R0 IN OCTAL
012346  004767  000200                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012352  000004  013251                  TYPE    ,SPACE+4
012356  012703  001002                  MOV     #ANS1,R3        ;ADDRESS OF DATA
012362  113604                          MOVB    @(6)+,R4        ;AMOUNT OF DATA IN TABLE
012364  001426                          BEQ     3$
012366  100016                          BPL     2$              ;TYPE STACK?
012370  016667  000006  166404          MOV     6(6),ANS1
012376  016667  000010  166400          MOV     10(6),ANS2
012404  016667  000012  166374          MOV     12(6),ANS3
012412  016667  000014  166370          MOV     14(6),ANS4
012420  042704  177600                  BIC     #177600,R4      ;CLEAR SIGN
012424  000004  013251          2$:     TYPE    ,SPACE+4
012430  012305                          MOV     (3)+,TTY        ;TYPE (3)+ IN OCTAL
012432  004767  000114                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012436  005304                          DEC     R4
012440  001371                          BNE     2$
012442  005700                  3$:     TST     FPS
012444  100016                          BPL     4$
012446  000004  013245                  TYPE    ,SPACE
012452  170367  166344                  STST    FEC
012456  016705  166340                  MOV     FEC,TTY         ;TYPE FEC IN OCTAL
012462  004767  000064                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012466  000004  013250                  TYPE    ,SPACE+3
012472  016705  166326                  MOV     FEA,TTY         ;TYPE FEA IN OCTAL
012476  004767  000050                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012502  012604                  4$:     MOV     (6)+,R4
012504  005737  177570                  TST     @#SWR           ;HALT ON ERROR
012510  100001                          BPL     .+4             ;SKIP IF CONTINUE
012512  000000                          HALT                    ;HALT ON ERROR!
012514  032737  001000  177570          BIT     #SW09,@#SWR     ;CHECK FOR INHIBIT LOOP ON ERROR
012522  001001                          BNE     .+4             ;SKIP IF LOOP ON ERROR
012524  000002                          RTI
012526  105067  166247                  CLRB    ICNT+1
012532  032737  000400  177570          BIT     #SW08,@#SWR     ;CHECK FOR LOAD MICROBREAK
012540  001233                          BNE     KIT             ;BRANCH IF NOT
012542  113703  177570                  MOVB    @#SWR,R3        ;PUT MICROBREAK ADDRESS IN R3
012546  170003                          LDUB                    ;LOAD MICROBREAK
012550  000627                          BR      KIT             ;LOOP ON TEST UNTIL NO ERRORS
```

```
012552  112767  000001  000130  PRINTR: MOVB    #1,A4$          ;SET ZERO FILL SWITCH
012560  000402                  BR      .+6
012562  005067  000122          PRINTS: CLR     A4$             ;SUPRESS LEADING ZERO'S
012566  112767  177772  000115          MOVB    #-6,A4$+1       ;SET COUNT
012574  010446                  MOV     R4,-(6)         ;SAVE R4
012576  012704  012700                  MOV     #3$,R4          ;SET POINTER TO FIRST ASCII CHAR.
012602  105014                  CLRB    (4)             ;CLEAR FIRST BYTE
012604  000405                  BR      2$              ;ROTATE FIRST BIT
012606  105014          1$:     CLRB    (4)             ;CLEAR BYTE OF CHARACTER
012610  006105                  ROL     TTY             ;ROTATE BIT INTO C
012612  106114                  ROLB    (4)             ;PACK IT
012614  006105                  ROL     TTY             ;ROTATE BIT INTO C
012616  106114                  ROLB    (4)             ;PACK IT
012620  006105          2$:     ROL     TTY             ;ROTATE BIT INTO C
012622  106114                  ROLB    (4)             ;PACK IT
012624  105714                  TSTB    (4)
012626  001402                  BEQ     .+6
012630  105267  000054          INCB    A4$
012634  105767  000050          TSTB    A4$             ;CHECK FILL SWITCH
012640  001402                  BEQ     .+6
012642  152724  000060          BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
012646  105267  000037          INCB    A4$+1
012652  001355                  BNE     1$              ;REPEAT
012654  022704  012700          CMP     #3$,R4
012660  001002                  BNE     .+6
012662  112724  000060          MOVB    #'0,(4)+
012666  105014                  CLRB    (4)
012670  000004  012700          TYPE    ,3$             ;TYPE IT
012674  012604                  MOV     (6)+,R4         ;RESTORE R4
012676  000207                  RTS     PC

012700  000004          3$:     .BLKW   4
012710  000000          A4$:    0

012712  005267  000364  ERROR:  INC     ERRORS          ;COUNT ERRORS
012716  132737  000001  000041  BITB    #1,@#41         ;AUTO MODE?
012724  001412                  BEQ     1$              ;NO!
012726  022767  000010  000346  CMP     #10.,ERRORS     ;TOO MANY?
012734  001006                  BNE     1$              ;NOT YET
012736  013700  000042          MOV     @#42,R0         ;GET ADDRESS
012742  001403                  BEQ     1$              ;FORGET IT IF ZERO
012744  005037  000042          CLR     @#42            ;ZAP 42
012750  004710                  JSR     PC,(0)          ;CALL THE MONITOR
012752  000207          1$:     RTS     PC              ;RETURN
```

```
012754  012777  013150  000306  POWDWN: MOV     #ILLUP,@UPVEC   ;SET FOR FAST UP
012762  012777  000340  000302          MOV     #340,@UPVEC+2   ;PRIO:7
012770  170246                          STFPS   -(6)            ;GET THE FPS
012772  170011                          SETD
012774  174046                          STD     AC0,-(6)        ;SAVE AC'S
012776  174146                          STD     AC1,-(6)
013000  174246                          STD     AC2,-(6)
013002  174346                          STD     AC3,-(6)
013004  172404                          LDD     AC4,AC0
013006  174046                          STD     AC0,-(6)
013010  172405                          LDD     AC5,AC0
013012  174046                          STD     AC0,-(6)
013014  010046                          MOV     R0,-(6)         ;SAVE REGISTERS
013016  010146                          MOV     R1,-(6)
013020  010246                          MOV     R2,-(6)
013022  010346                          MOV     R3,-(6)
013024  010446                          MOV     R4,-(6)
013026  010546                          MOV     R5,-(6)
013030  010667  000220                  MOV     SP,SAVE6        ;SAVE SP
013034  012777  013044  000226          MOV     #POWUP,@UPVEC   ;SET UP VECTOR
013042  000000                          HALT

013044  016706  000204          POWUP:  MOV     SAVE6,SP        ;GET SP
013050  005001                          CLR     R1              ;WAIT LOOP FOR THE TTY
013052  005201                  1$:     INC     R1
013054  001376                          BNE     1$
013056  012605                          MOV     (6)+,R5         ;GET THE REGISTERS
013060  012604                          MOV     (6)+,R4
013062  012603                          MOV     (6)+,R3
013064  012602                          MOV     (6)+,R2
013066  012601                          MOV     (6)+,R1
013070  012600                          MOV     (6)+,R0
013072  170011                          SETD
013074  172426                          LDD     (6)+,AC0        ;RESTORE THE AC'S
013076  174005                          STD     AC0,AC5
013100  172426                          LDD     (6)+,AC0
013102  174004                          STD     AC0,AC4
013104  172726                          LDD     (6)+,AC3
013106  172626                          LDD     (6)+,AC2
013110  172526                          LDD     (6)+,AC1
013112  172426                          LDD     (6)+,AC0
013114  170126                          LDFPS   (6)+            ;RESTORE FPS
013116  012777  012754  000140          MOV     #POWDWN,@DWNVEC ;SET UP THE POWER DOWN VECTOR
013124  012777  000340  000134          MOV     #340,@DWNVEC+2
013132  000004  013136                  TYPE    ..+2            ;.ASCIZ <15><12>"POWER"
013146  000002                          RTI

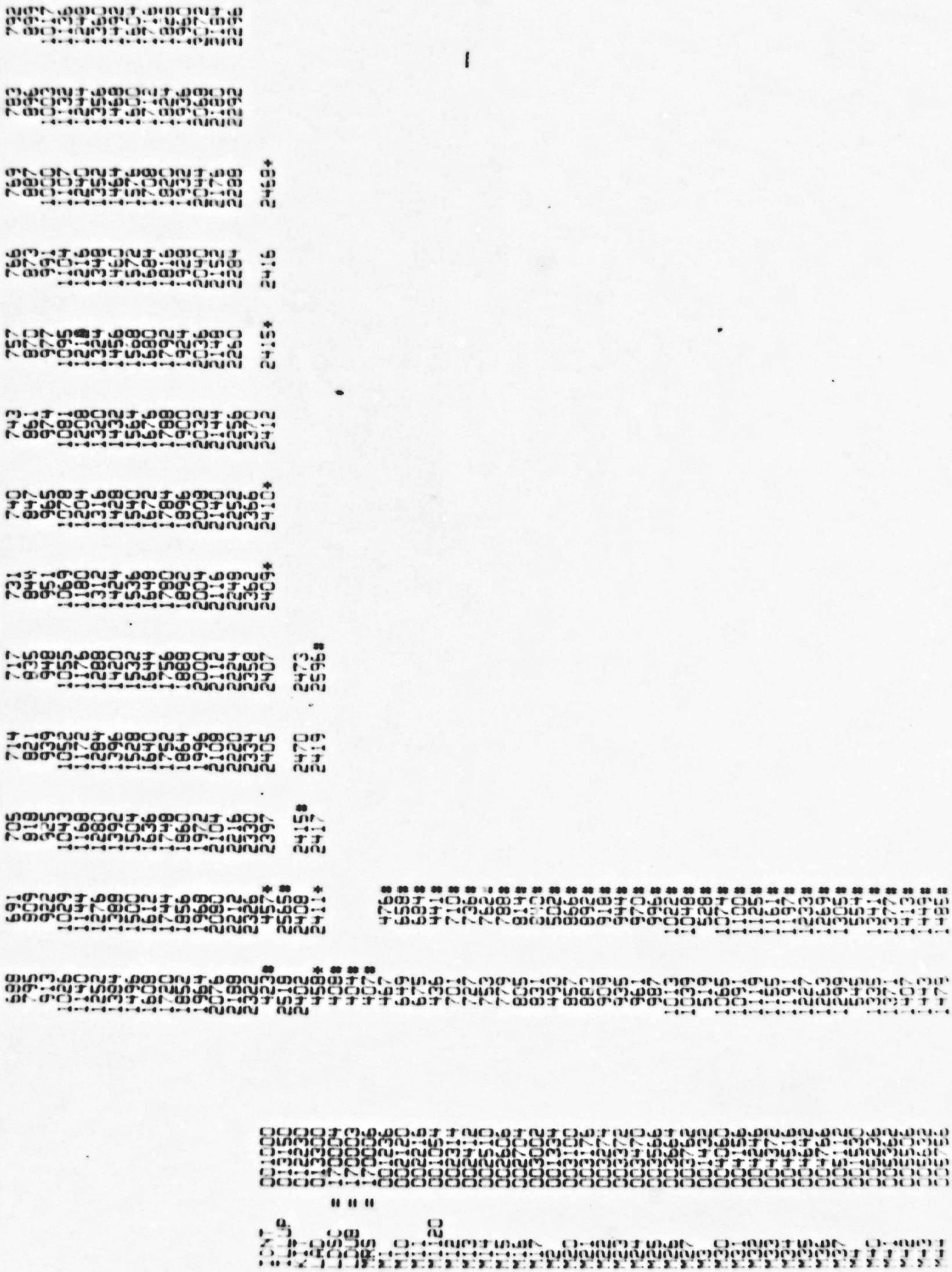
013150  000000          ILLUP:  HALT                            ;THE POWER UP SEQUENCE WAS STARTED
013152  000776                  BR      .-2                     ; BEFORE THE POWER DOWN WAS COMPLETE
```

```
013154  010546                  .IOT:   MOV     TTY,-(6)        ;SAVE TTY
013156  017605  000002                  MOV     @2(6),TTY       ;GET ADDRESS TO BE TYPED
013162  105715                  1$:     TSTB    (TTY)           ;TERMINATOR?
013164  001406                          BEQ     2$
013166  112537  177566                  MOVB    (TTY)+,@#177566 ;LOAD AND TYPE THE CHARACTER
013172  105737  177564                  TSTB    @#177564        ;IS THE PRINTER READY
013176  100375                          BPL     .-4
013200  000770                          BR      1$              ;GET THE NEXT CHARACTER
013202  017646  000002          2$:     MOV     @2(6),-(6)      ;GET ADDRESS TO BE TYPED
013206  062766  000002  000004          ADD     #2,4(6)         ;ADD 2 TO THE ADDRESS
013214  022666  000002                  CMP     (6)+,2(6)       ;IS IT .+2?
013220  001006                          BNE     3$              ;NO
013222  062705  000002                  ADD     #2,TTY          ;ADD 2 TO THE ADDRESS
013226  042705  000001                  BIC     #1,TTY          ;BACK UP TO AN EVEN BYTE
013232  010566  000002                  MOV     TTY,2(6)        ;RESTORE ADDRESS
013236  012605                  3$:     MOV     (6)+,TTY        ;RESTORE TTY
013240  000002                          RTI                     ;RETURN

013242  005015     000          RETURN: .ASCIZ  <15><12>        ;RETURN AND LINEFEED
013245     015  020012  020040  SPACE:  .ASCIZ  <15><12>"   "   ;RETURN AND 3 SPACES
013252     000
        013254                  .EVEN
013254  000000                  SAVE6:  0
013256  172160                  FPTADR: 172160                  ;FLOATING POINT ADDRESS ON THE 11/20
013260  000244  000246          FPVECT: 244,246                 ;FLOATING POINT VECTOR ADDRESS
013264  000024  000026          DWNVEC: 24,26                   ;POWER DOWN VECTOR ADDRESS
013270  000024  000026          UPVEC:  24,26                   ;POWER UP VECTOR ADDRESS
013274  000000                  .TYPE:  0
013276  000000                  TRPB:   0
013300  000000                  LAD:    0                       ;LOOP ADDRESS
013302  000000                  ERRORS: 0                       ;ERROR COUNT
013304  000377                  TIMES:  377                     ;ITERATION COUNT
        000001                  .END
```

```
AC0     =%000000            390#  2522  2526*  2527  2528*  2529  2551*  2552  2553*  2554  2558*
AC1     =%000001            391#  2523  2557*
AC2     =%000002            392#  2524  2556*
AC3     =%000003            393#  2525  2555*
AC4     =%000004            394#  2526  2554*
AC5     =%000005            395#  2528  2552*
ANS1      001002            424#   473*   478   499*   504   525*   530   551*   556   577*   582   603*   608
                            629*   634   655*   660   681*   686   707*   712   733*   738   759*   764   785*
                            790    811*  816    837*  842    863*  868    889*  894    915*  920    941*  946
                            967*   972   993*   998  1019*  1024  1045*  1050  1071*  1076  1097*  1102  1120*
                           1130   1156*  1166  1192*  1202  1228*  1233  1264*  1274  1300*  1310  1336*  1346
                           1372*  1382  1408*  1418  1444*  1454  1480*  1490  1516*  1526  1552*  1562  1588*
                           1598   1624*  1634  1660*  1670  1696*  1706  1732*  1742  1768*  1778  1804*  1814
                           1840*  1850  1876*  1886  1912*  1922  1948*  1958  1984*  1994  2020*  2030  2056*
                           2066   2092*  2102  2128*  2138  2164*  2174  2200*  2210  2236*  2246  2272*  2282
                           2310*  2320  2346*  2356  2438  2442*
ANS2      001004            425#   481   507   533   559   585   611   637   663   689   715   741   767
                            793    819   845   871   897   923   949   975  1001  1027  1053  1079  1105
                           1134   1170  1206  1242  1278  1314  1350  1386  1422  1458  1494  1530  1566
                           1602   1638  1674  1710  1746  1782  1818  1854  1890  1926  1962  1998  2034
                           2070   2106  2142  2178  2214  2250  2286  2324  2360  2443*
ANS3      001006            426#  1138  1174  1210  1246  1282  1318  1354  1390  1426  1462  1498  1534
                           1570   1606  1642  1678  1714  1750  1786  1822  1858  1894  1930  1966  2002
                           2038   2074  2110  2146  2182  2218  2254  2290  2328  2364  2444*
ANS4      001010            427#  1142  1178  1214  1250  1286  1322  1358  1394  1430  1466  1502  1538
                           1574   1610  1646  1682  1718  1754  1790  1826  1862  1898  1934  1970  2006
                           2042   2078  2114  2150  2186  2222  2258  2294  2332  2368  2445*
ANS5      001012            428#
ANS6      001014            429#
ANS7      001016            430#
ANS8      001020            431#
AN1       001242            477#   478   481
AN10      002124            659#   660   663
AN11      002222            685#   686   689
AN12      002320            711#   712   715
AN13      002416            737#   738   741
AN14      002514            763#   764   767
AN15      002612            789#   790   793
AN16      002710            815#   816   819
AN17      003006            841#   842   845
AN2       001340            503#   504   507
AN20      003104            867#   868   871
AN21      003202            893#   894   897
AN22      003300            919#   920   923
AN23      003376            945#   946   949
AN24      003474            971#   972   975
AN25      003572            997#   998  1001
AN26      003670           1023#  1024  1027
AN27      003766           1049#  1050  1053
AN3       001436            529#   530   533
AN30      004064           1075#  1076  1079
AN31      004162           1101#  1102  1105
AN32      004256           1127#  1130  1134  1138  1142
AN33      004402           1163#  1166  1170  1174  1178
AN34      004526           1199#  1202  1206  1210  1214
AN35      004652           1235#  1238  1242  1246  1250
```

```
AN36    004776          1271#   1274    1278    1282    1286
AN37    005122          1307#   1310    1314    1318    1322
AN4     001534           555#    556     559
AN40    005246          1343#   1346    1350    1354    1358
AN41    005372          1379#   1382    1386    1390    1394
AN42    005516          1415#   1418    1422    1426    1430
AN43    005642          1451#   1454    1458    1462    1466
AN44    005766          1487#   1490    1494    1498    1502
AN45    006112          1523#   1526    1530    1534    1538
AN46    006236          1559#   1562    1566    1570    1574
AN47    006362          1595#   1598    1602    1606    1610
AN5     001632           581#    582     585
AN50    006506          1631#   1634    1638    1642    1646
AN51    006632          1667#   1670    1674    1678    1682
AN52    006756          1703#   1706    1710    1714    1718
AN53    007102          1739#   1742    1746    1750    1754
AN54    007226          1775#   1778    1782    1786    1790
AN55    007352          1811#   1814    1818    1822    1826
AN56    007476          1847#   1850    1854    1858    1862
AN57    007622          1883#   1886    1890    1894    1898
AN6     001730           607#    608     611
AN60    007746          1919#   1922    1926    1930    1934
AN61    010072          1955#   1958    1962    1966    1970
AN62    010216          1991#   1994    1998    2002    2006
AN63    010342          2027#   2030    2034    2038    2042
AN64    010466          2063#   2066    2070    2074    2078
AN65    010612          2099#   2102    2106    2110    2114
AN66    010736          2135#   2138    2142    2146    2150
AN67    011062          2171#   2174    2178    2182    2186
AN7     002026           633#    634     637
AN70    011206          2207#   2210    2214    2218    2222
AN71    011332          2243#   2246    2250    2254    2258
AN72    011456          2279#   2282    2286    2290    2294
AN73    011606          2317#   2320    2324    2328    2332
AN74    011732          2353#   2356    2360    2364    2368
A4$     012710          2474*   2476*   2477*   2491*   2492    2495*   2506#
BEG     001026           414     435#
BEGIN   001062           439     444#    2383    2385
BELL  = 000007           379#    2375    2423
DISPLA= 177570           375#    2412*   2416*
DONE    012012          2372#
DWNVEC  013264           447*    448*    2560*   2561*   2592#
ERROR   012712          2425    2508#
ERRORS  013302          2508*   2511    2597#
FEA     001024           433#    2459
FEC     001022           418*    432#    2455*   2456
FLTERR  000760           417#    455
FPS   =%000000           380#    417*    468*    469     494*    495     520*    521     546*    547     572*    573     598*
                         599     624*    625     650*    651     676*    677     702*    703     728*    729     754*    755
                         780*    781     806*    807     832*    833     858*    859     884*    885     910*    911     936*
                         937     962*    963     988*    989     1014*   1015    1040*   1041    1066*   1067    1092*   1093
                        2452
FPTADR  013256           441    2590#
FPVECT  013260           455*    456*   2591#
HLT   = 104000           377#    471     480     483     497     506     509     523     532     535     549     558     561
                         575     584     587     601     610     613     627     636     639     653     662     665     679
```



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M45        006102      1515   1521#
M46        006226      1551   1557#
M47        006352      1587   1593#
M5         001626       571    580#
M50        006476      1623   1629#
M51        006622      1659   1665#
M52        006746      1695   1701#
M53        007072      1731   1737#
M54        007216      1767   1773#
M55        007342      1803   1809#
M56        007466      1839   1845#
M57        007612      1875   1881#
M6         001724       597    606#
M60        007736      1911   1917#
M61        010062      1947   1953#
M62        010206      1983   1989#
M63        010332      2019   2025#
M64        010456      2055   2061#
M65        010602      2091   2097#
M66        010726      2127   2133#
M67        011052      2163   2169#
M7         002022       623    632#
M70        011176      2199   2205#
M71        011322      2235   2241#
M72        011446      2271   2277#
M73        011576      2308   2315#
M74        011722      2345   2351#
N        = 000075       372#   459    485#   511#   537#   563#   589#   615#   641#   667#   693#   719#   745#
                        771#   797#   823#   849#   875#   901#   927#   953#   979#  1005#  1031#  1057#  1083#
                       1109#  1110   1146#  1182#  1218#  1254#  1290#  1326#  1362#  1398#  1434#  1470#  1506#
                       1542#  1578#  1614#  1650#  1686#  1722#  1758#  1794#  1830#  1866#  1902#  1938#  1974#
                       2010#  2046#  2082#  2118#  2154#  2190#  2226#  2262#  2298#  2336#  2372#
N1         001232       466    475#
N10        002114       648    657#
N11        002212       674    683#
N12        002310       700    709#
N13        002406       726    735#
N14        002504       752    761#
N15        002602       778    787#
N16        002700       804    813#
N17        002776       830    839#
N2         001330       492    501#
N20        003074       856    865#
N21        003172       882    891#
N22        003270       908    917#
N23        003366       934    943#
N24        003464       960    969#
N25        003562       986    995#
N26        003660      1012   1021#
N27        003756      1038   1047#
N3         001426       518    527#
N30        004054      1064   1073#
N31        004152      1090   1099#
N32        004236      1118   1123#
N33        004362      1154   1159#
N34        004506      1190   1195#
```

```
N35     004632          1226    1231#
N36     004756          1262    1267#
N37     005102          1298    1303#
N4      001524           544     553#
N40     005226          1334    1339#
N41     005352          1370    1375#
N42     005476          1406    1411#
N43     005622          1442    1447#
N44     005746          1478    1483#
N45     006072          1514    1519#
N46     006216          1550    1555#
N47     006342          1586    1591#
N5      001622           570     579#
N50     006466          1622    1627#
N51     006612          1658    1663#
N52     006736          1694    1699#
N53     007062          1730    1735#
N54     007206          1766    1771#
N55     007332          1802    1807#
N56     007456          1838    1843#
N57     007602          1874    1879#
N6      001720           596     605#
N60     007726          1910    1915#
N61     010052          1946    1951#
N62     010176          1982    1987#
N63     010322          2018    2023#
N64     010446          2054    2059#
N65     010572          2090    2095#
N66     010716          2126    2131#
N67     011042          2162    2167#
N7      002016           622     631#
N70     011166          2198    2203#
N71     011312          2234    2239#
N72     011436          2270    2275#
N73     011566          2306    2313#
N74     011712          2344    2349#
N75     012234          2398    2416#
N8      001246           474     478#
N9      002130           656     660#
N10     002226           682     686#
N11     002324           708     712#
N12     002422           734     738#
N13     002520           760     764#
N14     002616           786     790#
N15     002714           812     816#
N16     003012           838     842#
N17     001344           500     504#
N2      003110           864     868#
N20     003206           890     894#
N21     003304           916     920#
N22     003402           942     946#
N23     003500           968     972#
N24     003576           994     998#
N25     003674          1020    1024#
N26     003772          1046    1050#
N27     001442           526     530#
```

```
030     004070          1072    1076#
031     004166          1098    1102#
032     004266          1121    1130#
033     004412          1157    1166#
034     004536          1193    1202#
035     004662          1229    1238#
036     005006          1265    1274#
037     005132          1301    1310#
04      001540           552     556#
040     005256          1337    1346#
041     005402          1373    1382#
042     005526          1409    1418#
043     005652          1445    1454#
044     005776          1481    1490#
045     006122          1517    1526#
046     006246          1553    1562#
047     006372          1589    1598#
05      001636           578     582#
050     006516          1625    1634#
051     006642          1661    1670#
052     006766          1697    1706#
053     007112          1733    1742#
054     007236          1769    1778#
055     007362          1805    1814#
056     007506          1841    1850#
057     007632          1877    1886#
06      001734           604     608#
060     007756          1913    1922#
061     010102          1949    1958#
062     010226          1985    1994#
063     010352          2021    2030#
064     010476          2057    2066#
065     010622          2093    2102#
066     010746          2129    2138#
067     011072          2165    2174#
07      002032           630     634#
070     011216          2201    2210#
071     011342          2237    2246#
072     011466          2273    2282#
073     011616          2311    2320#
074     011742          2347    2356#
PC    =%000007           389#    2425*   2503*   2516*   2517*
POWDWN  012754           447     2518#   2560
POWUP   013044          2537    2540#
PRINTR  012552          2433    2436    2449    2457    2460    2474#
PRINTS  012562          2476#
PS    = 177776           373#
RETURN  013242          2429    2585#
R0    =%000000           381#    450*    2386*   2435    2513*   2530    2549*
R1    =%000001           382#    2531    2541*   2542*   2548*
R2    =%000002           383#    2532    2547*
R3    =%000003           384#    2399*   2438*   2471*   2533    2546*
R4    =%000004           385#    2426    2439*   2446*   2450*   2461*   2478    2479*   2497    2502*   2534    2545*
R5    =%000005           386#    2535    2544*
SAVEG   013254          2536*   2540    2589#
SAVLAD  012210          2404    2410#   2418
```

F06

```
MAINDEC-11-DCFPF-B      TEST OF MULF AND MULD   MACY11 27(732)  03-SEP-76  16:26  PAGE 71
DCFPFB.P11      CROSS REFERENCE TABLE -- USER SYMBOLS

SCOPE = 104400           376#    464    490    516    542    568    594    620    646    672    698    724    750
                         776     802    828    854    880    906    932    958    984   1010   1036   1062   1098
                        1116    1152   1188   1224   1260   1296   1332   1368   1404   1440   1476   1512   1548
                        1584    1620   1656   1692   1728   1764   1800   1836   1872   1908   1944   1980   2016
                        2052    2088   2124   2160   2196   2232   2268   2304   2342   2372
SP      =%000006         388#    435*   445*  2536   2540*
SPACE    013245         2434    2437   2447   2454   2458   2586#
STAO    = 170005         405#
STQO    = 170007         406#
SWR     = 177570         374#    375   2373   2378   2395   2397   2399   2401   2403   2421   2427   2462   2465
                        2469    2471
SW08    = 000400         403#   2395   2469
SW09    = 001000         402#   2465
SW10    = 002000         401#   2373   2421
SW11    = 004000         400#   2403
SW12    = 010000         399#   2378
SW13    = 020000         398#   2427
SW14    = 040000         397#   2401
SW15    = 100000         396#
TIMES    013304         2407    2598#
TRPB     013276         2380*   2595#
TTY     =%000005         387#   2432*  2435*  2448*  2456*  2459*  2483*  2485*  2487*  2567   2568*  2569   2571
                        2579*   2580*  2581   2582*
TYPE    = 000004         378#   2376   2424   2429   2434   2437   2447   2454   2458   2501   2562
UPVEC    013270         2518*   2519*  2537*  2593#
YESRT    012114          438*    446   2384   2393#
.       = 013306         410#    411    412#   416#   421#   470    479    482    496    505    508    522    531
                         534     548    557    560    574    583    586    600    609    612    626    635    638
                         652     661    664    678    687    690    704    713    716    730    739    742    756
                         765     768    782    791    794    808    817    820    834    843    846    860    869
                         872     886    895    898    912    921    924    938    947    950    964    973    976
                         990     999   1002   1016   1025   1028   1042   1051   1054   1068   1077   1080   1094
                        1103    1106   1131   1135   1139   1143   1167   1171   1175   1179   1203   1207   1211
                        1215    1239   1243   1247   1251   1275   1279   1283   1287   1311   1315   1319   1323
                        1347    1351   1355   1359   1383   1387   1391   1395   1419   1423   1427   1431   1455
                        1459    1463   1467   1491   1495   1499   1503   1527   1531   1535   1539   1563   1567
                        1571    1575   1599   1603   1607   1611   1635   1639   1643   1647   1671   1675   1679
                        1683    1707   1711   1715   1719   1743   1747   1751   1755   1779   1783   1787   1791
                        1815    1819   1823   1827   1851   1855   1859   1863   1887   1891   1895   1899   1923
                        1927    1931   1935   1959   1963   1967   1971   1995   1999   2003   2007   2031   2035
                        2039    2043   2067   2071   2075   2079   2103   2107   2111   2115   2139   2143   2147
                        2151    2175   2179   2183   2187   2211   2215   2219   2223   2247   2251   2255   2259
                        2283    2287   2291   2295   2321   2325   2329   2333   2357   2361   2365   2369   2463
                        2466    2475   2490   2493   2498   2505#  2562   2566   2573   2588#
.EMT     012116          453    2395#
.IOT     013154          449    2567#
.TRP     012256          451    2421#
.TYPE    013274         2375*   2376   2423*  2424   2594#
```

```
DUMP      371#  2432  2435  2448  2456  2459
PRINT     371#  2562
SDUMP     371#
STATUS    371#   468   494   520   546   572   598   624   650   676   702   728   754   780   806
           832   858   884   910   936   962   988  1014  1040  1066  1092
TYPEM     371#  2375  2423
$MULD     459#  1110  1146  1182  1218  1254  1290  1326  1362  1398  1434  1470  1506  1542  1578
          1614  1650  1686  1722  1758  1794  1830  1866  1902  1938  1974  2010  2046  2082  2118
          2154  2190  2226  2262  2336
$MULDR    459#  2298
$MULF     459#   485   511   537   563   589   615   641   667   693   719   745   771   797   823
           849   875   901   927   953   979  1005  1031  1057  1083
```

ADD	2576	2579													
BEQ	470	479	482	496	505	508	522	531	534	548	557	560	574	583	586
	600	609	612	626	635	638	652	661	664	678	687	690	704	713	716
	730	739	742	756	765	768	782	791	794	808	817	820	834	843	846
	860	869	872	886	895	898	912	921	924	938	947	950	964	973	976
	990	999	1002	1016	1025	1028	1042	1051	1054	1068	1077	1080	1094	1103	1106
	1131	1135	1139	1143	1167	1171	1175	1179	1203	1207	1211	1215	1239	1243	1247
	1251	1275	1279	1283	1287	1311	1315	1319	1323	1347	1351	1355	1359	1383	1387
	1391	1395	1419	1423	1427	1431	1455	1459	1463	1467	1491	1495	1499	1503	1527
	1531	1535	1539	1563	1567	1571	1575	1599	1603	1607	1611	1635	1639	1643	1647
	1671	1675	1679	1683	1707	1711	1715	1719	1743	1747	1751	1755	1779	1783	1787
	1791	1815	1819	1823	1827	1851	1855	1859	1863	1887	1891	1895	1899	1923	1927
	1931	1935	1959	1963	1967	1971	1995	1999	2003	2007	2031	2035	2039	2043	2067
	2071	2075	2079	2103	2107	2111	2115	2139	2143	2147	2151	2175	2179	2183	2187
	2211	2215	2219	2223	2247	2251	2255	2259	2283	2287	2291	2295	2321	2325	2329
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	2347	2384	2473	2475	2481	2566	2574								
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          856   882   908   934   960   986  1012  1038  1064  1090
LDFPS     465   491   517   543   569   595   621   647   673   699   725   751   777   803   829
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         1837  1873  1909  1945  1981  2017  2053  2089  2125  2161  2197  2233  2269  2343  2559
LDUB     2400  2472
MOV       435   436   438   441   444   445   446   447   448   449   450   451   452   453   454
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         2560  2561  2567  2568  2575  2581  2582
MOVB     2399  2409  2439  2471  2474  2477  2499  2571
MULD     1119  1155  1191  1227  1263  1299  1335  1371  1407  1443  1479  1515  1551  1587  1623
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MULF      467   493   519   545   571   597   623   649   675   701   727   753   779   805   831
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ROL      2483  2485  2487
ROLB     2484  2486  2488
RTI       420  2392  2393  2413  2420  2467  2563  2583
RTS      2503  2517
SETD     2521  2550
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STF       473   499   525   551   577   603   629   655   681   707   733   759   785   811   837
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STFPS     417   468   494   520   546   572   598   624   650   676   702   728   754   780   806
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SUB      2431
TRAP      376
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.IIF         459     469     485     495     511     521     537     547     563     573     589     599     615     625     641
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Spooler runtime 8 Seconds, 32 KCS, 224 disk reads, 4 disk writes, 74 pages