FP11

BASIC INSTRUCTION EXERCISER

MD-11-DCFPO-D

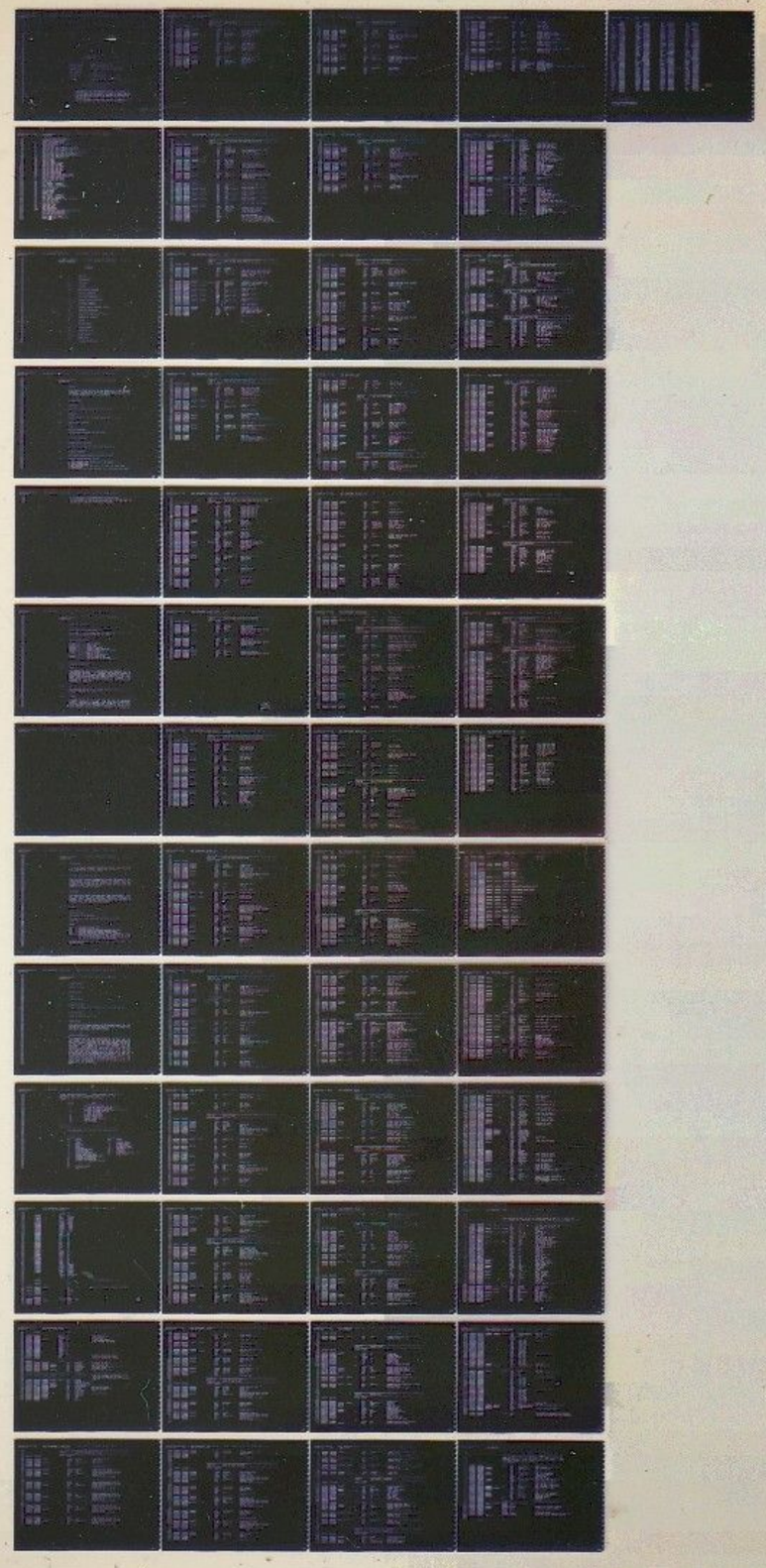
EP-DCFPO-D-DL

MAY 1978

digital

FICHE 1 OF 1

MADE IN USA



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                                        .REPT   8
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[redacted]

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DCFPD-D-D

PRODUCT NAME: FP11 BASIC INSTRUCTION EXERCISER

DATE CREATED: JANUARY 1975

MAINTAINER: DIAGNOSTIC GROUP

AUTHORS: BOB BRAIN/STANLEY HARACKIEWICZ

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DESCRIPTION

1. ABSTRACT

THIS PROGRAM TESTS THE FP11 IN ALL MODES WITH FIXED NUMBER PATTERNS. IT RUNS WITH INTERUPTS BOTH ENABLED AND DISABLED AND CAUSES ERROR CONDITIONS. THE PROGRAM SHOULD BE RUN 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

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                                        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
                                        DATA DISPLAY SWITCH TO THE DISPLAY POSITION.
```

DESCRIPTION

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

AT SA 200 ,, ALL SWITCHES DOWN IS WORST CASE TESTING. 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 ..... INHIBIT RELOCATION
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). 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

F1

216 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)

WHEN THE FP11 INTERRUPT DISABLE BIT IS SET, 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. WHEN THE INTERUPT DISABLE BIT IS CLEAR, THE PROGRAM WILL HANDLE THE TRAPS.

5.2.6 RELOCATOR

WITH SW<9> ON A ZERO, FLOATING POINT TEST (STARTING AT TEST 40) ARE RELOC ED AND EXECUTED THROUGHOUT MEMORY IN 1 K BLOCKS. WHEN A ERROR IS ENCOUNTED, THE ACTUAL ADDRESS IS PRINTED OUT. TO FIND THE LISTING ADDRESS, MASK OUT BITS 12 THROUGH 15 AND ADD 10000 TO THE RESULT.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

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

WHERE:

ADR = ADDRESS OF ERROR HLT
FPS = FLOATING POINT STATUS OR BAD DATA IN "FPS"
PEC = 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 1MINUTE WITH ALL SWITCHES DOWN.

8.2 STACK POINTER

STACK IS INITALLY SET TO 600

8.3 POWER FAIL

THIS TEST CAN BE POWER FAILED WITH NO ERRORS 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

THIS PROGRAM TEST ALL THE INSTRUCTIONS ON THE FP11 AND ALL THE MODES. IT IS DIVIDED INTO 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. WITH SW<9> ON A 1, THE PROGRAM WILL NOT RELOCATE. 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-DCFPO-D      FP11 EXERCISER  STAND ALONE
                        ;COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS
                        ;PROGRAM BY BOB BRAIN AND STAN HANACKIEWICZ
                        .REM@

                                SWITCH                  USE
                                ------          --------------------
                                  0             0 - LOAD UB REGISTER WITH SW<7:0>
                                                1 - LOOP ON TEST IN SW<7:0>
                                  9             RELOCATE @ EXECUTE TESTS THROUGHOUT MEMORY
                                 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 FORMI

                                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
                                    N=      1
                    000001          PS=     177776
                    177776          SWR=    177570
                    177570          SW14=   40000
                    040000          SW13=   20000
                    020000          SW12=   10000
                    010000          SW11=    4000
                    004000          SW10=    2000
                    002000          SW09=    1000
                    001000          SW08=     400
                    000400          FPS=    %0
                    000000          R0=     %0
                    000000          RETURN= %1
                    000001          R1=     %1
                    000001          R2=     %2
                    000002          R3=     %3
                    000003          R4=     %4
                    000004          R5=     %5
                    000005          TTY=    %5
                    000005          SP=     %6
                    000006          PC=     %7
                    000007          TYPE=   IOT
                    000004          BELL=   7
                    000007          AC0=    %0
                    000000          AC1=    %1
                    000001          AC2=    %2
                    000002          AC3=    %3
                    000003          AC4=    %4
                    000004          AC5=    %5
                    000005          LDUB=   170003
                    170003          STAB=   170005
                    170005          STOB=   170007
                    170007          MRS=    170006
                    170006          LDSC=   170004
                    170004          PS=     177776
                    177776          .EQUIV  TRAP,SCOPE
                                    .EQUIV  EMT,HLT

                    000000          .=      0                       ;TRAP CATCHER FROM 0 - 776
(1)
(1)                 000200          .=      200
(1)
(1) 000200  000167  000632                  JMP     START           ;JUMP TO STARTING ADDRESS OF PROGRAM
                    000046          .=      46
000046  011406                              LOGICAL
                    000052          .=      52
000052  040000                              40000

                    000760          .=      760
000760  170200      000044          FLTERR: STFPS   FPS
000762  170367      000044                  STST    FEC
000766  000000                              HALT
000770  000002                              RTI
```

K1

```
                    001000                  .=      1000
                    
001000  000000                ICNT:   0                       ;ITERATION COUNT - LH   TEST NO. - RH
001002  000000                ERRORS: 0                       ;ERROR COUNT
001004  000000  000000        PCNT:   0,0                     ;2 WORD PASS COUNT
001010  000000                LAD:    0                       ;LOOP ADDRESS FOR SCOPE
001012  000000                ANS1:   0                       ;FIRST ANSWER (SEE CODE)
001014  000000                ANS2:   0
001016  000000                ANS3:   0
001020  000000                ANS4:   0
001022  000000                ANS5:   0
001024  000000                ANS6:   0
001026  000000                ANS7:   0
001030  000000                ANS8:   0
001032  000000                FEC:    0                       ;FLOATING EXCEPTION CODES
001034  000000                FEA:    0                       ;FLOATING EXECPTION ADDRESS
                    
001036                  START:
001036  012706  000600                MOV     #600,SP         ;** STACK AT 600 **
001042  012737  000002  000016        MOV     #2,@#16         ;SET RTI INTO 16
001050  012737  001072  000004        MOV     #M1120,@#4      ;FIND OUT WHICH MACHINE THIS IS
001056  005737  177772                TST     @#177772        ;IS PIRQ THERE?
001062  012737  000006  000016        MOV     #6,@#16         ;FUDGE IN RTT IF 11/45
001070  000403                        BR      BEGIN
                    
001072  016737  011542  000010  M1120:  MOV     FPTADR,@#10     ;LOAD THE ILLEGAL INSTRUCTION VECTOR
                                                              ; WITH THE ADDRESS OF THE FPU,
                                                              ; THE FPU WILL HANDLE THE BAD OPCODES
001100  012737  000006  000004  BEGIN:  MOV     #6,@#4          ;RESET 4
001106  012706  000600                MOV     #600,SP
001112  012777  012306  011504        MOV     #POWDWN,@DWNVEC
001120  012777  000340  011500        MOV     #340,@DWNVEC+2
001126  012737  012506  000020        MOV     #IOTS,@#20      ;SET UP VECTOR 20
001134  012700  000030                MOV     #30,R0          ;SET R0 TO VECTOR 30
001140  012720  011560                MOV     #.,TRP,(0)+     ;SET EMT VECTOR
001144  012720  000340                MOV     #340,(0)+
001150  012720  011420                MOV     #.,EMT,(0)+     ;SET TRAP VECTOR
001154  012710  000340                MOV     #340,(0)
001160  005067  177614                CLR     ICNT
001164  005067  177620                CLR     LAD
001170  005001                        CLR     RETURN
```

```
                                ;*****************************************************************
                                ;TEST 1         TEST OF WRITABILITY OF FPS
                                ;*****************************************************************
001172  184400                  TST1:   SCOPE

001174  170127  147757                  LDFPS   #147757         ;TEST FPS WITH ALL 1'S
001200  170200                  STFPS   FPS             ;GET STATUS
001202  022700  147757          CMP     #147757,FPS     ;CHECK IT
001206  001401                  BEQ     .+4
001210  104000                  HLT                     ;FPS NOT 147777

001212  170127  040000          LDFPS   #40000          ;TEST FPS WITH 40000
001216  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1) 001220  022700  040000          CMP     #40000,FPS      ;CHECK FLOATING POINT STATUS
(1) 001224  001401                  BEQ     .+4             ;BRANCH IF OK
(1) 001226  104000                  HLT                     ;FPS NOT EQUAL TO 40000
(1)

001230  170011                  SETD                    ;TEST OF DOUBLE BIT ON A 1
001232  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1) 001234  022700  040200          CMP     #40200,FPS      ;CHECK FLOATING POINT STATUS
(1) 001240  001401                  BEQ     .+4             ;BRANCH IF OK
(1) 001242  104000                  HLT                     ;FPS NOT EQUAL TO 40200
(1)

001244  170001                  SETF                    ;TEST OF DOUBLE BIT ON A 0
001246  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1) 001250  022700  040000          CMP     #40000,FPS      ;CHECK FLOATING POINT STATUS
(1) 001254  001401                  BEQ     .+4             ;BRANCH IF OK
(1) 001256  104000                  HLT                     ;FPS NOT EQUAL TO 40000
(1)

001260  170012                  SETL                    ;TEST OF LONG BIT ON A 1
001262  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1) 001264  022700  040100          CMP     #40100,FPS      ;CHECK FLOATING POINT STATUS
(1) 001270  001401                  BEQ     .+4             ;BRANCH IF OK
(1) 001272  104000                  HLT                     ;FPS NOT EQUAL TO 40100
(1)

001274  170002                  SETI                    ;TEST OF LONG BIT ON A 0
001276  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1) 001300  022700  040000          CMP     #40000,FPS      ;CHECK FLOATING POINT STATUS
(1) 001304  001401                  BEQ     .+4             ;BRANCH IF OK
(1) 001306  104000                  HLT                     ;FPS NOT EQUAL TO 40000
(1)
```

```
                                ;*****************************************************************
                                ;TEST 2          TEST OF CFCC
                                ;*****************************************************************
001310  184400                  TST2:   SCOPE

001312  170127  040017                  LDFPS   #40017          ;LOAD ALL STATUS BITS TO 1'S
001316  170000                  CFCC                            ;GET THEM INTO PS
001320  013700  177776          MOV     @#PS,FPS                ;GET THEM FOR TYPING
001324  042700  177760          BIC     #177760,FPS             ;CLEAR JUNK
001330  022700  000017          CMP     #17,FPS                 ;ALL SET?
001334  001401                  BEQ     .+4
001336  184000                  HLT                             ;PS NOT 17

001340  170127  040012          LDFPS   #40012          ;LOAD FPS WITH 12
001344  170000                  CFCC                    ;GET INTO PS
001346  013700  177776          MOV     @#PS,FPS        ;GET FOR TYPING
001352  042700  177760          BIC     #177760,FPS     ;CLEAR JUNK
001356  022700  000012          CMP     #12,FPS         ;SAME AS LD?
001362  001401                  BEQ     .+4
001364  184000                  HLT                     ;PS NOT 12

001366  170127  040005          LDFPS   #40005          ;LOAD FPS WITH 5
001372  170000                  CFCC                    ;GET BITS
001374  013700  177776          MOV     @#PS,FPS        ;SET FOR TYPING
001400  042700  177760          BIC     #177760,FPS     ;CLEAR JUNK
001404  022700  000005          CMP     #5,FPS          ;SAME?
001410  001401                  BEQ     .+4
001412  184000                  HLT                     ;PS NOT 5
```

```
615                                     ;*****************************************************************
(2)                                     ;TEST 3         TEST OF LDD, STD, CMPD OF -1,0,-1,0
(2)                                     ;*****************************************************************
(2)  001414  104400                     TST3:   SCOPE
616
617  001416  170127  047600                    LDFPS   #47600
618  001422  012700  011102                    MOV     #D1010,FPS      ;GET ADDRESS OF DATA WORD
619  001426  172420                            LDD     (FPS)+,AC0      ;LOAD INTO AC0
620  001430  022700  011112                    CMP     #D1010+10,FPS   ;IS THE NEW ADDRESS RIGHT?
621  001434  001401                            BEQ     .+4
622  001436  104000                            HLT                     ;FPS NOT D1010+10
623
624  001440  010667  011146                    MOV     SP,.TYPE
625  001444  162767  000010  011140           SUB     #10.,.TYPE
626  001452  174046                            STD     AC0,-(SP)       ;GET THE DATA BACK
627  001454  010600                            MOV     SP,FPS          ;SAVE THE SP FOR TYPING
628  001456  026706  011130                    CMP     .TYPE,SP        ;SP DECREMENTED PROPERLY?
629  001462  001401                            BEQ     .+4
630  001464  104000                            HLT                     ;SP NOT SP-10
631
632  001466  170200                            STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  001470  022700  047610                    CMP     #47610,FPS      ;CHECK FLOATING POINT STATUS
(1)  001474  001401                            BEQ     .+4             ;BRANCH IF OK
(1)  001476  104000                            HLT                     ;FPS NOT EQUAL TO 47610
(1)
633
634  001500  021667  007376                    CMP     (SP),D1010      ;CHECK FIRST PIECE OF DATA
635  001504  001401                            BEQ     .+4
636  001506  104204                            HLT     204             ;DATA IN (SP) NOT D1010
637  001510  026667  000002  007366            CMP     2(SP),D1010+2   ;CHECK SECOND
638  001516  001401                            BEQ     .+4
639  001520  104204                            HLT     204             ;DATA IN 2(SP) NOT D1010+2
640  001522  026667  000004  007356            CMP     4(SP),D1010+4   ;CHECK THIRD
641  001530  001401                            BEQ     .+4
642  001532  104204                            HLT     204             ;DATA IN 4(SP) NOT D1010+4
643  001534  026667  000006  007346            CMP     6(SP),D1010+6   ;CHECK FOURTH
644  001542  001401                            BEQ     .+4
645  001544  104204                            HLT     204             ;DATA IN 6(SP) NOT D1010+6
646
647  001546  062767  000010  011036            ADD     #10.,.TYPE
648  001554  173426                            CMPD    (SP)+,AC0       ;RECHECK DATA AND SP
649  001556  010600                            MOV     SP,FPS          ;SAVE SP FOR TYPING
650  001560  026706  011026                    CMP     .TYPE,SP        ;CHECK ADDRESS IN SP
651  001564  001401                            BEQ     .+4
652  001566  104000                            HLT                     ;SP NOT RESTORED
653  001570  170200                            STFPS   FPS             ;GET FPS IN CASE CMPD FAILED
654  001572  170000                            CFCC                    ;NOW GET THE FP CONDITION CODES
655  001574  001401                            BEQ     .+4             ;IF IT HALTS HERE IT MUST BE THE
656  001576  104000                            HLT                     ; CMPD BECAUSE THE IS ALREADY CONFIRMED
```

```
658                                     ;*****************************************************************
(2)                                     ;TEST 4         TEST OF LDD, STD, CMPD OF 0,-1,0,-1
(2)                                     ;*****************************************************************
(2)  001600  104400                     TST4:   SCOPE
659
660  001602  170127  047600                    LDFPS   #47600
661  001606  172437  011104                    LDD     @#D0101,AC0     ;LOAD 0,-1,0,-1 INTO AC0 *PIC*
662  001612  170200                            STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  001614  022700  047604                    CMP     #47604,FPS      ;CHECK FLOATING POINT STATUS
(1)  001620  001401                            BEQ     ,+4             ;BRANCH IF OK
(1)  001622  104000                            HLT                     ;FPS NOT EQUAL TO 47604
(1)
663
664  001624  012700  001812                    MOV     #ANS1,FPS       ;ADDRESS TO BE STORED INTO
665  001630  174010                            STD     AC0,(FPS)       ;STORE IT INTO ANS1-4 *PIC*
666  001632  026767  000246  177152            CMP     D0101,ANS1      ;FIRST WORD OK?
667  001640  001401                            BEQ     ,+4
668  001642  104004                            HLT     4               ;ANS1 NOT D0101
669  001644  026767  000236  177142            CMP     D0101+2,ANS2    ;SECOND
670  001652  001401                            BEQ     ,+4
671  001654  104004                            HLT     4               ;ANS2 NOT D0101+2
672  001656  026767  000226  177132            CMP     D0101+4,ANS3    ;THIRD
673  001664  001401                            BEQ     ,+4
674  001666  104004                            HLT     4               ;ANS3 NOT D0101+4
675  001670  026767  000216  177122            CMP     D0101+6,ANS4    ;FOURTH
676  001676  001401                            BEQ     ,+4
677  001700  104004                            HLT     4               ;ANS4 NOT D0101+6
678
679  001702  012704  011126                    MOV     #AD0101-2,R4    ;ADDRESS-2 OF DATA
680  001706  173474  000002                    CMPD    @2(4),AC0       ;CHECK DATA IN AC0 *PIC*
681  001712  170200                            STFPS   FPS             ;GET STAUS FOR TYPING
682  001714  170000                            CFCC                    ;GET CONDITION CODES
683  001716  001401                            BEQ     ,+4
684  001720  104000                            HLT                     ;CMPD FAILED
```

```
                                ;*****************************************************************
                                ;TEST 5         TEST OF LDF, STF, CMPF OF -1,0
                                ;*****************************************************************
001722  104400                  TST5:   SCOPE
                        ;
001724  170127  047400          LDFPS   #47400          ;SET FLOATING MODE
001730  172467  007146          LDF     D1010,AC0       ;LOAD -1,0 INTO AC0
001734  012700  001012          MOV     #ANS1,FPS       ;POINTED TO ANSWER AREA *PIC*
001740  174020                  STF     AC0,(FPS)+      ;STORE RESULT
001742  022700  001016          CMP     #ANS3,FPS       ;INCREMENTED PROPERLY
001746  001401                  BEQ     .+4
001750  104000                  HLT                     ;FPS NOT ANS1+4
                        ;
001752  026767  007124  177032  CMP     D1010,ANS1      ;CHECK FIRST WORD
001760  001401                  BEQ     .+4
001762  104002                  HLT     2               ;ANS1 NOT D1010
001764  026767  007114  177022  CMP     D1010+2,ANS2    ;SECOND
001772  001401                  BEQ     .+4
001774  104002                  HLT     2               ;ANS2 NOT D1010+2
                        ;
001776  170011                  SETD                    ;GO TO DOUBLE MODE
002000  012700  001022          MOV     #ANS5,FPS       ;ADDRESS OF DATA+10
002004  174040                  STD     AC0,-(FPS)      ;GET DATA
002006  022700  001012          CMP     #ANS1,FPS       ;CHECK FOR PROPER DECREMENTATION
002012  001401                  BEQ     .+4
002014  104000                  HLT                     ;FPS NOT ANS1
                        ;
002016  012700  011134          MOV     #AD1000,FPS     ;LOAD ADDRESS OF ADDRESS OF DATA
002022  173430                  CMPD    @(FPS)+,AC0     ;CHECK THE DATA
002024  022700  011136          CMP     #AD1000+2,FPS   ;FPS GETS INCREMENTED BY 2
002030  001401                  BEQ     .+4
002032  104000                  HLT                     ;FPS NOT AD1001+2
                        ;
002034  170200                  STFPS   FPS             ;GET FPS
002036  170000                  CFCC                    ;COPY CONDITION CODES
002040  001401                  BEQ     .+4             ;EITHER CMPD FAILED OR THE
002042  104004                  HLT     4               ;LDF MODIFIED RIGHT HALF
```

```
                                ;*****************************************************************
                                ;TEST 6          TEST OF LDF, STF, CMPF WITH <=> IN ALL AC'S
                                ;*****************************************************************
002044  104400          TST61   SCOPE

002046  170127  047400          LDFPS   #47400          ;LOAD FLOATING MODE
002052  172427  140640          LDF     #-5,AC0         ;LOAD AC0 WITH -5
002056  172527  140200          LDF     #-1,AC1         ;LOAD AC1 WITH -1
002062  172627  000000          LDF     #0,AC2          ;LOAD AC2 WITH 0
002066  172727  040640          LDF     #5,AC3          ;LOAD AC3 WITH 5
002072  174004                  STF     AC0,AC4         ;LOAD AC4 WITH -5
002074  174305                  STF     AC3,AC5         ;LOAD AC5 WITH 5

002076  174067  176710          STF     AC0,ANS1        ;GET AC0
002102  173427  140640          CMPF    #-5,AC0         ;CHECK IT
002106  170200                  STFPS   FPS             ;GET STATUS
002110  170000                  CFCC                    ;GET CC
002112  001401                  BEQ     .+4
002114  104002                  HLT     2               ;AC0 NOT -5

002116  174137  001012          STF     AC1,@#ANS1      ;GET AC1
002122  173567  176664          CMPF    ANS1,AC1        ;CHECK IT
002126  170200                  STFPS   FPS             ;GET STATUS
002130  170000                  CFCC                    ;GET CC
002132  001401                  BEQ     .+4
002134  104002                  HLT     2               ;AC1 NOT -1
002136  012704  001012  ADANS1: MOV     #ANS1,R4        ;POINTER TO ANSWER AREA
002142  174214                  STF     AC2,(4)         ;PUT DATA INTO ANS1
002144  173667  176642          CMPF    ANS1,AC2        ;CHECK DATA
002150  170200                  STFPS   FPS             ;SET STATUS
002152  170000                  CFCC                    ;GET CC
002154  001401                  BEQ     .+4
002156  104002                  HLT     2               ;AC2 NOT 0

002160  174377  177754          STF     AC3,@ADANS1+2   ;PUT DATA INTO ANS1
002164  173767  176622          CMPF    ANS1,AC3        ;CHECK DATA
002170  170200                  STFPS   FPS             ;GET STATUS
002172  170000                  CFCC                    ;GET CC
002174  001401                  BEQ     .+4
002176  104002                  HLT     2               ;AC3 NOT 5

002200  173404                  CMPF    AC4,AC0         ;CHECK AC4 FOR -5
002202  170200                  STFPS   FPS             ;GET STATUS
002204  170000                  CFCC                    ;GET CC
002206  001401                  BEQ     .+4
002210  104000                  HLT
                                                        ;AC0 NOT AC4

002212  173705                  CMPF    AC5,AC3         ;CHECK AC5 FOR 5
002214  170200                  STFPS   FPS             ;GET STATUS
002216  170000                  CFCC                    ;GET CC
002220  001401                  BEQ     .+4
002222  104000                  HLT                     ;AC3 NOT AC5
```

```
772                                ;*****************************************************************
(2)                                ;TEST 7          TEST OF CMPF WITH DATA IN AC0-AC5
(2)                                ;*****************************************************************
(2)  002224  104400                TST7:   SCOPE
773
774  002226  170127  041000                LDFPS   #41000          ;LOAD STATUS WITH 0
775  002232  173405                CMPF    AC5,AC0         ;CMP 5 TO -5
776  002234  170200                STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002236  022700  041000                CMP     #41000,FPS      ;CHECK FLOATING POINT STATUS
(1)  002242  001401                BEQ     .+4             ;BRANCH IF OK
(1)  002244  104000                HLT                     ;FPS NOT EQUAL TO 41000
(1)
777
778  002246  173704                CMPF    AC4,AC3         ;CMP -5 TO 5
779  002250  170200                STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002252  022700  041010                CMP     #41010,FPS      ;CHECK FLOATING POINT STATUS
(1)  002256  001401                BEQ     .+4             ;BRANCH IF OK
(1)  002260  104000                HLT                     ;FPS NOT EQUAL TO 41010
(1)
780
781  002262  173767  000650                CMPF    DBIG,AC3        ;MAKE IT OVERFLOW
782  002266  170200                STFPS   FPS             ;STORE FLOATING POINT STATUS
783  002270  022700  041000                CMP     #41000,FPS      ;CHECK FLOATING POINT STATUS
784  002274  001401                BEQ     .+4
785  002276  104000                HLT                     ;FPS NOT 141002
786
```

```
                                ;*****************************************************************
                                ;TEST 10        TEST OF TSTF AND TSTD USING OLD AC0-AC5
                                ;*****************************************************************
002300  104400          TST10:  SCOPE

002302  170127  040000          LDFPS   #40000
002306  170501          TSTF    AC1             ;TEST AC1 = -1
002310  170200          STFPS   FPS             ;GET THE STATUS
002312  022700  040010          CMP     #40010,FPS      ;CHECK STATUS
002316  001401          BEQ     .+4
002320  104000          HLT                     ;N BIT NOT SET

002322  170505          TSTF    AC5             ;TEST AC5 = 5
002324  170200          STFPS   FPS             ;GET STATUS
002326  022700  040000          CMP     #40000,FPS      ;CHECK STATUS
002332  001401          BEQ     .+4
002334  104000          HLT                     ;NOT 0

002336  170502          TSTF    AC2             ;TEST AC2 = 0
002340  170200          STFPS   FPS             ;GET STATUS
002342  022700  040004          CMP     #40004,FPS      ;CHECK STATUS
002346  001401          BEQ     .+4
002350  104000          HLT                     ;Z BIT NOT SET

002352  170527  177777          TSTF    #-1             ;TEST FOR THE N BIT IN LINE
002356  000401          BR      .+4             ;SHOULD GO HERE
002360  104000          HLT                     ;INCREMENTED BY 4 NOT 2
002362  170200          STFPS   FPS             ;GET STATUS
002364  022700  040010          CMP     #40010,FPS      ;CHECK THE N BIT
002370  001401          BEQ     .+4
002372  104000          HLT                     ;N BIT NOT SET

002374  170011          SETD                    ;SET DOUBLE MODE
002376  170527  000000          TSTD    #0              ;TEST FOR Z BIT IN LINE
002402  000403          BR      .+10            ;SHOULD GO HERE
002404  000000          HALT                    ;NOT HERE
002406  000000          HALT                    ;OR HERE
002410  000000          HALT                    ;OR HERE
002412  170200          STFPS   FPS             ;GET STATUS
002414  022700  040204          CMP     #40204,FPS      ;CHECK STATUS
002420  001401          BEQ     .+4
002422  104000          HLT                     ;Z BIT NOT SET
```

```
828                                     ;*****************************************************************
(2)                                     ;TEST 11        TEST OF CLRX INSTRUCTIONS
(2)                                     ;*****************************************************************
(2)  002424  104400                     TST11:  SCOPE
829
830  002426  170127  040200                    LDFPS   #40200          ;DOUBLE MODE
831  002432  172467  000444                    LDD     D1010,AC0       ;LOAD A -1
832  002436  174067  176350                    STD     AC0,ANS1        ;PUT INTO ANS1
833  002442  170001                             SETF                    ;SET FLOATING
834  002444  170467  176342                    CLRF    ANS1            ;CLEAR IT OUT
835  002450  170200                             STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002452  022700  040004                    CMP     #40004,FPS      ;CHECK FLOATING POINT STATUS
(1)  002456  001401                             BEQ     .+4             ;BRANCH IF OK
(1)  002460  104000                             HLT                     ;FPS NOT EQUAL TO 40004
(1)
836
837  002462  170567  176324                    TSTF    ANS1            ;TEST FOR ZERO
838  002466  170000                             CFCC                    ;GET CC
839  002470  001401                             BEQ     .+4
840  002472  104002                             HLT     2               ;AC0 NOT ZERO
841
842  002474  026767  000406  176314             CMP     D1010+4,ANS3    ;CHECK THIRD WORD
843  002502  001401                             BEQ     .+4
844  002504  104004                             HLT     4               ;ANS3 NOT -1
845  002506  026767  000376  176304             CMP     D1010+6,ANS4    ;CHECK FOURTH
846  002514  001401                             BEQ     .+4
847  002516  104004                             HLT     4               ;ANS4 NOT 0
848
849  002520  170011                             SETD
850  002522  170400                             CLRD    AC0             ;CLEAR THE REST OF AC0
851  002524  170200                             STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002526  022700  040204                    CMP     #40204,FPS      ;CHECK FLOATING POINT STATUS
(1)  002532  001401                             BEQ     .+4             ;BRANCH IF OK
(1)  002534  104000                             HLT                     ;FPS NOT EQUAL TO 40204
(1)
852  002536  174067  176250                    STD     AC0,ANS1        ;STORE RESULT
853  002542  170500                             TSTD    AC0             ;DID IT CLEAR
854  002544  170000                             CFCC                    ;GET STATUS
855  002546  001401                             BEQ     .+4
856  002550  104004                             HLT     4               ;DID NOT CLEAR
857
858  002552  172467  000370                    LDD     DMZERO,AC0      ;LOAD A MINUS ZERO
859  002556  170400                             CLRD    AC0             ;CLEAR IT OUT
860  002560  170200                             STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002562  022700  040204                    CMP     #40204,FPS      ;CHECK FLOATING POINT STATUS
(1)  002566  001401                             BEQ     .+4             ;BRANCH IF OK
(1)  002570  104000                             HLT                     ;FPS NOT EQUAL TO 40204
(1)
861  002572  174067  176214                    STD     AC0,ANS1        ;STORE RESULT
862  002576  170500                             TSTD    AC0             ;CHECK IT
863  002600  170000                             CFCC                    ;GET CC
864  002602  001401                             BEQ     .+4
865  002604  104004                             HLT     4               ;DID NOT CLEAR
```

```
867                                     ;*****************************************************************
(2)                                     ;TEST 12        TEST OF NEGX
(2)                                     ;*****************************************************************
(2)  002606  184400                     TST12:  SCOPE
868
869  002610  170127  040000                    LDFPS   #40000
870  002614  172427  140640                    LDF     #-5,AC0         ;LOAD AC0 WITH -5
871  002620  170700                     NEGF    AC0             ;MAKE IT 5
872  002622  170200                     STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002624  022700  040000                    CMP     #40000,FPS      ;CHECK FLOATING POINT STATUS
(1)  002630  001401                     BEQ     .+4             ;BRANCH IF OK
(1)  002632  104000                     HLT                     ;FPS NOT EQUAL TO 40000
(1)
873
874  002634  174067  176152                   STF     AC0,ANS1        ;GET THE RESULT
875  002640  173427  040640                    CMPF    #5,AC0          ;CHECK THE RESULT
876  002644  170000                     CFCC                    ;GET CC
877  002646  001401                     BEQ     .+4
878  002650  104002                     HLT     2               ;RESULT NOT 5
879
880  002652  170767  176134                   NEGF    ANS1            ;MAKE IT -5
881  002656  170200                     STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002660  022700  040010                    CMP     #40010,FPS      ;CHECK FLOATING POINT STATUS
(1)  002664  001401                     BEQ     .+4             ;BRANCH IF OK
(1)  002666  104000                     HLT                     ;FPS NOT EQUAL TO 40010
(1)
882
883  002670  022767  140640  176114           CMP     #140640,ANS1    ;CHECK THE RESULT
884  002676  001401                     BEQ     .+4
885  002700  104002                     HLT     2               ;RESULT NOT -5
886
887  002702  005767  176106                   TST     ANS2            ;REST 0?
888  002706  001401                     BEQ     .+4             ;SKIP IF OK
889  002710  104002                     HLT     2
890
891  002712  170127  047400                    LDFPS   #47400          ;TURN ON INTERUPTS
892  002716  170400                     CLRF    AC0             ;CLEAR AC0
893  002720  170700                     NEGF    AC0             ;NEGATE IT
894  002722  170200                     STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  002724  022700  047404                    CMP     #47404,FPS      ;CHECK FLOATING POINT STATUS
(1)  002730  001401                     BEQ     .+4             ;BRANCH IF OK
(1)  002732  104000                     HLT                     ;FPS NOT EQUAL TO 47404
(1)
895
896  002734  174067  176052                   STF     AC0,ANS1        ;GET RESULT
897  002740  170500                     TSTF    AC0             ;CHECK IT
898  002742  170000                     CFCC                    ;GET CC
899  002744  001401                     BEQ     .+4
900  002746  104002                     HLT     2               ;RESULT NOT 0
901
902  002750  170011                     SETD                    ;SET DOUBLE MODE
903  002752  170400                     CLRD    AC0             ;CLEAR AC0
904  002754  170700                     NEGD    AC0             ;NEGATE AC0
905  002756  170200                     STFPS   FPS             ;STORE FLOATING POINT STATUS
```

```
(1)  002760  022700  047604          CMP     #47604,FPS      ;CHECK FLOATING POINT STATUS
(1)  002764  001401                  BEQ     .+4             ;BRANCH IF OK
(1)  002766  104000                  HLT                     ;FPS NOT EQUAL TO 47604
(1)
926
927  002770  174067  176016          STF     AC0,ANS1        ;GET RESULT
928  002774  170500                  TSTF    AC0             ;TEST RESULT
929  002776  170000                  CFCC                    ;GET CC
930  003000  001401                  BEQ     .+4
931  003002  104004                  HLT     4               ;RESULT NOT 0
932
933                          ;*****************************************************************
(2)                          ;TEST 13        TEST OF ABSX
(2)                          ;*****************************************************************
(2)  003004  104400          TST13:  SCOPE
934
935  003006  170127  040000          LDFPS   #40000
936  003012  172427  140200          LDF     #-1,AC0         ;LOAD A -1
937  003016  174067  175770          STF     AC0,ANS1        ;GET IT
938  003022  170667  175764          ABSF    ANS1            ;MAKE IT A 1
939  003026  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  003030  022700  040000          CMP     #40000,FPS      ;CHECK FLOATING POINT STATUS
(1)  003034  001401                  BEQ     .+4             ;BRANCH IF OK
(1)  003036  104000                  HLT                     ;FPS NOT EQUAL TO 40000
(1)
940
941  003040  022767  040200  175744  CMP     #40200,ANS1     ;CHECK FOR A 1
942  003046  001401                  BEQ     .+4
943  003050  104002                  HLT     2               ;RESULT NOT 1
944
945  003052  005767  175736          TST     ANS2            ;TEST IT
946  003056  001401                  BEQ     .+4             ;SKIP IF OK
947  003060  104002                  HLT     2
948
949  003062  170600                  ABSF    AC0             ;ABS IT AGAIN
950  003064  170200                  STFPS   FPS             ;GET STATUS
951  003066  173427  040200          CMPF    #1,AC0          ;CHECK FOR A 1
952  003072  170000                  CFCC                    ;GET CC
953  003074  001401                  BEQ     .+4
954  003076  104002                  HLT     2               ;RESULT NOT 1
955
956  003100  172467  000042          LDF     DMZERO,AC0      ;LOAD A MINUS ZERO
957  003104  170600                  ABSF    AC0             ;ABS IT
958  003106  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
(1)  003110  022700  040004          CMP     #40004,FPS      ;CHECK FLOATING POINT STATUS
(1)  003114  001401                  BEQ     .+4             ;BRANCH IF OK
(1)  003116  104000                  HLT                     ;FPS NOT EQUAL TO 40004
(1)
959
960  003120  174067  175666          STF     AC0,ANS1        ;GET RESULT
961  003124  170500                  TSTF    AC0             ;TEST FOR 0
962  003126  170000                  CFCC                    ;GET CC
963  003130  001401                  BEQ     .+4
964  003132  104002                  HLT     2               ;RESULT NOT 0
```

J2

```
                                                                                
                                                                                
                        SETD                            ;SET DOUBLE MODE
                        LDD     D1010,AC0               ;LOAD -1,0,-1,0
                        ABSD    AC0                     ;ABS IT
                        STFPS   FPS                      STORE FLOATING POINT STATUS
                        CMP     #40200,FPS              ;CHECK FLOATING POINT STATUS
                        BEQ     .+4                     ;BRANCH IF OK
                        HLT                             ;FPS NOT EQUAL TO 40200
                                                                                
                        STD     AC0,ANS1                ;GET RESULT
                        CMPD    DBIG,AC0                ;CHECK THE RESULT
                        CFCC                            ;GET CC
                        BEQ     .+4
                        HLT     4                       ;RESULT NOT 77777,0,-1,0
                                                                                
                ;*******************************************************************
                ;TEST 14         TEST OF LDEXP & STEXP
                ;*******************************************************************
                TST14:  SCOPE
                                                                                
                        LDFPS   #40200                  ;SET DOUBLE MODE
                        LDD     D1010,AC0               ;LOAD A -1,0,-1,0
                        LDEXP   #-200,AC0               ;CLEAR THE EXPONENT
                        STFPS   FPS                     ;STORE FLOATING POINT STATUS
                        CMP     #40204,FPS              ;CHECK FLOATING POINT STATUS
                        BEQ     .+4                     ;BRANCH IF OK
                        HLT                             ;FPS NOT EQUAL TO 40204
                                                                                
                        STD     AC0,ANS1                ;GET THE RESULT
                        TSTD    AC0                     ;IS IT 0
                        CFCC
                        BEQ     .+4
                        HLT     4                       ;AC0 NOT 0
                                                                                
                        STEXP   AC0,ANS1                ;GET THE RESULT
                        MOV     @PS,FPS                 ;GET PS BITS
                        BIC     #177760,FPS             ;CLEAR JUNK
                        CMP     #10,FPS                 ;IS IT OK?
                        BEQ     .+4                     ;SKIP IF OK
                        HLT                             ;PS IS WRONG
                                                                                
                        CMP     @-200,ANS1              ;CHECK IT
                        BEQ     .+4
                        HLT     1                       ;EXPONENT NOT 0
                                                                                
                        SETF                            ;SET FLOATING MODE
                        LDF     D0101,AC0               ;LOAD A 0,-1
                        LDEXP   #200,AC0                ;SET EXPONENT TO -1
                        STFPS   FPS                     ;STORE FLOATING POINT STATUS
                        CMP     #40000,FPS              ;CHECK FLOATING POINT STATUS
                        BEQ     .+4                     ;BRANCH IF OK
                        HLT                             ;FPS NOT EQUAL TO 40000
                                                                                
```

```
                                                                    ;SAVE RESULT
000322  174067  175464          STF     AC0,ANS1
000326  005767  175460          TST     ANS1                       ;CHECK FIRST WORD
000332  001401                  BEQ     .+4
000334  104002                  HLT     2                          ;ANS1 NOT 0
                                                                    ;CHECK SECOND WORD
000336  022767  177777  175450  CMP     #-1,ANS2
000344  001401                  BEQ     .+4
000346  104002                  HLT     2                          ;ANS2 NOT -1
                                                                    ;GET THE EXPONENT BACK
000350  175067  175436          STEXP   AC0,ANS1
000354  022767  177600  175430  CMP     #-200,ANS1                 ;CHECK IT
000362  001401                  BEQ     .+4
000364  104000                  HLT                                ;EXPONENT NOT -200
                                                                    ;LOAD ALT 1'S
000366  176527  000052          LDEXP   #52,AC1
000372  175100                  STEXP   AC1,FPS                    ;GET THEM BACK
000374  022700  000052          CMP     #52,FPS                    ;OK?
000400  001401                  BEQ     .+4
000402  104000                  HLT                                ;EXP NOT 292
                                                                    ;LOAD OTHER ALT 1'S
000404  176627  000025          LDEXP   #25,AC2
000410  175200                  STEXP   AC2,FPS                    ;GET IT BACK
000412  022700  000025          CMP     #25,FPS                    ;CHECK IT
000416  001401                  BEQ     .+4
000420  104000                  HLT                                ;EXP NOT 125
                                ;*****************************************************************
                                ;TEST 15        TEST OF ADDF & SUBF
                                ;*****************************************************************
000422  104400  TST15:  SCOPE

000424  170127  047400          LDFPS   #47400                     ;LOAD FLOATING MODE
000430  172427  040600          LDF     #4,AC0                     ;LOAD A 4
000434  172027  040400          ADDF    #2,AC0                     ;ADD A 2
000440  170200                  STFPS   FPS                        ;STORE FLOATING POINT STATUS
000442  022700  047400          CMP     #47400,FPS                 ;CHECK FLOATING POINT STATUS
000446  001401                  BEQ     .+4                        ;BRANCH IF OK
000450  104000                  HLT                                ;FPS NOT EQUAL TO 47400

000452  174067  175334          STF     AC0,ANS1                   ;STORE RESULT
000456  173427  040700          CMPF    #6,AC0                     ;CHECK RESULT
000462  170000                  CFCC                               ;GET CC
000464  001401                  BEQ     .+4
000466  104002                  HLT     2                          ;RESULT NOT 6

000470  173027  041020          SUBF    #9,AC0                     ;SUBTRACT 9 FROM 6
000474  170200                  STFPS   FPS                        ;STORE FLOATING POINT STATUS
000476  022700  047410          CMP     #47410,FPS                 ;CHECK FLOATING POINT STATUS
000502  001401                  BEQ     .+4                        ;BRANCH IF OK
000504  104000                  HLT                                ;FPS NOT EQUAL TO 47410
```

```
  1027  003506  174067  175300          STF     AC0,ANS1        ;STORE RESULT IN ANS1
  1028  003512  173427  140500          CMPF    #-3,AC0         ;CHECK RESULT
  1029  003516  170000                  CFCC                    ;GET CC
  1030  003520  001401                  BEQ     .+4
  1031  003522  104002                  HLT     2               ;0 = 9 NOT -37
  1032
  1033
  1034                          ;*****************************************************************
   (2)                          ;TEST 16        TEST OF ADDD AND SUBD
   (2)                          ;*****************************************************************
   (2)  003524  104400          TST16:  SCOPE
  1035
  1036  003526  170127  047600          LDFPS   #47600          ;SET DOUBLE MODE
  1037  003532  172527  141400          LDD     #-32.,.AC1      ;LOAD A -32.
  1038  003536  172127  040640          ADDD    #9,AC1          ;ADD 9 TO -32.
  1039  003542  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
   (1)  003544  022700  047610          CMP     #47610,FPS      ;CHECK FLOATING POINT STATUS
   (1)  003550  001401                  BEQ     .+4             ;BRANCH IF OK
   (1)  003552  104000                  HLT                     ;FPS NOT EQUAL TO 47610
   (1)
  1040
  1041  003554  174177  000376          STD     AC1,@AANS1      ;GET RESULT
  1042  003560  173527  141330          CMPD    #-27.,.AC1      ;CHECK RESULT
  1043  003564  170000                  CFCC                    ;GET CC
  1044  003566  001401                  BEQ     .+4
  1045  003570  104004                  HLT     4               ;-32.+9 NOT -27
  1046
  1047  003572  172667  000362          LDD     DALTA,AC2       ;LOAD ALT 1'S
  1048  003576  172267  000366          ADDD    DALTB,AC2       ;ADD OTHER 1'S
  1049  003602  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
   (1)  003604  022700  047600          CMP     #47600,FPS      ;CHECK FLOATING POINT STATUS
   (1)  003610  001401                  BEQ     .+4             ;BRANCH IF OK
   (1)  003612  104000                  HLT                     ;FPS NOT EQUAL TO 47600
   (1)
  1050
  1051  003614  174277  000336          STD     AC2,@AANS1      ;GET RESULT
  1052  003620  173607  040500          CMPD    #3,AC2          ;CHECK RESULT
  1053  003624  170000                  CFCC                    ;GET CC
  1054  003626  001401                  BEQ     .+4
  1055  003630  104004                  HLT     4               ;ANS1 NOT DALTAN
  1056
  1057  003632  172267  000322          SUBD    DALTA,AC2       ;SUBTRACT IT BACK
  1058  003636  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
   (1)  003640  022700  047600          CMP     #47600,FPS      ;CHECK FLOATING POINT STATUS
   (1)  003644  001401                  BEQ     .+4             ;BRANCH IF OK
   (1)  003646  104000                  HLT                     ;FPS NOT EQUAL TO 47600
   (1)
  1059
  1060  003650  174267  175136          STD     AC2,ANS1        ;GET THE RESULT
  1061  003654  173667  000320          CMPD    DALTC,AC2       ;CHECK IT
  1062  003660  170000                  CFCC                    ;GET CC
  1063  003662  001401                  BEQ     .+4
  1064  003664  104004                  HLT     4               ;ANS1 NOT DALTA
```

```
                                ;*****************************************************************
                                ;TEST 17        TEST OF MULF AND DIVF
                                ;*****************************************************************
                        TST17:  SCOPE

                                LDFPS   #47400          ;LOAD FLOATING MODE
                                LDF     #7,AC3          ;LOAD A7
                                MULF    #-3,AC3         ;X -3
                                STFPS   FPS             ;STORE FLOATING POINT STATUS
                                CMP     #47410,FPS      ;CHECK FLOATING POINT STATUS
                                BEQ     .+4             ;BRANCH IF OK
                                HLT                     ;FPS NOT EQUAL TO 47410

                                STF     AC3,ANS1        ;GET RESULT
                                CMPF    #-21.,AC3       ;CHECK RESULT
                                CFCC                    ;GET CC
                                BEQ     .+4
                                HLT     2               ;X -3 NOT -21.

                                DIVF    #-7,AC3         ;DIVIDE BY -3
                                STFPS   FPS             ;STORE FLOATING POINT STATUS
                                CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
                                BEQ     .+4             ;BRANCH IF OK
                                HLT                     ;FPS NOT EQUAL TO 47400

                                STF     AC3,ANS1        ;GET RESULT
                                CMPF    #3,AC3          ;CHECK RESULT
                                CFCC                    ;GET CC
                                BEQ     .+4
                                HLT     .               ;-21. / -7 NOT 3
```

```
1088                                    ;*****************************************************************
 (2)                                    ;TEST 20        TEST OF MULD AND DIVD
 (2)                                    ;*****************************************************************
 (2)  003770  104400                    TST20:  SCOPE
1089
1090  003772  170127  047600                    LDFPS   #47600          ;LOAD DOUBLE MODE
1091  003776  172427  140640                    LDD     #-5,AC0         ;LOAD A -5
1092  004002  171827  140580                    MULD    #-3,AC0         ;MUL BY -3
1093  004006  170200                           STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004010  022700  047600                    CMP     #47600,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004014  001401                           BEQ     .+4             ;BRANCH IF OK
 (1)  004016  104000                           HLT                     ;FPS NOT EQUAL TO 47600
 (1)
1094
1095  004020  174067  174766                    STD     AC0,ANS1        ;GET RESULT
1096  004024  173427  041160                    CMPD    #15.,AC0        ;CHECK RESULT
1097  004030  170000                           CFCC                    ;GET CC
1098  004032  001401                           BEQ     .+4
1099  004034  104004                           HLT     4               ;-3 X -3 NOT +15.
1100
1101  004036  174427  140600                    DIVD    #-2,AC0         ;15. / -2
1102  004042  170200                           STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004044  022700  047610                    CMP     #47610,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004050  001401                           BEQ     .+4             ;BRANCH IF OK
 (1)  004052  104000                           HLT                     ;FPS NOT EQUAL TO 47610
 (1)
1103
1104  004054  174067  174732                    STD     AC0,ANS1        ;STORE RESULT
1105  004060  173427  140760                    CMPD    #-7.5,AC0       ;CHECK RESULT
1106  004064  170000                           CFCC                    ;GET CC
1107  004066  001401                           BEQ     .+4
1108  004070  104004                           HLT     4               ;15. / -2 NOT -7.5
```

```
1110                                    ;*****************************************************************
 (2)                                    ;TEST 21        TEST OF LDCFD,LDCDF
 (2)                                    ;*****************************************************************
 (2)  004072  104400                    TST21:  SCOPE
1111
1112  004074  170127  047600                    LDFPS   #47600          ;SET DOUBLE MODE
1113  004100  172477  005024                    LDD     @AD0101,AC0     ;LOAC A 0,-1,0,-1
1114  004104  012700  011102                    MOV     #D1010,FPS      ;GET ADDRESS OF DATA
1115  004110  177420                            LDCFD   (FPS)+,AC0      ;LOAD A -1,0,0,0
1116  004112  022700  011106                    CMP     #D1010+4,FPS    ;INC BY 4?
1117  004116  001401                            BEQ     .+4
1118  004120  104000                            HLT                     ;FPS NOT #D1010+4
1119
1120  004122  170200                            STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004124  022700  047610                    CMP     #47610,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004130  001401                            BEQ     .+4             ;BRANCH IF OK
 (1)  004132  104000                            HLT                     ;FPS NOT EQUAL TO 47610
 (1)
1121
1122  004134  174067  174052                    STD     AC0,ANS1        ;GET ANSWER
1123  004140  173467  005106                    CMPD    D1000,AC0       ;CHECK RESULT
1124  004144  170000                            CFCC                    ;GET CC
1125  004146  001401                            BEQ     .+4
1126  004150  104004                            HLT     4               ;AC0 NOT -1,0,0,0
1127
1128  004152  172567  004726                    LDD     D0101,AC1       ;LOAD A 0,-1,0,-1
1129  004156  170001                            SETF                    ;SET FLOATING MODE
1130  004160  012700  011112                    MOV     #D1010+10,FPS   ;GET ADDRESS OF DATA +10
1131  004164  177540                            LDCDF   -(FPS),AC1      ;LOAD A -1,0
1132  004166  022700  011102                    CMP     #D1010,FPS      ;ADDRESS DECREMENT BY 10?
1133  004172  001401                            BEQ     .+4
1134  004174  104000                            HLT                     ;FPS NOT #D1010
1135
1136  004176  170200                            STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004200  022700  047410                    CMP     #47410,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004204  001401                            BEQ     .+4             ;BRANCH IF OK
 (1)  004206  104000                            HLT                     ;FPS NOT EQUAL TO 47410
 (1)
1137
1138  004210  170011                            SETD
1139  004212  174167  174574                    STD     AC1,ANS1        ;GET RESULT
1140  004216  173567  004676                    CMPD    WEIRD,AC1       ;CHECK RESULT
1141  004222  170000                            CFCC
1142  004224  001401                            BEQ     .+4
1143  004226  104004                            HLT     4               ;RESULT NOT -1,1,0,-1
1144
1145  004230  170127  047440                    LDFPS   #47440          ;SET DOUBLE AND TRUNCATE MODES
1146  004234  177567  004642                    LDCDF   D1010,AC1       ;LOAD IT
1147  004240  174167  174546                    STD     AC1,ANS1        ;GET RESULT
1148  004244  173567  004642                    CMPD    D1001,AC1       ;CHECK RESULT
1149  004250  170200                            STFPS   FPS
1150  004252  170000                            CFCC                    ;GET CC
1151  004254  001401                            BEQ     .+4
1152  004256  104004                            HLT     4               ;AC1 NOT -1,0,0,1
```

e2

c3

```
1153
1154  004260  170127  047400                LDFPS   #47400          ;SET ROUND AND FLOATING MODES
1155  004264  177567  004612                LDCDF   D1010,AC1       ;LOAD A -1.0
1156  004270  174167  174516                STD     AC1,ANS1        ;GET THE RESULT
1157  004274  170200                        STFPS   FPS
1158  004276  022767  000001  174510        CMP     #1,ANS2         ;CHECK WORD 2 FOR A 1
1159  004304  001401                        BEQ     .+4
1160  004306  104004                        HLT     4               ;LDCDF DID NOT ROUND PROPERLY
1161
1162                                ;*****************************************************************
 (2)                                ;TEST 22        TEST OF STCFD,STCDF
 (2)                                ;*****************************************************************
 (2)  004310  104400                TST22:  SCOPE
1163
1164  004312  170127  040200                LDFPS   #40200          ;SET DOUBLE MODE
1165  004316  172667  004560                LDD     D1010,AC2       ;LOAD A -1.0,-1.0
1166  004322  170001                        SETF                    ;SET FLOATING MODE
1167  004324  176202                        STCDF   AC2,AC2         ;CLEAR RIGHT HALF
1168  004326  170011                        SETD                    ;SET DOUBLE MODE
1169  004330  174267  174456                STD     AC2,ANS1        ;GET RESULT
1170  004334  173667  004712                CMPD    D1000,AC2       ;IS IT -1.0,0.0
1171  004340  170000                        CFCC                    ;GET CC
1172  004342  001401                        BEQ     .+4
1173  004344  104004                        HLT     4               ;AC1 NOT -1.0,0.0
1174
1175  004346  172767  004716                LDD     D0111,AC3       ;LOAD A 0,-1.0,-1
1176  004352  176303                        STCFD   AC3,AC3         ;CLEAR OUT RIGHT HALF!?
1177  004354  174367  174432                STD     AC3,ANS1        ;GET RESULT
1178  004360  173767  004676                CMPD    D0100X,AC3      ;CHECK RESULT
1179  004364  170000                        CFCC                    ;GET CC
1180  004366  001401                        BEQ     .+4
1181  004370  104004                        HLT     4               ;ANS3 NOT 100,0,0 (ROUND)
1182
1183  004372  172467  004672                LDD     D0111,AC0       ;LOAD 0,-1.0,-1
1184  004376  170127  000040                LDFPS   #40             ;FLOATING AND TRUNCATE MODES
1185  004402  176000                        STCFD   AC0,AC0         ;CLEAN RIGHT HALF
1186  004404  170011                        SETD                    ;SET DOUBLE
1187  004406  174067  174400                STD     AC0,ANS1        ;GET RESULT
1188  004412  173467  004632                CMPD    D0100,AC0       ;CHECK IT
1189  004416  170000                        CFCC                    ;GET CC
1190  004420  001401                        BEQ     .+4
1191  004422  104004                        HLT     4               ;AC0 NOT 0,-1.0,0 (TRUNCATE)
1192
1193                                ;*****************************************************************
 (2)                                ;TEST 23        TEST OF LDCIF,LDCID,STCFI,STCDI
 (2)                                ;*****************************************************************
 (2)  004424  104400                TST23:  SCOPE
1194
1195  004426  170127  047400                LDFPS   #47400          ;FLOATING MODE
1196  004432  177027  000005                LDCIF   #5,AC0          ;STORE A 5
1197  004436  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004440  022700  047400                CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004444  001401                        BEQ     .+4             ;BRANCH IF OK
 (1)  004446  104000                        HLT                     ;FPS NOT EQUAL TO 47400
```

```
 (1)
1198
1199  004458  174067  174336          STF     AC0,ANS1        ;GET THE RESULT
1200  004454  173427  040040          CMPF    #5,AC0          ;CHECK IT
1201  004460  170000                  CFCC                    ;GET CC
1202  004462  001401                  BEQ     .+4
1203  004464  104002                  HLT     2               ;AC0 NOT 5.0
1204
1205  004466  175400                  STCFI   AC0,FPS         ;CONVERT IT BACK
1206  004470  022700  000005          CMP     #5,FPS          ;CHECK RESULT
1207  004474  001401                  BEQ     .+4
1208  004476  104000                  HLT                     ;FPS NOT 5
1209
1210  004500  170011                  SETD                    ;SET DOUBLE MODE
1211  004502  172567  004376          LDD     D0101,AC1       ;LOAD JUNK
1212  004506  012700  011102          MOV     #D1010,FPS      ;LOAD ADDRESS OF DATA
1213  004512  177120                  LDCID   (FPS)+,AC1      ;CONVERT TO -1.0
1214  004514  022700  011104          CMP     #D1010+2,FPS    ;CHECK ADDRESS
1215  004520  001401                  BEQ     .+4
1216  004522  104000                  HLT                     ;FPS NOT #D1010+2
1217
1218  004524  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004526  022700  047610          CMP     #47610,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004532  001401                  BEQ     .+4             ;BRANCH IF OK
 (1)  004534  104000                  HLT                     ;FPS NOT EQUAL TO 47610
 (1)
1219
1220  004536  174167  174250          STD     AC1,ANS1        ;GET RESULT
1221  004542  173527  140200          CMPD    #-1,AC1         ;CHECK RESULT
1222  004546  170000                  CFCC                    ;GET CC
1223  004550  001401                  BEQ     .+4
1224  004552  104004                  HLT     4               ;AC1 NOT -1.0
1225
1226  004554  175500                  STCDI   AC1,FPS         ;CONVERT IT BACK
1227  004556  022700  177777          CMP     #-1,FPS         ;CHECK RESULT
1228  004562  001401                  BEQ     .+4
1229  004564  104000                  HLT                     ;FPS NOT -1
1230
1231  004566  170001                  SETF                    ;SET FLOATING MODE
1232  004570  177227  054321          LDCIF   #54321,AC2      ;LOAD 54321
1233  004574  174267  174212          STF     AC2,ANS1        ;GET RESULT
1234  004600  170200                  STFPS   FPS             ;GET THE STATUS
1235  004602  173667  004500          CMPF    F5T01,AC2       ;CHECK IT
1236  004606  170000                  CFCC                    ;CHECK CC
1237  004610  001401                  BEQ     .+4
1238  004612  104002                  HLT     2               ;AC2 NOT 54321.
1239
1240  004614  052737  000017  177776  BIS     #17,@#PS        ;SET PS
1241  004622  175667  174164          STCFI   AC2,ANS1        ;CONVERT IT BACK
1242  004626  013700  177776          MOV     @#PS,FPS        ;GET PS
1243  004632  042700  177760          BIC     #177760,FPS     ;CLEAR JUNK
1244  004636  005700                  TST     FPS             ;IS IT 0
1245  004640  001401                  BEQ     .+4             ;SKIP IF OK
1246  004642  104000                  HLT                     ;PS NOT 0
```

E2

E-

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1247  004644  170200                          STFPS   FPS             ;GET THE FPS
1248
1249  004646  022767  054321  174136          CMP     #54321,ANS1     ;CHECK RESULT
1250  004654  001401                          BEQ     .+4
1251  004656  104001                          HLT     1               ;ANS1 NOT 54321
1252
1253                                  ;*****************************************************************
 (2)                                  ;TEST 24        TEST OF LDCLF,LDCLD,STCFL,STCDL
 (2)                                  ;*****************************************************************
 (2)  004660  104400                  TST24:  SCOPE
1254
1255  004662  170127  047500                  LDFPS   #47500          ;FLOATING AND LONG MODES
1256  004666  177327  177773                  LDCLF   #-5,AC3         ;LOAD A -5
1257  004672  000401                          BR      .+4
1258  004674  000000                          HALT                    ;LDCLF INCREMENTED BY 4 NOT 2
1259
1260  004676  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  004700  022700  047510                  CMP     #47510,FPS      ;CHECK FLOATING POINT STATUS
 (1)  004704  001401                          BEQ     .+4             ;BRANCH IF OK
 (1)  004706  104000                          HLT                     ;FPS NOT EQUAL TO 47510
 (1)
1261
1262  004710  174367  174076                  STF     AC3,ANS1        ;GET THE RESULT
1263  004714  173727                          CMPF    (7)+,AC3        ;CHECK IT
1264  004716  144640                          144640
1265  004720  170000                          CFCC                    ;GET CC
1266  004722  001401                          BEQ     .+4
1267  004724  104002                          HLT     2               ;AC3 NOT -5
1268
1269  004726  012700  011156                  MOV     #AANS1,FPS      ;SET UP ADDRESS OF ADDRESS
1270  004732  175730                          STCFL   AC3,@(FPS)+     ;STORE IN ANS1
1271  004734  022700  011160                  CMP     #AANS1+2,FPS    ;CHECK ADDRESS
1272  004740  001401                          BEQ     .+4
1273  004742  104000                          HLT                     ;ADDRESS IN FPU NOT AANS1+2
1274
1275  004744  170200                          STFPS   FPS             ;GET STATUS
1276  004746  022767  177773  174036          CMP     #-5,ANS1        ;CHECK LEFT HALF
1277  004754  001401                          BEQ     .+4
1278  004756  104002                          HLT     2               ;LEFT NOT -5
1279
1280  004760  005767  174030                  TST     ANS2            ;CHECK RIGHT HALF OF RESULT
1281  004764  001401                          BEQ     .+4
1282  004766  104002                          HLT     2               ;ANS2 NOT 0
1283
1284  004770  170011                          SETD                    ;SET DOUBLE MODE
1285  004772  177067  004302                  LDCLD   DST01,AC0       ;LOAD WEIRD NUMBER
1286  004776  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  005000  022700  047700                  CMP     #47700,FPS      ;CHECK FLOATING POINT STATUS
 (1)  005004  001401                          BEQ     .+4             ;BRANCH IF OK
 (1)  005006  104000                          HLT                     ;FPS NOT EQUAL TO 47700
 (1)
1287
1288  005010  174067  173776                  STD     AC0,ANS1        ;GET RESULT
1289  005014  173467  004266                  CMPD    FST01,AC0       ;CHECK IT
```

```
 1298  000820  170000                        CFCC                    ;GET CC
 1291  000822  001401                        BEQ     .+4
 1292  000824  104004                        HLT     4               ;ACO NOT F9TO1
 1293
 1294  000826  012700  001016                MOV     #ANS3,FPS
 1295  000832  175440                        STCDL   AC0,-(FPS)      ;GET IT BACK
 1296  000834  022700  001012                CMP     #ANS1,FPS       ;CHECK ADDRESS
 1297  000840  001401                        BEQ     .+4
 1298  000842  104000                        HLT                     ;FPS NOT #ANS1
 1299
 1300  000844  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
  (1)  000846  022700  047700                CMP     #47700,FPS      ;CHECK FLOATING POINT STATUS
  (1)  000852  001401                        BEQ     .+4             ;BRANCH IF OK
  (1)  000854  104000                        HLT                     ;FPS NOT EQUAL TO 47700
  (1)
 1301
 1302  000856  170200                        STFPS   FPS
 1303  000860  026767  004214  173724        CMP     D5TO1,ANS1      ;CHECK LEFT
 1304  000866  001401                        BEQ     .+4
 1305  000870  104002                        HLT     2               ;ANS1 NOT
 1306
 1307  000872  026767  004204  173714        CMP     D5TO1+2,ANS2    ;CHECK RIGHT
 1308  000100  001401                        BEQ     .+4
 1309  000102  104002                        HLT     2               ;ANS2 NOT
 1310
 1311                          ;*****************************************************************
  (2)                          ;TEST 25        TEST OF MODF AND MODD
  (2)                          ;*****************************************************************
  (2)  000104  104400          TST25:  SCOPE
 1312
 1313  000106  170127  047400                LDFPS   #47400          ;SET FLOATING MODE
 1314  000112  172467  004054                LDF     DALTB+2,AC0     ;LOAD 52525,52525 INTO AC0
 1315  000116  171427  040200                MODF    #1,AC0          ;MODF BY A 1 +MGT+
 1316  000122  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
  (1)  000124  022700  047404                CMP     #47404,FPS      ;CHECK FLOATING POINT STATUS
  (1)  000130  001401                        BEQ     .+4             ;BRANCH IF OK
  (1)  000132  104000                        HLT                     ;FPS NOT EQUAL TO 47404
  (1)
 1317
 1318  000134  174067  173652                STF     AC0,ANS1        ;GET RESULT
 1319  000140  170300                        TSTF    AC0             ;CHECK FRACTION
 1320  000142  170000                        CFCC
 1321  000144  001401                        BEQ     .+4
 1322  000146  104002                        HLT     2               ;FRACTION NOT 0
 1323
 1324  000150  174167  173636                STF     AC1,ANS1        ;GET IT
 1325  000154  173567  004012                CMPF    DALTB+2,AC1     ;CHECK INTEGER
 1326  000160  170000                        CFCC
 1327  000162  001401                        BEQ     .+4
 1328  000164  104002                        HLT     2               ;INTEGER IS NOT 52525,52525
 1329
 1330  000166  172627  040200                LDF     #1,AC2          ;LOAD A 1
 1331  000172  171667  004042                MODF    D20,AC2         ;MOD BY 20000,0
 1332  000176  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
```

```
    (1)  000200  022700  047400          CMP     #47400,FPS      ;CHECK FLOATING POINT STATUS
    (1)  000204  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000206  104000                  HLT                     ;FPS NOT EQUAL TO 47400
    (1)
  1333
  1334  000210  174267  173576          STF     AC2,ANS1        ;GET IT
  1335  000214  173667  000020          CMPF    D20,AC2         ;CHECK FRACT
  1336  000220  170000                  CFCC
  1337  000222  001401                  BEQ     .+4
  1338  000224  104002                  HLT     2               ;RESULT NOT 20000,0
  1339
  1340  000226  174367  173560          STF     AC3,ANS1        ;GET INT
  1341  000232  170503                  TSTF    AC3             ;CHECK FOR 0
  1342  000234  170000                  CFCC
  1343  000236  001401                  BEQ     .+4
  1344  000240  104002                  HLT     2               ;RESULT NOT 0
  1345
  1346  000242  170011                  SETD                    ;SET DOUBLE MODE
  1347  000244  172467  000760          LDD     D46,AC0         ;LOAD A 40000,0,0,0
  1348  000250  171467  000744          MODD    D37,AC0         ;MOD BY 37400,0,0,0
  1349  000254  173467  000730          CMPD    D40,AC0         ;CHECK FOR 400000,0,0,0
  1350  000260  170000                  CFCC
  1351  000262  001401                  BEQ     .+4
  1352  000264  104004                  HLT     4               ;RESULT NOT 40000,0,0,0
  1353
  1354  000266  174367  173520          STD     AC3,ANS1        ;GET THE RESULT
  1355  000272  170503                  TSTD    AC3             ;CHECK FOR 0
  1356  000274  170000                  CFCC
  1357  000276  001401                  BEQ     .+4
  1358  000300  104004                  HLT     4               ;RESULT NOT 0
  1359
  1363                          ;*****************************************************************
    (2)                         ;TEST 26        LDD OF -0
    (2)                         ;*****************************************************************
    (2)  000302  104400          TST26: SCOPE
  1364
  1365  000304  170127  047600          LDFPS   #47600          ;DOUBLE MODE
  1366  000310  172467  000674          LDD     D48,AC0         ;LOAD DUMMY DATA
  1367  000314  172467  000626  181     LDD     DMZERO,AC0      ;LOAD A -0
  1368  000320  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
    (1)  000322  170367  173504          STST    FEC             ;STORE EXCEPTION CODES
    (1)  000326  022700  147614          CMP     #147614,FPS     ;CHECK FLOATING POINT STATUS
    (1)  000332  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000334  104000                  HLT                     ;FPS NOT EQUAL TO 147614
    (1)
    (1)  000336  022767  000014  173466  CMP     #14,FEC         ;CHECK FLOATING EXCEPTION CODE
    (1)  000344  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000346  104000                  HLT                     ;FEC NOT EQUAL TO 14
    (1)
    (1)  000350  022767  005314  173456  CMP     #5314,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
    (1)  000356  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000360  104000                  HLT                     ;FEA NOT EQUAL TO 5314
    (1)
  1369
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 1370  005362  174067  173424                  STD     AC0,ANS1        ;GET RESULT FOR TYPING
 1371  005366  173467  003616                  CMPD    D40,AC0         ;DID IT CHANGE AC0?
 1372  005372  170200                          STFPS   FPS             ;GET FPS FOR TYPING
 1373  005374  170000                          CFCC                    ;GET CC
 1374  005376  001401                          BEQ     .+4             ;SKIP IF OK
 1375  005400  104004                          HLT     4               ;RESULT IS WRONG
 1376
 1377  005402  170127  040200                  LDFPS   #40200          ;DOUBLE MODE
 1378  005406  172467  003534                  LDF     ONEERO,AC0      ;LOAD A -0
 1379  005412  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
  (1)  005414  022700  040214                  CMP     #40214,FPS      ;CHECK FLOATING POINT STATUS
  (1)  005420  001401                          BEQ     .+4             ;BRANCH IF OK
  (1)  005422  104000                          HLT                     ;FPS NOT EQUAL TO 40214
  (1)
 1380
 1381  005424  174067  173362                  STD     AC0,ANS1        ;GET RESULT
 1382  005430  173467  003512                  CMPD    ONEERO,AC0      ;CMP TO -0
 1383  005434  170200                          STFPS   FPS             ;GET FPS
 1384  005436  170000                          CFCC                    ;GET CC
 1385  005440  001401                          BEQ     .+4             ;SKIP IF OK
 1386  005442  104004                          HLT     4               ;RESULT NOT -0
 1387
 1388                          ;*****************************************************************
  (2)                          ;TEST 27        MULF ERROR - OVERFLOW
  (2)                          ;*****************************************************************
  (2)  005444  104400          TST27:  SCOPE
 1389
 1390  005446  170127  001000                  LDFPS   #1000           ;FLOATING/OVERFLOW
 1391  005452  013777  177776  005164          MOV     @#PS,@FPVECT+2  ;SET THE MODE IN PS WORD
 1392  005460  005001                          CLR     R1              ;CLEAR FLAG WORD
 1393  005462  012777  011074  005152          MOV     #CHKERR,@FPVECT ;SET TRAP ADDRESS
 1394  005470  172427  076101                  LDF     #1E36,AC0       ;LOAD A LARGE NUMBER INTO AC0.
 1395  005474  171027  076101          1$:     MULF    #1E36,AC0       ;MULTIPLY BY A LARGE NUMBER
 1396  005500  174067  173306                  STF     AC0,ANS1        ;GET FOR TYPING
 1397  005504  170200                          STFPS   FPS             ;GET STATUS
 1398  005506  005701                          TST     R1              ;DID IT TRAP?
 1399  005510  001001                          BNE     3$              ;YES
 1400  005512  104002                          HLT     2               ;DID NOT TRAP ON OVERFLOW
 1401  005514                          3$:
  (1)  005514  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
  (1)  005516  170367  173310                  STST    FEC             ;STORE EXCEPTION CODES
  (1)  005522  022700  101002                  CMP     #101002,FPS     ;CHECK FLOATING POINT STATUS
  (1)  005526  001401                          BEQ     .+4             ;BRANCH IF OK
  (1)  005530  104000                          HLT                     ;FPS NOT EQUAL TO 101002
  (1)
  (1)  005532  022767  000010  173272          CMP     #10,FEC         ;CHECK FLOATING EXCEPTION CODE
  (1)  005540  001401                          BEQ     .+4             ;BRANCH IF OK
  (1)  005542  104000                          HLT                     ;FEC NOT EQUAL TO 10
  (1)
  (1)  005544  022767  005474  173262          CMP     #5474,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
  (1)  005552  001401                          BEQ     .+4             ;BRANCH IF OK
  (1)  005554  104000                          HLT                     ;FEA NOT EQUAL TO 5474
  (1)
 1402
```

```
1483                                ;*****************************************************************
 (2)                                ;TEST 38        DIVF ERROR - UNDERFLOW
 (2)                                ;*****************************************************************
 (2)  005556  104400                TST38:  SCOPE
1484
1485  005560  170127  002000               LDFPS   #2000           ;FLOATING/UNDERFLOW
1486  005564  005001                       CLR     R1              ;CLEAR FLAG WORD
1487  005566  172427  002252               LDF     #1E-36,AC0      ;LOAD A SMALL NUMBER
1488  005572  174427  076101         1$:   DIVF    #1E36,AC0       ;DIVIVE BY A LARGE NUMBER
1489  005576  174067  173210               STF     AC0,ANS1        ;GET FOR TYPING
1490  005602  170200                       STFPS   FPS             ;GET STATUS
1491  005604  005701                       TST     R1              ;DID IT TRAP?
1492  005606  001001                       BNE     3$              ;SKIP IF SET
1493  005610  104002                       HLT     2               ;DID NOT TRAP ON UNDERFLOW
1494  005612                         3$:
 (1)  005612  170200                       STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  005614  170367  173212               STST    FEC             ;STORE EXCEPTION CODES
 (1)  005620  022700  102000               CMP     #102000,FPS     ;CHECK FLOATING POINT STATUS
 (1)  005624  001401                       BEQ     .+4             ;BRANCH IF OK
 (1)  005626  104000                       HLT                     ;FPS NOT EQUAL TO 102000
 (1)
 (1)  005630  022767  000012  173174       CMP     #12,FEC         ;CHECK FLOATING EXCEPTION CODE
 (1)  005636  001401                       BEQ     .+4             ;BRANCH IF OK
 (1)  005640  104000                       HLT                     ;FEC NOT EQUAL TO 12
 (1)
 (1)  005642  022767  005572  173164       CMP     #5572,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
 (1)  005650  001401                       BEQ     .+4             ;BRANCH IF OK
 (1)  005652  104000                       HLT                     ;FEA NOT EQUAL TO 5572
 (1)
1495
1496                                ;*****************************************************************
 (2)                                ;TEST 31        STCFI ERROR - CONVERSION(6)
 (2)                                ;*****************************************************************
 (2)  005654  104400                TST31:  SCOPE
1497
1498  005656  170127  000400               LDFPS   #400            ;FLOATING/INTEGER/CONVERSION
1499  005662  005001                       CLR     R1              ;CLEAR FLAG WORD
1500  005664  172527  076101               LDF     #1E36,AC1       ;LOAD LARGE NUMBER
1501  005670  175567  173116         1$:   STCFI   AC1,ANS1        ;TRY TO STUFF INTO 16 BITS
1502  005674  170200                       STFPS   FPS             ;GET STATUS
1503  005676  005701                       TST     R1              ;TRAP FLAG SET?
1504  005700  001001                       BNE     3$              ;SKIP IF SET
1505  005702  104000                       HLT                     ;DID NOT TRAP ON CONVERT
1506  005704                         3$:
 (1)  005704  170200                       STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  005706  170367  173128               STST    FEC             ;STORE EXCEPTION CODES
 (1)  005712  022700  100405               CMP     #100405,FPS     ;CHECK FLOATING POINT STATUS
 (1)  005716  001401                       BEQ     .+4             ;BRANCH IF OK
 (1)  005720  104000                       HLT                     ;FPS NOT EQUAL TO 100405
 (1)
 (1)  005722  022767  000006  173102       CMP     #6,FEC          ;CHECK FLOATING EXCEPTION CODE
 (1)  005730  001401                       BEQ     .+4             ;BRANCH IF OK
 (1)  005732  104000                       HLT                     ;FEC NOT EQUAL TO 6
 (1)
```

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   (1)  005734  022767  005670  173872          CMP     #5670,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
   (1)  005742  001401                          BEQ     .+4             ;BRANCH IF OK
   (1)  005744  104000                          HLT                     ;FEA NOT EQUAL TO 5670
   (1)
  1427
  1428                                  ;******************************************************************
   (2)                                  ;TEST 32        DIVF BY 0 ERROR
   (2)                                  ;******************************************************************
   (2)  005746  104400                  TST32:  SCOPE
  1429
  1430  005750  170127  000000                  LDFPS   #0              ;FLOATING
  1431  005754  005001                          CLR     R1              ;CLEAR FLAG
  1432  005756  174527  000000          1$:     DIVF    #0,AC1          ;DIVIDE BY 0
  1433  005762  170200                          STFPS   FPS             ;GET STATUS
  1434  005764  005701                          TST     R1              ;CHECK FLAG
  1435  005766  001001                          BNE     3$              ;SKIP IF SET
  1436  005770  104000                          HLT                     ;DIVIDE BY 0 DID NOT TRAP
  1437  005772                          3$:
   (1)  005772  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
   (1)  005774  170307  173832                  STST    FEC             ;STORE EXCEPTION CODES
   (1)  006000  022700  100000                  CMP     #100000,FPS     ;CHECK FLOATING POINT STATUS
   (1)  006004  001401                          BEQ     .+4             ;BRANCH IF OK
   (1)  006006  104000                          HLT                     ;FPS NOT EQUAL TO 100000
   (1)
   (1)  006010  022767  000004  173814          CMP     #4,FEC          ;CHECK FLOATING EXCEPTION CODE
   (1)  006016  001401                          BEQ     .+4             ;BRANCH IF OK
   (1)  006020  104000                          HLT                     ;FEC NOT EQUAL TO 4
   (1)
   (1)  006022  022767  005756  173804          CMP     #5756,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
   (1)  006030  001401                          BEQ     .+4             ;BRANCH IF OK
   (1)  006032  104000                          HLT                     ;FEA NOT EQUAL TO 5756
   (1)
  1438
  1439                                  ;******************************************************************
   (2)                                  ;TEST 33        LDF -0 ERROR
   (2)                                  ;******************************************************************
   (2)  006034  104400                  TST33:  SCOPE
  1440
  1441  006036  170127  004000                  LDFPS   #4000           ;FLOATING/UNDEFINED VARIABLE
  1442  006042  005001                          CLR     R1              ;CLEAR FLAG
  1443  006044  172667  003076          1$:     LDF     ZMBERO,AC2      ;LOAD AN UNDEFINED VARIABLE
  1444  006050  170200                          STFPS   FPS             ;GET STATUS
  1445  006052  005701                          TST     R1              ;CHECK FLAG
  1446  006054  001001                          BNE     3$              ;SKIP IF SET
  1447  006056  104000                          HLT                     ;LOAD OF -0 DID NOT TRAP
  1448  006060                          3$:
   (1)  006060  170200                          STFPS   FPS             ;STORE FLOATING POINT STATUS
   (1)  006062  170307  172744                  STST    FEC             ;STORE EXCEPTION CODES
   (1)  006066  022700  104014                  CMP     #104014,FPS     ;CHECK FLOATING POINT STATUS
   (1)  006072  001401                          BEQ     .+4             ;BRANCH IF OK
   (1)  006074  104000                          HLT                     ;FPS NOT EQUAL TO 104014
   (1)
   (1)  006076  022767  000014  172726          CMP     #14,FEC         ;CHECK FLOATING EXCEPTION CODE
   (1)  006104  001401                          BEQ     .+4             ;BRANCH IF OK
```

K2

K3

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    (1)  000196  104000                        HLT                     ;FEC NOT EQUAL TO 14
    (1)
    (1)  000110  022767  000044  172716        CMP     #6844,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
    (1)  000116  001401                        BEQ     .+4             ;BRANCH IF OK
    (1)  000120  104000                        HLT                     ;FEA NOT EQUAL TO 6844
    (1)
  1449
  1450                          ;*****************************************************************
    (2)                         ;TEST 34        OPCODE ERROR
    (2)                         ;*****************************************************************
    (2)  000122  104400                TST34:  SCOPE
  1451
  1452  000124  170127  000000                LDFPS   #0              ;FLOATING
  1453  000130  005001                        CLR     R1              ;CLEAR FLAG
  1454  000132  177777                1$:     177777                  ;ILLEGAL OPCODE
  1455  000134  170200                        STFPS   FPS             ;GET STATUS
  1456  000136  005701                        TST     R1              ;CHECK FLAG
  1457  000140  001001                        BNE     3$              ;SKIP IF SET
  1458  000142  104000                        HLT                     ;NOT AN ILLEGAL OPCODE?
  1459  000144                         3$:
    (1)  000144  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
    (1)  000146  170367  172660                STST    FEC             ;STORE EXCEPTION CODES
    (1)  000152  022700  100000                CMP     #100000,FPS     ;CHECK FLOATING POINT STATUS
    (1)  000156  001401                        BEQ     .+4             ;BRANCH IF OK
    (1)  000160  104000                        HLT                     ;FPS NOT EQUAL TO 100000
    (1)
    (1)  000162  022767  000002  172642        CMP     #2,FEC          ;CHECK FLOATING EXCEPTION CODE
    (1)  000170  001401                        BEQ     .+4             ;BRANCH IF OK
    (1)  000172  104000                        HLT                     ;FEC NOT EQUAL TO 2
    (1)
    (1)  000174  022767  000132  172632        CMP     #6132,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
    (1)  000202  001401                        BEQ     .+4             ;BRANCH IF OK
    (1)  000204  104000                        HLT                     ;FEA NOT EQUAL TO 6132
    (1)
  1460
  1461                          ;*****************************************************************
    (2)                         ;TEST 35        UBREAK TRAP
    (2)                         ;*****************************************************************
    (2)  000206  104400                TST35:  SCOPE
  1462
  1463  000210  005001                        CLR     R1              ;CLEAR FLAG
  1464  000212  013767  177776  003106        MOV     @#PS,SAVSTS     ;GET PS
  1465  000220  005037  177776                CLR     @#PS            ;ZERO IT
  1466  000224  012703  000314                MOV     #314,R3         ;LOAD 314 INTO
  1467  000230  170003                        LDUB                    ;UBREAK REG.
  1468  000232  170127  000020                LDFPS   #20             ;FLOATING/MAINT
  1469  000236  174427  040200        1$:     DIVF    #1,AC0          ;DIVIDE SHOULD TRAP
  1470  000242  170200                        STFPS   FPS             ;GET STATUS
  1471  000244  005701                        TST     R1              ;CHECK FLAG
  1472  000246  001001                        BNE     3$              ;SKIP IF NOT SET
  1473  000250  104000                        HLT                     ;UBREAK DID NOT TRAP
  1474  000252                         3$:
    (1)  000252  170200                        STFPS   FPS             ;STORE FLOATING POINT STATUS
    (1)  000254  170367  172572                STST    FEC             ;STORE EXCEPTION CODES
```

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    (1)  000260  022700  100020          CMP     #100020,FPS     ;CHECK FLOATING POINT STATUS
    (1)  000264  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000266  104000                  HLT                     ;FPS NOT EQUAL TO 100020
    (1)
    (1)  000270  022767  000016  172534  CMP     #16,FEC         ;CHECK FLOATING EXCEPTION CODE
    (1)  000276  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000300  104000                  HLT                     ;FEC NOT EQUAL TO 16
    (1)
    (1)  000302  022767  000236  172524  CMP     #0236,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
    (1)  000310  001401                  BEQ     .+4             ;BRANCH IF OK
    (1)  000312  104000                  HLT                     ;FEA NOT EQUAL TO 0236
    (1)
 1475    000314  170127  040000          LDFPS   #40000          ;CLEAR FPS
 1476    000320  016737  000774  177776  MOV     SAVSTS,@#PS     ;RESTORE PS
 1477
 1478                                    ;*****************************************************************
  (2)                                    ;TEST 36        ADDF ERROR - OVERFLOW
  (2)                                    ;*****************************************************************
  (2)    000326  104400                  TST36:  SCOPE
 1479
 1480    000330  170127  000100          LDFPS   #100            ;FLOATING/OVERFLOW
 1481    000334  005001                  CLR     R1              ;CLEAR FLAG
 1482    000336  172767  000574          LDF     DBIG,AC3        ;LOAD A BIG NUMBER
 1483    000342  172367  000570  181:     ADDF    DBIG,AC3        ;MAKE OVERFLOW
 1484    000346  170200                  STFPS   FPS             ;GET STATUS
 1485    000350  174367  172436          STF     AC3,ANS1        ;GET RESULT
 1486    000354  005701                  TST     R1              ;FLAG SET?
 1487    000356  001001                  BNE     3$              ;SKIP IF SET
 1488    000360  104002                  HLT     2               ;DID NOT OVERFLOW
 1489    000362                  3$:
  (1)    000362  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
  (1)    000364  170367  172442          STST    FEC             ;STORE EXCEPTION CODES
  (1)    000370  022700  101000          CMP     #101000,FPS     ;CHECK FLOATING POINT STATUS
  (1)    000374  001401                  BEQ     .+4             ;BRANCH IF OK
  (1)    000376  104000                  HLT                     ;FPS NOT EQUAL TO 101000
  (1)
  (1)    000400  022767  000016  172424  CMP     #16,FEC         ;CHECK FLOATING EXCEPTION CODE
  (1)    000406  001401                  BEQ     .+4             ;BRANCH IF OK
  (1)    000410  104000                  HLT                     ;FEC NOT EQUAL TO 16
  (1)
  (1)    000412  022767  000342  172414  CMP     #0342,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
  (1)    000420  001401                  BEQ     .+4             ;BRANCH IF OK
  (1)    000422  104000                  HLT                     ;FEA NOT EQUAL TO 0342
  (1)
 1490
 1491                                    ;*****************************************************************
  (2)                                    ;TEST 37        SUBF ERROR - UNDERFLOW
  (2)                                    ;*****************************************************************
  (2)    000424  104400                  TST37:  SCOPE
 1492
 1493    000426  170127  002000          LDFPS   #2000           ;FLOATING/UNDERFLOW
 1494    000432  005001                  CLR     R1              ;CLEAR FLAG
 1495    000434  172427  000430          LDF     #.87E-37,AC0    ;LOAD SMALL NUMBER
 1496    000440  173027  000504          SUBF    #.99E-37,AC0    ;SUB BIG NUMBER
```

```
1497  006444  174067  172342          STF     ACB,ANS1        ;GET RESULT
1498  006450  170200                  STFPS   FPS             ;GET STATUS
1499  006452  005701                  TST     R1              ;FLAG SET?
1500  006454  001001                  BNE     3$              ;SKIP IF SET
1501  006456  104002                  HLT     2               ;NO UNDERFLOW
1502  006460                      3$1
 (1)  006460  170200                  STFPS   FPS             ;STORE FLOATING POINT STATUS
 (1)  006462  170367  172344          STST    FEC             ;STORE EXCEPTION CODES
 (1)  006466  022700  102014          CMP     #102014,FPS     ;CHECK FLOATING POINT STATUS
 (1)  006472  001401                  BEQ     .+4             ;BRANCH IF OK
 (1)  006474  104000                  HLT                     ;FPS NOT EQUAL TO 102014
 (1)
 (1)  006476  022767  000012  172326  CMP     #12,FEC         ;CHECK FLOATING EXCEPTION CODE
 (1)  006504  001401                  BEQ     .+4             ;BRANCH IF OK
 (1)  006506  104000                  HLT                     ;FEC NOT EQUAL TO 12
 (1)
 (1)  006510  022767  006440  172316  CMP     #6440,FEA       ;CHECK FLOATING EXCEPTION ADDRESS
 (1)  006516  001401                  BEQ     .+4             ;BRANCH IF OK
 (1)  006520  104000                  HLT                     ;FEA NOT EQUAL TO 6440
 (1)
1503
1504  006522  104400                  SCOPE
1505
1506  006524  170127  040000          LDFPS   #40000          ;I/O FPS
1507  006530  012777  000760  004104  MOV     #FLTERR,@FPVECT ;RESTORE VECTOR
1508  006536  012777  000340  004100  MOV     #340,@FPVECT+2  ;RESTORE LEVEL 7
1509  006544  004767  001230          JSR     PC,CODE         ;DO FLOATING POINT EXERCISER THROUGHOUT MEMORY
1510  006550  032737  001000  177570  BIT     #SW09,@#SWR     ;RELOCATE CODE?
1511  006556  001402                  BEQ     RELEX           ;RELOCATE
1512  006560  000167  002540          JMP     DONE+2          ;DO NOT RELOCATE
```

A3

A4

```
1514                                        ;RELOCATOR AND EXECUTOR
1515  000564  012737  000672  000004  RELEX1: MOV     #TRAP4,@#4
1516  000572  012701  013000              MOV     #CODE,R1        ;LOAD STARTING POINT
1517  000576  012704  020000              MOV     #20000,R4       ;LOAD DESTINATION
1518  000602  004767  000102              JSR     PC,MOVE         ;MOVE THE CODE THERE
1519  000606  004737  020000              JSR     PC,@#20000      ;EXECUTE THE 5K BANK
1520  000612  012704  024000              MOV     #24000,R4
1521  000616  010401                  1$: MOV     R4,R1           ;GET THE ADDRESS
1522  000620  010146                      MOV     R1,-(6)         ;SAVE ON THE STACK
1523  000622  012704  020000              MOV     #20000,R4       ;SET TO GET THE LOADER
1524  000626  004767  000056              JSR     PC,MOVE         ;GET THE PAGE
1525  000632  011604                      MOV     (6),R4          ;GET THE DESTINATION ADDRESS
1526  000634  012701  010000              MOV     #CODE,R1        ;DATA TO BE TRANSFERED
1527  000640  004767  000044              JSR     PC,MOVE         ;MOVE IT
1528  000644  004776  000000              JSR     PC,0(6)         ;EXECUTE IT
1529  000650  012604                      MOV     (6)+,R4         ;GET DEST ADDRESS
1530  000652  012701  020000              MOV     #20000,R1       ;GET SAVE ADDRESS
1531  000656  004767  000026              JSR     PC,MOVE         ;RESTORE LOADER
1532  000662  022704  160000              CMP     #160000,R4      ;END OF WORLD
1533  000666  001353                      BNE     1$              ;NO - LOOP
1534  000670  000402                      BR      X2X             ;YES = 5K/P STACK CLEANER
1535
1536  000672  062706  000010  TRAP4:  ADD     #10,SP          ;CLEAR THE STACK
1537  000676  012737  000006  000004  X2X:    MOV     #6,@#4          ;RESET 4
1538  000704  000167  002412              JMP     DONE
1539
1540                                        ;MOVE SUBROUTINE = MOVES 1K CHUNK FROM (1) TO (4)
1541
1542  000710  010246  MOVE:   MOV     R2,-(6)         ;SAVE R2
1543  000712  012702  002000              MOV     #2000,R2        ;LOAD A 1K COUNT
1544  000716  016746  171054              MOV     PS,-(6)         ;SAVE PSW
1545  000722  005046                      CLR     -(6)            ;PUT 0 ON STACK
1546  000724  012746  000732              MOV     #1$,-(6)        ;PUT RETURN ADD ON STACK
1547  000730  000002                      RTI                     ;CONT. WITH NEW PS
1548  000732  011114  1$:     MOV     (1),(4)         ;MOVE A WORD
1549  000734  010400                      MOV     R4,FP$          ;SAVE NEW ADD FOR TYPE OUT
1550  000736  022124                      CMP     (1)+,(4)+       ;DID WE GET TO NEW LOCATION OK
1551  000740  001401                      BEQ     .+4             ;YES
1552  000742  104000                      HLT                     ;DATA TRANSFER BAD R1=OLD ADD +2 R4=NEW ADD +2
1553  000744  005302                      DEC     R2              ;DEC COUNT
1554  000746  001371                      BNE     :$              ;LOOP UNTIL DONE
1555  000750  012746  000756              MOV     #2$,-(6)        ;STOR RETURN ADD
1556  000754  000002                      RTI                     ;GET OLD PSW AND NEW RETURN ADD
1557  000756  012602  2$:     MOV     (6)+,R2         ;RESTORE R2
1558  000760  000207                      RTS     PC              ;RETURN
```

```
                    010000
                                        .=10000
010000  012737  000037  001000  CODE1   MOV     #37,@#ICNT
                                ;*****************************************************************
                                ;TEST 40        TEST FOR CONVERSION, ADDD AND SUBD
                                ;*****************************************************************
010006  104400                  TST40:  SCOPE
010010  170127  047600                  LDFPS   #47600
010014  177327  000004                  LDCID   #4,AC3          ;LOAD AC3 WITH A FLOATING 4
010020  177227  000002                  LDCID   #2,AC2          ;LOAD AC2 WITH A FLOATING 2
010024  172382                          ADDD    AC2,AC3         ;ADD 2+4 = 6 IN AC3
010026  173382                          SUBD    AC2,AC3         ;SUB 2 FROM 6
010030  175737  001012                  STCDI   AC3,@#ANS1      ;@#ANS1 SHOULD =4
010034  022737  000004  001012          CMP     #4,@#ANS1               ;DOES @#ANS1 =4
010042  170200                          STFPS   FPS
010044  001401                          BEQ     .+4             ;YES
010046  104001                          HLT     1               ;@#ANS1 SHOULD = 4
                                ;*****************************************************************
                                ;TEST 41        LDD AND STD TEST
                                ;*****************************************************************
010050  104400                  TST41:  SCOPE
010052  177027  000005                  LDCID   #5,AC0          ;LOAD AC0 WITH A FLOATING 5
010056  174005                          STD     AC0,AC5         ;NOW PUT IT INTO AC5
010060  172605                          LDD     AC5,AC2         ;NOW PUT IT INTO AC2
010062  172200                          ADDD    AC0,AC2         ;ADD 5 TO 5
010064  173205                          SUBD    AC5,AC2         ;SUB 5 FROM 10
010066  175637  001012                  STCDI   AC2,@#ANS1      ;PUT ANS INTO @#ANS1
010072  022737  000005  001012                  CMP     #5,@#ANS1               ;WERE THE TWO AC'S EQUAL
010100  170200                          STFPS   FPS
010102  001401                          BEQ     .+4             ;YES
010104  104001                          HLT     1               ;ANS1 SHOULD = 5
                                ;*****************************************************************
                                ;TEST 42        MULD AND DIVD TEST
                                ;*****************************************************************
010106  104400                  TST42:  SCOPE
010110  177227  000052                  LDCID   #52,AC2         ;LOAD AC2 WITH FLOATING DOUBLE 52
010114  174204                          STD     AC2,AC4         ;PUT IT INTO AC4
010116  177327  000025                  LDCID   #25,AC3         ;LOAD AC3 WITH FL DB 25
010122  171304                          MULD    AC4,AC3         ;MUL 52X25 RESULT IN AC3
010124  174704                          DIVD    AC4,AC3         ;DIV 52 INTO RESULT IN AC3
010126  171304                          MULD    AC4,AC3         ;MUL 52X25
010130  172304                          ADDD    AC4,AC3         ;ADD AC4 TO AC3 TO MAKE 53 TIMES
010132  012704  000025                  MOV     #25,R4          ;SET UP COUNTER
010136  173304                  SUBT:   SUBD    AC4,AC3         ;SUB 52 FROM AC3 25 TIMES
010140  005304                          DEC     R4
010142  001375                          BNE     SUBT            ;SUB 53 TIMES
010144  175737  001012                  STCDI   AC3,@#ANS1      ;ANS SHOULD BE 52
010150  170200                          STFPS   FPS
010152  022737  000052  001012          CMP     #52,@#ANS1      ;IS ANS CORRECT?
010160  001401                          BEQ     .+4             ;YES
010162  104001                          HLT     1               ;ANS SHULD BE 52
```

```
1624                                    ;*****************************************************************
 (2)                                    ;TEST 43        EXERCISER TEST
 (2)                                    ;*****************************************************************
 (2)  010164  104400            TST43:  SCOPE
1625  010166  177027  025252            LDCID   #25252,AC0      ;LOAD 25252 INTO AC0
1626  010172  177127  000025            LDCID   #25,AC1         ;LOAD AC1 WITH 25
1627  010176  171100                    MULD    AC0,AC1         ;MUL 25252X25 ANS IN AC1
1628  010200  174137  001012            STD     AC1,@#ANS1      ;SAV ANS IN @#ANS1
1629  010204  012702  000024            MOV     #24,R2          ;SET UP COUNT
1630  010210  174005                    STD     AC0,AC5         ;PUT 25252 INTO AC5
1631  010212  172005                AAD:    ADDD    AC5,AC0         ;ADD 25252 TO 25252
1632  010214  005302                    DEC     R2              ;DO 25 TIMES
1633  010216  001375                    BNE     AAD             ;DONE?
1634  010220  174037  001022            STD     AC0,@#ANS5      ;LOAD TO PRINT
1635  010224  170200                    STFPS   FPS
1636  010226  173437  001012            CMPD    @#ANS1,AC0      ;IS ANS CORRECT?
1637  010232  170000                    CFCC
1638  010234  001401                    BEQ     .+4             ;YES
1639  010236  104010                    HLT     0,              ;EITHER THE ADD OR THE MUL DID NOT WORK
1640  010240  177327  000002            LDCID   #2,AC3          ;LOAD AC3 WITH A 2
1641  010244  012702  000013            MOV     #13,R2          ;SET UP COUNTER
1642  010250  174304                    STD     AC3,AC4         ;LOAD AC4 WITH A 2
1643  010252  171304                MMUL:   MULD    AC4,AC3         ;MUL 2 X 2
1644  010254  005302                    DEC     R2              ;DO 16 TIMES
1645  010256  001375                    BNE     MMUL
1646  010260  175703                    STCDI   AC3,R3          ;PUT ANS IN R3
1647  010262  010337  001012            MOV     R3,@#ANS1       ;NOW PUT IT INTO @#ANS1
1648  010266  022703  010000            CMP     #10000,R3       ;ANS SHOULD BE 10000
1649  010272  170200                    STFPS   FPS
1650  010274  001401                    BEQ     .+4             ;CONT, IF ANS IS CORRECT
1651  010276  104001                    HLT     1               ;ANS SHOULD BE 10000
1652  010300  177227  010000            LDCID   #10000,AC2      ;LOAD AC2 WITH 10000
1653  010304  177127  000002            LDCID   #2,AC1          ;LOAD AC1 WITH A 2
1654  010310  012702  000013            MOV     #13,R2          ;SET UP COUNTER
1655  010314  174601                DDIV:   DIVD    AC1,AC2         ;DIVD 2 INTO 65536 16 TIMES
1656  010316  005302                    DEC     R2              ;COUNT NO OF TIMES
1657  010320  001375                    BNE     DDIV            ;ARE WE DONE?
1658  010322  175603                    STCDI   AC2,R3          ;STOR ANS INTO R3
1659  010324  010237  001012            MOV     R2,@#ANS1       ;PUT IT INTO @#ANS1 FOR TYPING
1660  010330  022703  000002            CMP     #2,R3           ;IS ANS CORRECT
1661  010334  170200                    STFPS   FPS
1662  010336  001401                    BEQ     .+4             ;ANS IS CORRECT
1663  010340  104001                    HLT     1               ;ANS SHOULD EQUAL #2
```

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 1645                                   ;*****************************************************************
  (2)                                   ;TEST 44        MODE ONE TEST
  (2)                                   ;*****************************************************************
  (2)  010342  104400           TST44:  SCOPE
 1646  010344  170127  047400           LDFPS   #47400
 1647  010350  177327  000005           LDCIF   #5,AC3          ;AC3=5
 1648  010354  012702  001012           MOV     #ANS1,R2        ;R2=ANS1
 1649  010360  177227  000007           LDCIF   #7,AC2          ;LOAD 7 INTO AC2
 1650  010364  174312                   STF     AC3,(R2)        ;ANS1 SHOULD =5=R2
 1651  010366  173737  001012           CMPF    @#ANS1,AC3      ;DOES @#ANS1 = 5
 1652  010372  170200                   STFPS   FPS
 1653  010374  170000                   CFCC
 1654  010376  001401                   BEQ     .+4             ;YES BRANCH
 1655  010400  104001                   HLT     1               ;ANS1 SHOULD CONTAIN 5
 1656  010402  171212                   MULF    (R2),AC2        ;MUL 5 X 7,AC2 = 35
 1657  010404  012703  000006           MOV     #6,R3           ;SET UP COUNTER
 1658  010410  173212           SUBFM:  SUBF    (R2),AC2        ;SUB 5 FROM 35
 1659  010412  005303                   DEC     R3              ;DO 7 TIMES
 1660  010414  001375                   BNE     SUBFM
 1661  010416  175637  001012           STCFI   AC2,@#ANS1      ;@#ANS1 SHOULD =5
 1662  010422  022737  000005  001012   CMP     #5,@#ANS1       ;DOES @#ANS1 =5
 1663  010430  170200                   STFPS   FPS
 1664  010432  001401                   BEQ     .+4             ;BRANCH IF YES
 1665  010434  104001                   HLT     1               ;ANS SHOULD =5
 1666
 1667                                   ;*****************************************************************
  (2)                                   ;TEST 45        ADDD EXERCISER
  (2)                                   ;*****************************************************************
  (2)  010436  104400           TST45:  SCOPE
 1668  010440  170127  047600           LDFPS   #47600
 1669  010444  177027  000252           LDCID   #252,AC0        ;LOAD AC0 WITH 252
 1670  010450  177227  052525           LDCID   #52525,AC2      ;LOAD AC2 WITH 52525
 1671  010454  174204                   STD     AC2,AC4         ;AC4=52525
 1672  010456  171002                   MULD    AC2,AC0         ;AC0=52525 X 252
 1673  010460  012702  000251           MOV     #251,R2         ;SET UP COUNTER
 1674  010464  172204           AADDM:  ADDD    AC4,AC2         ;ADD 52525 TO 252
 1675  010466  005302                   DEC     R2              ;DO 252 TIMES
 1676  010470  001375                   BNE     AADDM           ;DONE?
 1677  010472  174237  001012           STD     AC2,@#ANS1      ;GET FOR PRINTING
 1678  010476  170200                   STFPS   FPS
 1679  010500  173402                   CMPD    AC2,AC0         ;DOES AC2 = AC0?
 1680  010502  170000                   CFCC
 1681  010504  001401                   BEQ     .+4             ;BRANCH IF EQUAL
 1682  010506  104004                   HLT     4               ;ANS SHOULD BE.....
```

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 1684                                   ;*****************************************************************
  (2)                                   ;TEST 46        TEST DIVDE BY 0
  (2)                                   ;*****************************************************************
  (2)  010510  104400                   TST46:  SCOPE
 1685  010512  170127  047600                    LDFPS   #47600
 1686  010516  177027  077777                    LDCID   #77777,AC0
 1687  010522  177127  000000                    LDCID   #0,AC1
 1688  010526  174401                           DIVD    AC1,AC0         ;DIVIDE 0 INTO 77777
 1689  010530  175437  001012                    STCDI   AC0,@#ANS1      ;LOAD @#ANS1 WITH 77777
 1690  010534  170200                           STFPS   FPS
 1691  010536  170337  001032                    STST    @#FEC           ;GET @#FEC STATUS
 1692  010542  022737  077777  001012           CMP     #77777,@#ANS1
 1693  010550  001401                           BEQ     .+4
 1694  010552  104001                           HLT     1               ;ANS SHOULD =77777
 1695  010554  022737  000004  001032           CMP     #4,@#FEC                ;DID WE TRY TO DIV BY 0?
 1696  010562  001401                           BEQ     .+4             ;YES
 1697  010564  104000                           HLT                     ;FEC SHOULD =4
 1698                                   ;*****************************************************************
  (2)                                   ;TEST 47        EXERCISER FOR ADDD,SUBD,MULD AND DIVD
  (2)                                   ;*****************************************************************
  (2)  010566  104400                   TST47:  SCOPE
 1699  010570  170127  047400                    LDFPS   #47400
 1700  010574  170011                           SETD                    ;SET DOUBLE MODE
 1701  010576  177027  077777                    LDCID   #77777,AC0      ;LOAD AC0 WITH 77777
 1702  010602  177127  002525                    LDCID   #2525,AC1       ;LOAD AC1 WITH 2525
 1703  010606  012702  000012                    MOV     #12,R2          ;SET UP COUNTER
 1704  010612  174401                   EXLOP:  DIVD    AC1,AC0         ;DIVDE 2525 INTO 77777
 1705  010614  171001                           MULD    AC1,AC0         ;MUL 2525 X ANS
 1706  010616  172001                           ADDD    AC1,AC0         ;ADD 2525 TO ANS
 1707  010620  173001                           SUBD    AC1,AC0         ;SUB 2525 FROM ANS
 1708  010622  005302                           DEC     R2              ;DO 12 TIMES
 1709  010624  001372                           BNE     EXLOP           ;DONE?
 1710  010626  175437  001012                    STCDI   AC0,@#ANS1      ;LOAD ANS INTO @#ANS1
 1711  010632  170200                           STFPS   FPS
 1712  010634  022737  077777  001012           CMP     #77777,@#ANS1   ;IS @#ANS1 CORRECT
 1713  010642  001401                           BEQ     .+4             ;BRANCH IF CORRECT
 1714  010644  104001                           HLT     1
 1715  010646  172437  011102           EX4:    LDD     @#D1010,AC0     ;GET DATA
 1716  010652  012702  001012                    MOV     #ANS1,R2
 1717  010656  174022                           STD     AC0,(R2)+
 1718  010660  172537  011102                    LDD     @#D1010,AC1
 1719  010664  174122                           STD     AC1,(R2)+
 1720  010666  172737  001022                    LDD     @#ANS5,AC3
 1721  010672  170200                           STFPS   FPS
 1722  010674  173737  001012                    CMPD    @#ANS1,AC3
 1723  010700  170000                           CFCC
 1724  010702  001401                           BEQ     .+4
 1725  010704  104010                           HLT     10,             ;ANS1 AND ANS5 SHOULD =1010
 1726  010706  172537  011104                    LDD     @#D1011,AC1
 1727  010712  174142                           STD     AC1,-(R2)       ;STORED AC1 IN ANS5-8
 1728  010714  172012                           ADDD    (R2),AC0
 1729  010716  173042                           SUBD    -(R2),AC0
 1730  010720  173001                           SUBD    AC1,AC0
 1731  010722  175437  001012                    STCDI   AC0,@#ANS1
```

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1732  011726  022737  000000  001012          CMP     #0,@#ANS1
1733  011734  170208                          STFPS   FPS
1734  011736  001401                          BEQ     .+4
1735  011740  104001                          HLT     1
1736  011742  170001                  MORE:   SETF                    ;SET FLOATING MODE
1737  011744  177027  000525                  LDCIF   #525,AC0        ;LOAD AC0 WITH 525
1738  011750  177127  000252                  LDCIF   #252,AC1        ;LOAD AC1 WITH 252
1739  011754  174104                          STF     AC1,AC4         ;LOAD AC4 WITH 252
1740  011756  172104                          ADDF    AC4,AC1         ;ADD 252 TO 252
1741  011760  172701                          LDF     AC1,AC3         ;PUT ANS IN AC3=524
1742  011762  173003                          SUBF    AC3,AC0         ;SUB 524 FROM 525
1743  011764  175037  001012                  STEXP   AC0,@#ANS1      ;1 IN ANS1
1744  011770  170200                          STFPS   FPS
1745  011772  022737  000001  001012          CMP     #1,@#ANS1       ;CORRECT  ANS SHOULD BE 1
1746  011000  001401                          BEQ     .+4
1747  011002  104001                          HLT     1               ;ANS SHOULD BE 1
1748  011004  177027  000021                  LDCIF   #21,AC0         ;LOAD AC0 WITH 21
1749  011010  171000                          MULF    AC0,AC0         ;21 TIMES 21 AC0 = 441
1750  011012  174427  040400                  DIVF    #2,AC0          ;DIV BY 2
1751  011016  171427  040200                  MODF    #1,,AC0         ;MUL 1 TIMES 441
1752  011022  170200                          STFPS   FPS             ;STOR FPS
1753  011024  175537  001012                  STCFI   AC1,@#ANS1      ;PUT ANS IN ANS1
1754  011030  022737  000220  001012          CMP     #220,@#ANS1     ;IS IT EQUAL?
1755  011036  001401                          BEQ     .+4             ;YES
1756  011040  104001                          HLT     1               ;SHOULD = 220
1757  011042  171427  041040                  MODF    #10.,AC0        ;GET FRACTION
1758  011046  175537  001012                  STCFI   AC1,@#ANS1      ;PUT AC0 INTO ANS1
1759  011052  022737  000005  001012          CMP     #5,@#ANS1       ;ANS1 SHOULD = 5
1760  011060  001401                          BEQ     .+4
1761  011062  104001                          HLT     1               ;ANS1 SHOULD = 5
1762  011064  104400                          SCOPE
1763  011066  105037  001001                  CLRB    @#ICNT+1
1764  011072  000207                          RTS     PC
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```
 1766  011074  012701  177777          CHKERR: MOV     #-1,R1          ;SET FLAG
 1767  011100  000002                          RTI                     ;RETURN
 1768
 1769  011102  177777                  D1010:  -1
 1770  011104  000000  177777  000000  D0101:  0,-1,0
 1771  011112  177777  000000  000000  D1001:  -1,0,0
 1772  011120                          DSMALL:
 1773  011120  177777  000001  000000  WEIRD:  -1,1,0,-1
       011126  177777
 1774  011130  011104                  AD0101: D0101
 1775  011132  011112                  AD1001: D1001
 1776  011134  011252                  AD1000: D1000
 1777  011136  077777  000000  177777  DBIG:   77777,0,-1,0
       011144  000000
 1778  011146  100000  000000  000000  DMBERO: 100000,0,0,0
       011154  000000
 1779  011156  001012                  AANS1:  ANS1
 1780  011160  040252  125252  125252  DALTA:  40252,125252,125252,125252
       011166  125252
 1781  011170  040325  052525  052525  DALTB:  40325,52525,52525,52525
       011176  052525
 1782  011200  040325  052525  052525  DALTC:  40325,52525,52525,52526
       011206  052526
 1783  011210  040000  000000  000000  D40:    40000,0,0,0
       011216  000000
 1784  011220  037400  000000  000000  D37:    37400,0,0,0
       011226  000000
 1785  011230  040600  000000  000000  D46:    40600,0,0,0
       011236  000000
 1786  011240  020000  000000  000000  D20:    20000,0,0,0
       011246  000000
 1787  011250  000000                  D0100:  0
 1788  011252  177777  000000  000000  D1000:  -1,0,0,0
       011260  000000
 1789  011262  000100  000000  000000  D0100X: 100,0,0
 1790  011270  000000  177777  177777  D0111:  0,-1,-1,-1
       011276  177777
 1791  011300  000000  054321          D5T01:  0,54321
 1792  011304  011300                  AD5T01: D5T01
 1793  011306  043661  121000  000000  F5T01:  43661,121000,0,0
       011314  000000
 1794  011316  000000                  SAVADR: 0
 1795  011320  000000                  SAVST0: 0
```

```
1806  011322  104400                DONE:   SCOPE
1807  011324  032737  002000  177570        BIT     #SW10,@#SWR     ;RING THE BELL?  *SW10*
1808  011332  001002                        BNE     1$              ;NO!
1809  011334  000004  000007                TYPE    ,BELL
1810
1811  011340  005046                1$:     CLR     -(6)            ;CLEAR TRACE TRAP
1812  011342  032737  010000  177570        BIT     #SW12,@#SWR     ;RUN WITH TRT?  *SW12*
1813  011350  001010                        BNE     2$
1814  011352  005167  001256                COM     TRPB
1815  011356  100005                        BPL     2$
1816  011360  052716  000020                BIS     #20,(6)         ;SET TRACE TRAP
1817  011364  012746  001100                MOV     #BEGIN,-(6)     ;JUMP TO START OF TEST
1818  011370  000002                        RTI
1819  011372  012746  001100        2$:     MOV     #BEGIN,-(6)     ;JUMP TO START OF TEST
1820  011376  013700  000042                MOV     @#42,R0         ;RERUN?
1821  011402  001405                        BEQ     RERUN
1822  011404  000005                        RESET
1823  011406  004710                LOGICAL: JSR    7,(0)           ;JMP TO MONITOR
1824  011410  000240                        NOP
1825  011412  000240                        NOP
1826  011414  000240                        NOP
1827  011416  000002                RERUN:  RTI
1828
1829  011420  032737  000400  177570  ,EMT:  BIT     #400,@#SWR      ;KILL LOOP OR LOOP ON SPEC. TEST  *SW8*
1830  011426  001404                        BEQ     1$
1831  011430  126767  166134  167342        CMPB    SWR,ICNT        ;ON RIGHT TEST?   *SW7-0*
1832  011436  001437                        BEQ     OVER
1833  011440  116703  166124        1$:     MOVB    SWR,R3          ;GET UB BITS
1834  011444  170003                        LOOB
1835  011446  032737  040000  177570        BIT     #SW14,@#SWR     ;LOOP ON TEST   *SW14*
1836  011454  001026                        BNE     KIT
1837  011456  032737  004000  177570        BIT     #SW11,@#SWR     ;KILL ITERATIONS   *SW11*
1838  011464  001012                        BNE     SAVLAD
1839  011466  105767  167307                TSTB    ICNT+1
1840  011472  001404                        BEQ     2$              ;BRANCH IF FIRST
1841  011474  126767  001136  167277        CMPB    TIMES,ICNT+1    ;DONE?
1842  011502  001013                        BNE     KIT             ;BRANCH IF NOT
1843  011504  112767  000001  167267  2$:   MOVB    #1,ICNT+1       ;FIRST ITERATION
1844  011512  105267  167262        SAVLAD: INCB    ICNT            ;COUNT TEST NUMBERS
1845  011516  011667  167266                MOV     (6),LAD         ;SAVE LOOP ADDRESS
1846  011522  016737  167252  177570        MOV     ICNT,@#SWR      ;DISPLAY TEST NO. AND ITERATION COUNT
1847  011530  000002                        RTI                     ;RETURN
1848
1849  011532  105267  167243        KIT:    INCB    ICNT+1
1850  011536  016737  167236  177570  OVER: MOV     ICNT,@#SWR      ;SET UP DISPLAY
1851  011544  005767  167240                TST     LAD             ;FIRST ONE?
1852  011550  001760                        BEQ     SAVLAD
1853  011552  016716  167232                MOV     LAD,(6)         ;FUDGE RETURN ADDRESS
1854  011556  000002                        RTI                     ;FIXES PS
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1876  011560  032737  002000  177570  ,TRP:  BIT   @#SW10,0@#SWR   ;BELL ON ERROR?
1877  011566  001402                         BEQ   1$              ;NO - SKIP
1878  011570  000004  000007                 TYPE  ,BELL           ;RING BELL
1879  011574  004767  000444           1$:   JSR   PC,ERROR        ;COUNT THE NUMBER OF ERRORS
1880  011600  016446                         MOV   R4,-(6)
1881  011602  032737  020000  177570         BIT   @#SW13,0@#SWR   ;SKIP TYPEOUT IF SET
1882  011610  001074                         BNE   4$
1883  011612  000004  011616                 TYPE  ,.+2            ;,ASCII <15><12>
1884  011622  016646  000002                 MOV   2(6),-(6)       ;PUT ADDRESS OF INSTRUCTION ON STACK
1885  011626  162716  000002                 SUB   #2,(6)
1886  011632  011605                         MOV   (6),TTY         ;TYPE (6) IN OCTAL
 (1)  011634  004767  000222                 JSR   PC,PRINTR       ;TYPE LEADING ZERO'S
1887  011640  000004  012617                 TYPE  ,SPACE+3
1888  011644  010005                         MOV   R0,TTY          ;TYPE R0 IN OCTAL
 (1)  011646  004767  000210                 JSR   PC,PRINTR       ;TYPE LEADING ZERO'S
1889  011652  000004  012620                 TYPE  ,SPACE+4
1890  011656  012703  001012                 MOV   #ANS1,R3        ;ADDRESS OF DATA
1891  011662  113604                         MOVB  @(6)+,R4        ;AMOUNT OF DATA IN TABLE
1892  011664  001426                         BEQ   3$
1893  011666  100016                         BPL   2$              ;TYPE STACK?
1894  011670  016667  000006  167114         MOV   6(6),ANS1
1895  011676  016667  000010  167110         MOV   10(6),ANS2
1896  011704  016667  000012  167104         MOV   12(6),ANS3
1897  011712  016667  000014  167100         MOV   14(6),ANS4
1898  011720  042704  177600                 BIC   #177600,R4      ;CLEAR SIGN
1899  011724  000004  012620           2$:   TYPE  ,SPACE+4
1900  011730  012305                         MOV   (3)+,TTY        ;TYPE (3)+ IN OCTAL
 (1)  011732  004767  000124                 JSR   PC,PRINTR       ;TYPE LEADING ZERO'S
1901  011736  005304                         DEC   R4
1902  011740  001371                         BNE   2$
1903  011742  005700                   3$:   TST   FPS
1904  011744  100016                         BPL   4$
1905  011746  000004  012614                 TYPE  ,SPACE
1906  011752  170337  001032                 STST  @#FEC
1907  011756  013705  001032                 MOV   @#FEC,TTY       ;TYPE @#FEC IN OCTAL
 (1)  011762  004767  000074                 JSR   PC,PRINTR       ;TYPE LEADING ZERO'S
1908  011766  000004  012617                 TYPE  ,SPACE+3
1909  011772  016705  167036                 MOV   FEA,TTY         ;TYPE FEA IN OCTAL
 (1)  011776  004767  000060                 JSR   PC,PRINTR       ;TYPE LEADING ZERO'S
1910  012002  012604                   4$:   MOV   (6)+,R4
1911  012004  005737  177570                 TST   @#SWR           ;HALT ON ERROR
1912  012010  100001                         BPL   .+4             ;SKIP IF CONTINUE
1913  012012  000000                         HALT                  ;HALT ON ERROR!
1914  012014  032737  001000  177570         BIT   @#SW09,0@#SWR   ;CHECK FOR INHIBIT LOOP ON ERROR
1915  012022  001001                         BNE   .+4             ;SKIP IF LOOP ON ERROR
1916  012024  000002                         RTI
1917  012026  105067  166747                 CLRB  ICNT+1
1918  012032  032737  000400  177570         BIT   @#SW08,0@#SWR   ;CHECK FOR LOAD MICROBREAK
1919  012040  001234                         BNE   KIT             ;BRANCH IF NOT
1920  012042  113703  177570                 MOVB  @#SWR,R3        ;PUT MICROBREAK ADDRESS IN R3
1921  012046  170003                         LDUB                  ;LOAD MICROBREAK
1922  012050  000630                         BR    KIT             ;LOOP ON TEST UNTIL NO ERRORS
```

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1924                                    ;       SOCTAL          OCTAL TYPEOUT ROUTINE
 (1)
 (1)                                    ;THIS ROUTINE IS USED TO TYPE AN OCTAL NUMBER ON THE TTY. IT WILL TYPE
 (1)                                    ;ALL 6 CHARACTERS, SUPPRESS LEADING ZEROES, TYPE AN 18 BIT ADDRESS, OR TYPE
 (1)                                    ;THE 16 BITS. IT IS CALLED VIA THE DUMP, SDUMP, DUMP18, OR BITYPE MACRO'S.
 (1)
 (1)  012852  012767  170101  000148  BITYPS: MOV     #170101,,PR     ;SET BIT FLAG AND 16. CHARACTER COUNT
 (1)  012860  000411                        BR      ,PTIT           ;NOW TYPE IT IN BIT FORM
 (1)  012862  112767  000001  000138  PRINTR: MOVB    #1,,PR          ;SET ZERO FILL SWITCH
 (1)  012870  000402                        BR      ,+6             ;SKIP
 (1)  012872  005067  000122           PRINTS: CLR     ,PR             ;SUPRESS LEADING ZERO'S
 (1)  012876  112767  177772  000115          MOVB    #-6,,PR+1       ;SET COUNT
 (1)  013104  016446                  ,PTIT:  MOV     R4,-(6)         ;SAVE R4
 (1)  013106  012704  012222                  MOV     #,PR+2,R4       ;SET POINTER TO FIRST ASCII CHAR.
 (1)  013112  105014                          CLRB    (4)             ;CLEAR FIRST BYTE
 (1)  013114  000411                          BR      ,PRF            ;ROTATE FIRST BIT
 (1)  013116  105014                  ,PRL:   CLRB    (4)             ;CLEAR BYTE OF CHARACTER
 (1)  013120  032767  000100  000072          BIT     #100,,PR        ;BIT TYPING MODE?
 (1)  013126  001004                          BNE     ,PRF            ;YES - SKIP 2 ROTATES
 (1)  013130  006105                          ROL     TTY             ;ROTATE BIT INTO C
 (1)  013132  106114                          ROLB    (4)             ;PACK IT
 (1)  013134  006105                          ROL     TTY             ;ROTATE BIT INTO C
 (1)  013136  106114                          ROLB    (4)             ;PACK IT
 (1)  013140  006105                  ,PRF:   ROL     TTY             ;ROTATE BIT INTO C
 (1)  013142  106114                          ROLB    (4)             ;PACK IT
 (1)  013144  105714                          TSTB    (4)             ;IS IT ZERO?
 (1)  013146  001402                          BEQ     ,+6             ;SKIP INC
 (1)  013150  105267  000044                  INCB    ,PR             ;SET FILL SWITCH
 (1)  013154  105767  000040                  TSTB    ,PR             ;CHECK FILL SWITCH
 (1)  013160  001402                          BEQ     ,+6             ;SKIP BITSET
 (1)  013162  152724  000060                  BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
 (1)  013166  105267  000027                  INCB    ,PR+1           ;INC COUNT
 (1)  013172  001351                          BNE     ,PRL            ;REPEAT
 (1)  013174  022704  012222                  CMP     #,PR+2,R4       ;EMPTY BUFFER?
 (1)  013200  001002                          BNE     ,+6             ;SKIP IF NOT
 (1)  013202  112724  000060                  MOVB    #'0,(4)+        ;LOAD A ZERO
 (1)  013206  105014                          CLRB    (4)             ;NULL TERMINATOR
 (1)  013210  000004  012222                  TYPE    ,,PR+2          ;TYPE IT
 (1)  013214  012604                          MOV     (6)+,R4         ;RESTORE R4
 (1)  013216  000207                          RTS     PC              ;RETURN
 (1)  013220  000012                  ,PR:    .BLKW   12              ;COUNT, SWITCH, AND OUTPUT BUFFER
1925
1926  013244  005267  166532          ERROR:  INC     ERRORS          ;COUNT ERRORS
1927  013250  132737  000001  000041          BITB    #1,@#41         ;AUTO MODE?
1928  013256  001412                          BEQ     1$              ;NO!
1929  013260  022767  000010  166514          CMP     #10,ERRORS      ;TOO MANY?
1930  013266  001006                          BNE     1$              ;NOT YET
1931  013270  013700  000042                  MOV     @#42,R0         ;GET ADDRESS
1932  013274  001403                          BEQ     1$              ;FORGET IT IF ZERO
1933  013276  005037  000042                  CLR     @#42            ;ZAP 42
1934  013302  004710                          JSR     PC,(0)          ;CALL THE MONITOR
1935  013304  000207                  1$:     RTS     PC              ;RETURN
```

```
1948  012306  012777  012582  000314  POWDWN: MOV     #ILLUP,@UPVEC   ;SET FOR FAST UP
1949  012314  012777  000340  000310          MOV     #340,@UPVEC+2   ;PRIO17
1950  012322  170246                          STFPS   -(6)            ;GET THE FPS
1951  012324  170011                          SETD
1952  012326  174046                          STD     AC0,-(6)        ;SAVE AC'S
1953  012330  174146                          STD     AC1,-(6)
1954  012332  174246                          STD     AC2,-(6)
1955  012334  174346                          STD     AC3,-(6)
1956  012336  172404                          LDD     AC4,AC0
1957  012340  174046                          STD     AC0,-(6)
1958  012342  172405                          LDD     AC5,AC0
1959  012344  174046                          STD     AC0,-(6)
1960  012346  010046                          MOV     R0,-(6)         ;SAVE REGISTERS
1961  012350  010146                          MOV     R1,-(6)
1962  012352  010246                          MOV     R2,-(6)
1963  012354  010346                          MOV     R3,-(6)
1964  012356  010446                          MOV     R4,-(6)
1965  012360  010546                          MOV     R5,-(6)
1966  012362  010667  000234                  MOV     SP,SAVE6        ;SAVE SP
1967  012366  012777  012376  000234          MOV     #POWUP,@UPVEC   ;SET UP VECTOR
1968  012374  000000                          HALT
1969
1970  012376  016706  000220          POWUP:  MOV     SAVE6,SP        ;GET SP
1971  012402  005001                          CLR     R1              ;WAIT LOOP FOR THE TTY
1972  012404  005201                  1$:     INC     R1
1973  012406  001376                          BNE     1$
1974  012410  012605                          MOV     (6)+,R5         ;GET THE REGISTERS
1975  012412  012604                          MOV     (6)+,R4
1976  012414  012603                          MOV     (6)+,R3
1977  012416  012602                          MOV     (6)+,R2
1978  012420  012601                          MOV     (6)+,R1
1979  012422  012600                          MOV     (6)+,R0
1980  012424  170011                          SETD
1981  012426  172426                          LDD     (6)+,AC0        ;RESTORE THE AC'S
1982  012430  174005                          STD     AC0,AC5
1983  012432  172426                          LDD     (6)+,AC0
1984  012434  174004                          STD     AC0,AC4
1985  012436  172726                          LDD     (6)+,AC3
1986  012440  172626                          LDD     (6)+,AC2
1987  012442  172526                          LDD     (6)+,AC1
1988  012444  172426                          LDD     (6)+,AC0
1989  012446  170126                          LDFPS   (6)+            ;RESTORE FPS
1990  012450  012777  012306  000146          MOV     #POWDWN,@DWNVEC ;SET UP THE POWER DOWN VECTOR
1991  012456  012777  000340  000142          MOV     #340,@DWNVEC+2
1992  012464  000004  012470                  TYPE    ,,+2            ;,ASCIZ <12><12>"POWER"
1993  012500  000002                          RTI
1994
1995  012502  000000                  ILLUP:  HALT                    ;THE POWER UP SEQUENCE WAS STARTED
1996  012504  000776                          BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE
```

```
1998                                        ;       STYPE           MESSAGE TYPEOUT ROUTINE
 (1)
 (1)                                        ;THIS ROUTINE IS USE TO TYPE ASCII MESSAGES ON THE TTY. THE
 (1)                                        ;CALL CAN BE IN ONE OF 3 FORMS: 1) "TYPE ,ADR" - TYPES THE
 (1)                                        ;MESSAGE STARTIN IN LOCATION "ADR", 2) "TYPE ,CHAR" - TYPES
 (1)                                        ;THE ASCII "CHAR", AND 3) "PRINT <<15><12>"MESSAGE"> - TYPES
 (1)                                        ;THE MESSAGE WHICH IS INLINE ASCII.
 (1)
 (1)  012506  010546                        10$:    MOV     TTY,-(6)        ;SAVE TTY
 (1)  012516  017605  000002                        MOV     @2(6),TTY       ;GET ADDRESS TO BE TYPED
 (1)  012514  032705  177400                        BIT     #177400,TTY     ;IS IT A TYPE0?
 (1)  012520  001004                                BNE     1$              ;NO
 (1)  012522  010567  000004                        MOV     TTY,,TYPE       ;GET THE CHARACTER
 (1)  012526  012705  012612                        MOV     #,TYPE,TTY      ;FUDGE THE ADDRESS
 (1)  012532  105715                        1$:     TSTB    (TTY)           ;TERMINATOR?
 (1)  012534  001406                                BEQ     2$              ;GET OUT IF SO
 (1)  012536  112537  177566                        MOVB    (TTY)+,@#177566 ;LOAD AND TYPE THE CHARACTER
 (1)  012542  105737  177564                        TSTB    @#177564        ;IS THE PRINTER READY
 (1)  012546  100375                                BPL     .-4             ;WAIT UNTIL IT IS
 (1)  012550  000770                                BR      1$              ;GET THE NEXT CHARACTER
 (1)  012552  017646  000002                2$:     MOV     @2(6),-(6)      ;GET ADDRESS TO BE TYPED
 (1)  012556  062766  000002  000004                ADD     #2,4(6)         ;ADD 2 TO THE ADDRESS
 (1)  012564  022666  000002                        CMP     (6)+,2(6)       ;IS IT ,+2?
 (1)  012570  001006                                BNE     3$              ;NO
 (1)  012572  062705  000002                        ADD     #2,TTY          ;ADD 2 TO THE ADDRESS
 (1)  012576  042705  000001                        BIC     #1,TTY          ;BACK UP TO AN EVEN BYTE
 (1)  012602  010566  000002                        MOV     TTY,2(6)        ;RESTORE ADDRESS
 (1)  012606  012605                        3$:     MOV     (6)+,TTY        ;RESTORE TTY
 (1)  012610  000002                                RTI                     ;RETURN
 (1)  012612  000000                        .TYPE:  0                       ;CHARACTER TYPE LOCATION
1991  012614  000015  020040  000040        SPACE:  .ASCIZ  <15><12>"   "
1992  012622  000000                        SAVE6:  0
1993  012624  000024  000026                DWNVEC: 24,26                   ;POWER DOWN VECTOR ADDRESS
1994  012630  000024  000026                UPVEC:  24,26                   ;POWER UP VECTOR ADDRESS
1996  012634  000000                        TRPS:   0
1997  012636  000377                        TIMES:  377                     ;ITERATION COUNT
2000  012640  172160                        FPTADR: 172160                  ;FLOATING POINT ADDRESS ON THE 11/20
2001  012642  000244  000246                FPVECT: 244,246                 ;FLOATING POINT VECTOR ADDRESS
2002
2016
2018          000001                        .END
```

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AAC     =000212          AADDR   =000464          AANS1   =001150          ACO   =000000
AC1     =000001          AC2     =000002          AC3     =000003          AC4   =000004
AC5     =000005          ADANS1  =002136          AD0101  =011130          AD100A  =011134
AD1021  =011132          ADSTO1  =011304          ANS1    =001014          ANS2    =001014
ANS3    =001016          ANS4    =001020          ANS5    =001022          ANS6    =001024
ANS7    =001026          ANS8    =001030          BEGIN   =001100          BELL    =000007
BITPS   =012652          CMKERR  =011074          CODE    =010000          DALTA   =011160
DALTB   =011170          DALTC   =011200          DBIG    =011130          DDIV    =010314
DMPERR  =011146          DONE    =011322          DSMALL  =011120          DMNVEC  =012624
DP100   =011250          DP100X  =011262          DP101   =011104          DP111   =011270
D1220   =011252          D1001   =011112          D1010   =011102          D20     =011240
D37     =011220          D40     =011210          D46     =011230          DSTO1   =011300
ERROR   =012244          ERRORS  =001002          EXLOP   =010012          EX4     =010046
FEA     =001034          FEC     =001032          FLTERR  =000760          FPS     =000000
FPTADR  =012640          FPVECT  =012642          FSTO1   =011300          ICNT    =001000
ILLUP   =012502          IOTS    =012506          KIT     =011932          LAD     =001010
LOSC    =170004          LOUB    =170003          LOGICA  =011400          MMUL    =010292
MORE    =010742          MOVE    =006710          MRS     =170006          M1120   =001072
N       =000050          OVER    =011536          PC      =000007          PCNT    =001004
POWDWN  =012306          POWUP   =012376          PRINTR  =012062          PRINTS  =012072
PS      =177776          RELEX   =006564          RERUN   =011410          RETURN  =000001
R0      =000000          R1      =000001          R2      =000002          R3      =000003
R4      =000004          R5      =000005          SAVADR  =011310          SAVE6   =012622
SAVLAD  =011512          SAVSTS  =011320          SP      =000006          SPACE   =012614
START   =001036          STAB    =170005          STOB    =170007          SUBFM   =010410
SUBT    =010136          SWR     =177570          SW00    =000400          SW09    =001000
SW10    =002000          SW11    =004000          SW12    =010000          SW13    =020000
SW14    =040000          TIMES   =012636          TRAP4   =006672          TRP0    =012634
TST1    =001172          TST10   =002300          TST11   =002424          TST12   =002606
TST13   =003004          TST14   =003174          TST15   =003422          TST16   =003524
TST17   =003666          TST2    =001310          TST20   =003770          TST21   =004072
TST22   =004310          TST23   =004424          TST24   =004660          TST25   =005104
TST26   =005302          TST27   =005444          TST3    =001414          TST30   =005556
TST31   =005654          TST32   =005746          TST33   =006034          TST34   =006122
TST35   =006206          TST36   =006326          TST37   =006424          TST4    =001600
TST42   =010006          TST41   =010050          TST42   =010100          TST43   =010164
TST44   =010342          TST45   =010436          TST46   =010510          TST47   =010566
TST5    =001722          TST6    =002044          TTY     =000005          TYPE    =000004
UPVEC   =012630          .BIT    =176777          .CMT    =011420          .DPR    =012220
.PNF    =012140          .PRL    =012116          .PTIT   =012104          .TRP    =011542
.TYPE   =012612          .       =212646
```

ERRORS DETECTED: 0

.DCFPOD,DCFPOD=DCFPOD.P11
RUN-TIME: 13 19 0 SECONDS
CORE USED: 8K

14

A5