FP11-F FP11F FLTG PNT PRT B AH-F635C-MC
CKFPBCO FICHE 1 OF 1
APR 1982
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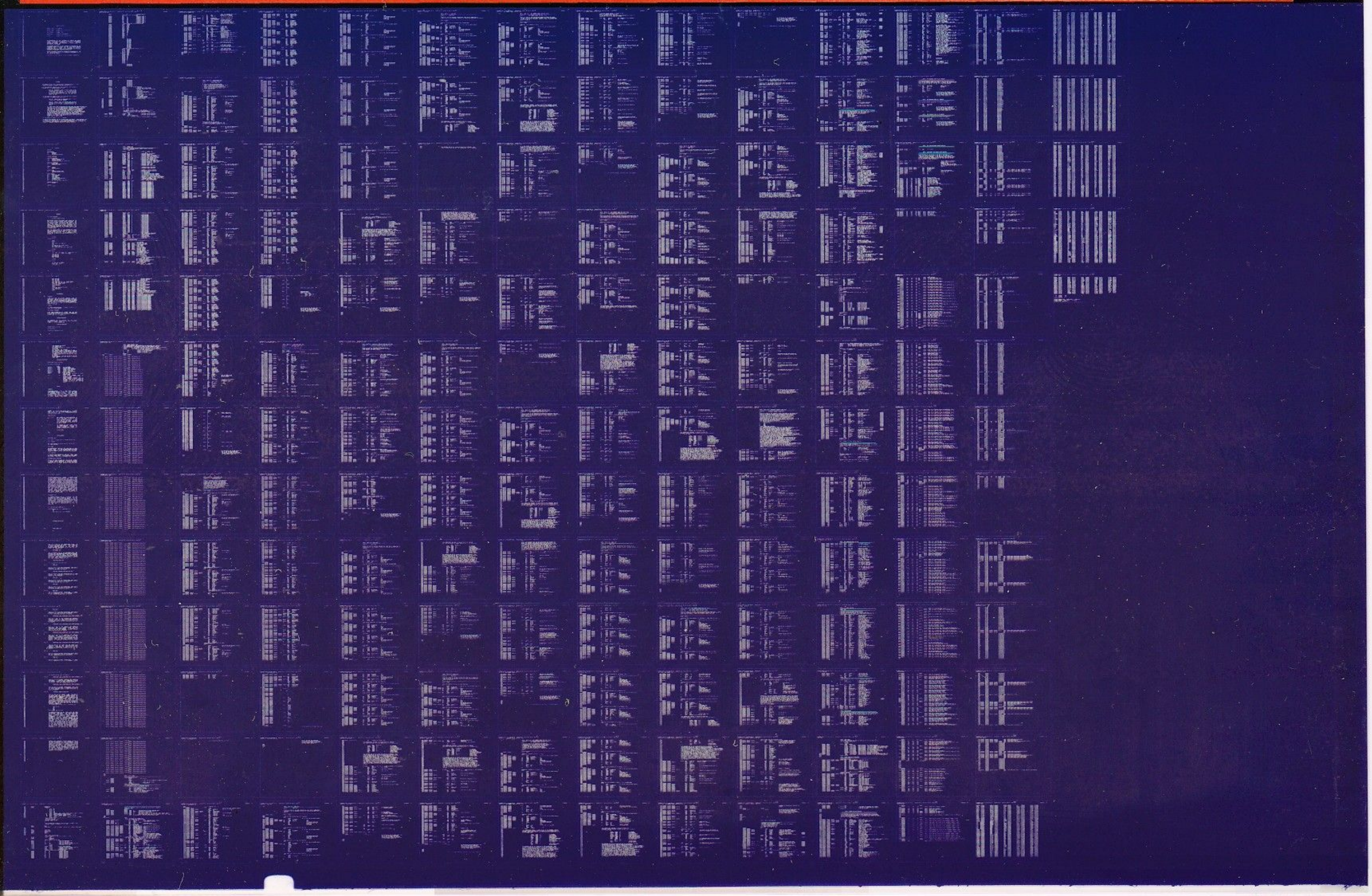

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                        .REM    &
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IDENTIFICATION

PRODUCT CODE: AC-F633C-MC

PRODUCT NAME: CKFPBC0 FP11F FLTG PNT PRT B

DATE CREATED: OCTOBER, 1981

MAINTAINER: DIAGNOSTIC ENGINEERING

AUTHOR: ANTHONY VEZZA, DAN MILLEVILLE

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HISTORY

NO CHANGES TO THE 11/34 FLOATING POINT DIAGNOSTICS PART 'A' WERE FOUND TO BE NEEDED TO ADAPT IT FOR USE ON THE 11/44.

THE FOLLOWING WAS ADDED TO THE 11/34 FLOATING POINT DIAGNOSTIC TO MAKE THE 'B' VERSION COVER THE 11/44:

1. TEST 22 - PROCESSOR LOOKS TO SEE IF APT IS CONTROLLING THE TEST, AND IF IT IS, CHECKS TO SEE IF THE USER HAS SELECTED THIS TEST BY CHECKING BIT 7 IN THE SWITCH REGISTER. IT HAS ALSO BEEN CHANGED SO THAT IF BIT 7 IS *ONE*, THE CODE WILL SELECT THE TEST.

THE FOLLOWING WAS ADDED TO THE 11/34 FLOATING POINT DIAGNOSTIC TO MAKE THE 'C' VERSION COVER THE 11/44:

1. TEST 76 - CHECKS THAT FP PROCESSOR DOESN'T ACCESS D-SPACE UNTIL CONDITIONS WARRANT.

2. TEST 77 - CHECKS THAT SR1 MATCHES WHAT ACTUALLY HAPPENED TO THE REGISTER OF THE INSTRUCTION, AND THAT THE VALUE OF AUTO INCREMENT/DECREMENT WAS PROPER.

ALL THREE PARTS WERE RE-RELEASED WITH NEW SCOPE AND ERROR ROUTINES THAT CHECK BIT 0 OF THE CPU ERROR REGISTER (POWER MONITOR BIT). THE ADDITIONS WERE MADE IN THE SCOPE ROUTINE, EXECUTED AT THE BEGINNING OF EACH TEST. IF THE BIT BECOMES SET, AN ERROR IS CALLED FROM THE SCOPE ROUTINE. THE BIT IS CLEARED, AND THE TEST IS CONTINUED. IF THE BIT BECOMES SET IN THE MIDDLE OF A TEST, AND AN ERROR OCCURS FOR ANY REASON, THE ERROR ROUTINE WILL CALL *TWO* ERRORS, THE POWER MONITOR BIT ERROR FIRST, THEN THE ERROR ORIGINALLY CALLED. IN ADDITION, THE $READ ROUTINE NOW CHECKS FOR A RANDOMLY INPUTED ^Q BEFORE A ^S IS TYPED. THIS BECAME NECESSARY WITH CERTAIN DATA CONNECTIONS OF SOME SYSTEMS.

THE FOLLOWING WAS ADDED TO THE 'D' VERSION:

THE END-OF-PASS MESSAGES ARE NOW PRINTED EVERY 200 PASSES. THESE MESSAGES CAN BE DISABLED BY TYPING ANY KEY. THEY CAN BE REENABLED BY AGAIN TYPING ANY KEY THIS IS HELPFUL FOR OVERNIGHT RUNS ON HARD COPY TERMINALS. IT ALSO MAKES THE DIAGNOSTIC HARDWARE INTENSIVE INSTEAD OF TERMINAL INTENSIVE.

CONTENTS

1. ABSTRACT

THE THREE PROGRAMS:

CKFPAD0 CKFPBC0 CKFPCD0

ARE DESIGN TO DETECT AND REPORT LOGIC FAULTS IN THE PDP 11/44 FP11-F FLOATING POINT PROCESSOR. THE DESIGN IS AN ATTEMPT TO REACH ALL ROM STATES, TAKE ALL BRANCH MICRO TESTS (BUT'S) AND VARIFY ALL THE LOGIC. THEY CONSIST OF 157 (OCT) INDIVIDUAL TESTS SEQUENCED TO DETECT AND ATTEMPT TO IDENTIFY FAULTS WITH A MINIMUM HARDWARE OR SOFTWARE LEVEL. THE TESTS ARE PARTIONED INTO THREE STAND-ALONE PROGRAMS DESCRIBED BELOW.

NOTE THAT ERROR REPORTS IN THESE PROGRAMS ARE BASED UPON THE KNOWLEDGE THAT ALL PREVIOUS TESTS HAVE BEEN RUN AND IN MOST CASE THAT THERE IS ONLY A SINGLE POINT FAULT IN THE FP11-F. IF THE PROGRAMS OR TESTS ARE NOT RUN IN ORDER THEN ERROR MESSAGES MAY NOT BE ACCURATE.

A. CKFPAD0

CKFPAD0 TESTS:

- LDFPS
- STFPS
- CFCC
- SETF, SETD, SETI AND SETL
- STST
- LDF AND LDD (ALL SOURCE MODES)
- STD (MODE 0 AND 1)
- ADDF, ADDD AND SUBD (MOST CONDITIONS)

B. CKFPBC0

CKFPBC0 TESTS:

- ADDF, ADDC AND SUBD (ALL CONDITIONS NOT TESTED IN CKFPBC0)
- CMPD AND CMPF
- DIVD AND DIVF
- MULD AND MULF
- MODD AND MODF

C. CKFPCD0

CKFPCD0 TESTS:

- STF AND STD (ALL MODES)
- STCFD AND STCDF
- CLRD AND CLRF

```
                                        NEGF AND NEGD
                                        ABSF AND ABSD
                                        TSTF AND TSTD
                                        NEGF, ABSF AND TSTF (ALL SOURCE MODES)
                                        NEGF, ABSF AND TSTF (ALL SOURCE MODES)
                                        LDFPS (ALL SOURCE MODES)
                                        LDCIF AND LDCLF
                                        LDCID AND LDCLD
                                        LDEXP
                                        STFPS (ALL DESTINATION MODES)
                                        STCFL AND STCFI
                                        STCDL AND STCDI
                                        STEXP
                                        STST
```

2. REQUIREMENTS

2.1 EQUIPMENT

A PDP 11/44 (WITH OR WITHOUT CONSOLE), LA30 (OR EQUIVALENT) AND AN FP11-F FLOATING POINT PROCESSOR. NOTE THAT A SPECIAL INTERRUPTS TEST MODULE IS BEING DESIGNED FOR USE IN THE MANUFACTURING ENVIRONMENT. WHEN THIS DEVICE IS PRESENT THE PROGRAM CKFPBC0 WILL MAKE USE OF IT TO TEST THE FPP INTERRUPT ON BUS REQUEST FUNCTIONS.

2.2 STORAGE

ALL THREE PROGRAM REQUIRE A MEMORY SYSTEM OF AT LEAST 16K TO LOAD AND RUN.

2.3 PRELIMINARY PROGRAMS

THESE THREE DIAGNOSTICS WILL ASSUME THAT THE PDP 11/44 CENTRAL PROCESSOR IS FAULTLESS, THEREFORE WHEN IN DOUBT RUN THE PDP 11/44 PROCESSOR DIAGNOST'CS BEFORE THESE FP11-F DIAGNOSTICS.

3. LOADING PROCEDURE

THE PROGRAMS WILL BE SUPPLIED ON THE 11/44 DIAGNOSTIC MEDIA. REFER TO THE XXDP OPERATING MANUAL FOR FURTHER INFORMATION.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE SECTION 5.1

4.2 PROGRAM AND OPERATOR ACTION

1. LOAD PROGRAM INTO MEMORY
2. LOAD ADDRESS 200
3. SET CONSOLE SWITCHES (IF CONSOLE IS PRESENT)
4. PRESS START
   ON FIRST PASS THE PROGRAM WILL IDENTIFY ITSELF. NOTE THAT IF THERE IS NO PHYSICAL CONSOLE THE PROGRAM WILL REQUEST THE OPERATOR FOR INITIAL VALUE FOR THE SOFTWARE SWITCH REGISTER (SEE SECTION 8.5). IF RUNNING UNDER ACT, APT OR CHAIN THIS DOES NOT APPLY.
5. THE PROGRAM WILL LOOP AND AN END OF PASS AND ERROR SUMMARY WILL BE TYPED AT THE END OF EVERY PASS.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

THE SWITCH SETTING ARE:

	OCTAL	
SW<15>=1...	100000	HALT ON ERROR
SW<14>=1...	40000	LOOP ON CURRENT TEST
SW<13>=1...	20000	INHIBIT ERROR TYPE OUTS
SW<12>=1...	10000	INHIBIT T-BIT TRAPPING
SW<11>=1...	4000	INHIBIT ITERATIONS
SW<10>=1...	2000	RING TTY BELL ON ERROR
SW<9>=1....	1000	LOOP ON ERROR
SW<8>=1....	400	LOOP ON TEST SPECIFIED IN SW<6> THROUGH SW<0>
SW<7>=1....	200	PRINT ERROR SUMMARY EVEN IF SW<13>=1, THIS APPLIES ONLY TO PROGRAM CKFPAD0.
SW<7>=1....	200	SELECT CORRECT INTERRUPT TEST IN PROGRAM CKFPBC0. IF APT IS SELECTING THE TEST, THE SWITCH REGISTER IS EXAMINED TO SEE IF THE USER HAS SELECTED THIS TEST BY A <1> IN SW<7>

6. ERRORS

6.1 SUMMARIES

IN PROGRAM CKFPAD0, TESTS 1 AND 11 HAVE A SPECIAL ERROR SUMMARY FEATURE. THESE TWO TEST RUN MANY TEST PATTERNS THROUGH THE LOGIC. AFTER AN ERROR IS ENCOUNTERED, ONLY THE FIRST FIVE ERRORS ARE REPORTED (TYPED ON THE TTY). EVERY ERROR THOUGH IS LOGGED AND AN ERROR SUMMARY IS PRINTED WHEN THE TEST IS COMPLETE. NOTE THAT IF SW<13>=1 THIS

SUMMARY WILL NOT BE TYPED UNLESS SW<7>=1. IN OTHER WORDS TO GET JUST AN ERROR SUMMARY FROM EITHER OF THESE TWO TESTS 1 AND 11 IN PROGRAM CKFPAD0 BOTH SWITCHES 13 AND 7 MUST = 1.

6.2 ERROR RECOVERY

SW<15:9>=0... MOST ERRORS WILL CAUSE EXECUTION TO GO TO THE START OF THE NEXT TEST AFTER THE MESSAGE IS TYPED. A FEW TESTS ARE IN SECTIONS. IN THESE TESTS AN ERROR WILL CAUSE EXECUTION TO GO TO THE NEXT SECTION AFTER THE MESSAGE IS TYPED.

SW<15>=1... THE PROGRAM WILL HALT AFTER TYPING THE ERROR MESSAGE. PRESSING THE CONSOLE CONTINUE WILL CAUSE THE PROGRAM TO CONTINUE AS IF SW<15>=0.

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIMES

LESS THAN 10 SECONDS FOR EACH PROGRAM ON ANY PASS.

8.2 STACK POINTER

THE STACK POINTER IS INITIALIZED TO 1100 IN EACH OF THE THREE PROGRAMS.

8.3 PASS COUNT

THE PROGRAM MAKES ONE PASS FOR EACH END OF PASS MESSAGE TYPED. THE END OF PASS MESSAGE DESCRIBES THE TOTAL NUMBER OF PASSES COMPLETED AND THE TOTAL NUMBER OF ERRORS SINCE THE LAST END OF PASS MESSAGE.

8.4 T-BIT TRAPPING

IF SW<12>=0 EACH PROGRAM WILL RUN WITH TRACE TRAPS ON EVERY OTHER PASS. FIRST PASS WILL NOT ENABLE TRACE TRAPS. NOTE SW<12>=1 DISABLES T-BIT TRAPS.

8.5 SOFTWARE SWITCH REGISTER

EACH OF THE THREE PROGRAMS WILL RUN WITH OR WITHOUT A CONSOLE SWITCH REGISTER. IF A PHYSICAL CONSOLE SWITCH REGISTER IS PRESENT ON THE SYSTEM, THEN THESE PROGRAMS WILL GO AHEAD AND USE IT FOR THE SWITCH

FUNCTIONS DESCRIBED IN 5.1 ABOVE. IF HOWEVER THERE IS NO CONSOLE SWITCH REGISTER ON THE SYSTEM A SOFTWARE SWITCH REGISTER WILL BE USED. THIS SOFTWARE SWITCH REGISTER CAN BE EXAMINED OR MODIFIED AT ANY TIME BY THE USER IF HE TYPES CONTROL G WHILE THE PROGRAM IS RUNNING. THIS CONTROL G WILL CAUSE THE CONTENTS OF THE SOFTWARE SWITCH REGISTER TO BE TYPED ON THE TTY AND ASK THE USER FOR A NEW VALUE. WHEN THE USER TYPES A VALUE AND CARRIAGE RETURN THEN THE PROGRAM WILL RESUME TESTING AT THE SAME POINT AT WHICH IT LEFT OFF WHEN THE USER TYPED CONTROL G. NOTE THAT WHEN NOT RUNNING UNDER ACT, APT OR CHAIN THE USER WILL BE ASKED FOR A SOFTWARE SWITCH REGISTER VALUE AFTER LOADING ADDRESS 200 AND STARTING THE PROGRAM THE FIRST TIME THE PROGRAM IS RUN AFTER LOADING (ONLY IF NO CONSOLE SWITCH REGISTER IS ON THE SYSTEM).

8.6 INTERRUPTS TEST

IN PROGRAM CKFPBC0, THERE IS A SPECIAL TEST FOR CHECKING THE CORRECT FLOWS OF THE FPP. THIS TEST CAN BE RUN ONLY IF A SPECIAL TEST MODULE IS IN THE SYSTEM. THIS MODULE WILL PROBABLY ONLY BE USED IN MANUFACTURING. IF THIS MODULE IS NOT IN THE SYSTEM THIS TEST WILL AUTOMATICALLY BE DESELECTED. IF THIS TEST MODULE IS ON THE SYSTEM AND SW<7>=0 THIS TEST WILL BE RUN. IF SW<7>=1 THIS TEST WILL BE DESELECTED.

8.7 ACT, APT AND XXDP COMPATIBILITY

THESE PROGRAMS ARE FULLY COMPATIBLE WITH:

- APT
- ACT
- XXDP MONITOR AND CHAIN PROGRAMS.

9. PROGRAM DESCRIPTION

TEST 1 ROUND\TRUNK TEST

```
                        THIS  IS  A  TEST  OF  THE  ROUND\TRUNK  FLOWS.   IN
                        PARTICULAR TWO THINGS ARE TESTED:  FIRST A CONDITION
                        IN  WHICH  ROUNDING  RESULTS   IN   THE   NEED   FOR
                        RENORMALIZATION,  AND SECOND THE PSW CONDITION CODES
                        N AND Z BIT COMMBINATIONS

TEST 2          OVER\UNDER TEST
------          ---------------

                        THIS IS A PARTIAL TEST OF THE OVER\UNDER FLOWS.  ONE
                        OVERFLOW  AND  TWO UNDERFLOW CONDITIONS ARE CHECKED.
                        THE REMAINING UNDERFLOW  COND.   AND  THE  REMAINING
                        OVERFLOW  COND.  WILL BE CHECKED LATER USING THE XXX
                        INSTRUCTION.  HERE EACH CONDITION TESTED IS  CHECKED
                        BOTH  WITH  TRAPS  ENABLED (FIU=1 OR FIV=1) AND ALSO
                        WITH TRAPS DISABLED (FIU=0 OR FIV=0).

TEST 3          LDCFD AND LDCDF TEST
------          --------------------

                        THIS IS A  EST OF LDCFD AND LDCDF.

TEST 4          CMPD TEST
------          ---------

                        THIS IS A TEST OF THE CMPD INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP OPERANDS, EXECUTE THE
                        INSTRUCTION AND CHECK THE RESULTS

TEST 5          DIVD WITH (FSRC=0) AND (BUT FD) TEST
------          ------------------------------------

                        THIS IS A TEST OF THE DIVD INSTRUCTION WITH  A  ZERO
                        DIVISOR.   THE  CONDITION  IS CHECKED WITH BOTH TRAP
                        ENABLED AND TRAPS DISABLED.

TEST 6          DIVF TEST
------          ---------

                        THIS IS A TEST OF THE DIVF INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 7          DIVD TEST
------          ---------

                        THIS IS A TEST OF THE DIVD INSTRUCTION.  NOTE THAT A
                        SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 10         MULF TEST
------          ---------
                        THIS IS A TEST OF THE MULF  INSTRUCTION.   IT  MAKES
                        USE  OF A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE
                        THE MULF INSTRUCTION AND CHECK THE RESULTS.
```

```
                        TEST 11         MULD TEST
                        -------         ---------

                                THIS IS A TEST OF THE MULD INSTRUCTION.  NOTE THAT A
                                SUBROUTINE  IS  USED TO SET UP THE OPERANDS, EXECUTE
                                THE MULD INSTRUCTION AND CHECK THE RESULTS.

                        TEST 12         UNDER\OVER FLOW, USING MULF WITH TRAPS DISABLED, TEST
                        -------         ----------------------------------------------------

                                THIS  IS  A  TEST  OF  THE  OVERFLOW  AND  UNDERFLOW
                                CONDITIONS  USING  THE  MULF  INSTRUCTION WITH TRAPS
                                DISABLED.  NOTE THAT A SUBROUTINE IS USED TO SET  UP
                                THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK
                                THE RESULTS.

                        TEST 13         UNDER\OVER FLOW, USING MULD WITH TRAPS DISABLED, TEST
                        -------         ----------------------------------------------------

                                THIS  IS  A  TEST  OF  THE  OVERFLOW  AND  UNDERFLOW
                                CONDITIONS   THAT   CAN   ARRISE   USING   THE  MULD
                                INSTRUCTION WITH TRAPS DISABLED.   A  SUBROUTINE  IS
                                USED  TO  SET  UP  THE  OPERANDS,  EXECUTE  THE MULD
                                INSTRUCTION AND CHECK THE RESULTS.

                        TEST 14         UNDER\OVER FLOW, USING MULF WITH TRAPS ENABLED, TEST
                        -------         ----------------------------------------------------

                                THIS  IS  A  TEST  OF  THE  UNDERFLOW  AND  OVERFLOW
                                CONDITIONS   THAT   CAN   OCCUR   USING   THE   MULF
                                INSTRUCTION.  A SUBROUTINE IS CALLED TO SET  UP  THE
                                OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK THE
                                RESULTS.   HERE  THE  PARTICULAR  INTERRUPT,  EITHER
                                OVERFLOW  OR  UNDERFLOW, IS ENABLED SO A TRAP SHOULD
                                OCCUR.

                        TEST 15         UNDER\OVER FLOW, USING MULD WITH TRAPS ENABLED, TEST
                        -------         ----------------------------------------------------

                                THIS IS A TEST OF  THE  OVER  FLOW  AND  UNDER  FLOW
                                CONDITIONS  USING  THE  MULD  INSTRUCTION WITH TRAPS
                                ENABLED.   A  SUBROUTINE  IS  USED  TO  SET  UP  THE
                                OPERANDS, EXECUTE THE MULD INSTRUCTION AND CHECK THE
                                RESULTS.

                        TEST 16         MODF TEST
                        -------         ---------

                                THIS IS A TEST OF THE MODF INSTRUCTION, WHICH  MAKES
                                USE  OF A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE
                                THE MODF INSTRUCTION AND CHECK THE RESULTS.

                        TEST 17         MODD TEST
                        -------         ---------

                                THIS IS A TEST OF THE MODD  INSTRUCTION.   IT  MAKES
                                USE OF A SUBROUTINE TO SET UP THE ARGUMENTS, EXECUTE
```

```
                        THE INSTRUCTION AND CHECK THE RESULTS.

TEST 20         UNDER\OVER FLOW, USING MODF WITH TRAPS DISABLED, TEST
-------         ----------------------------------------------------

        THIS IS A TEST OF THE MODF  OVERFLOW  AND  UNDERFLOW
        CONDITIONS.   IT  MAKES USE OF A SUBROUTINE TO SETUP
        THE OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK
        THE RESULTS.  TRAPS ARE DISABLED DURING THIS TEST.

TEST 21         UNDER\OVER FLOW, USING MODD WITH TRAPS DISABLED, TEST
-------         ----------------------------------------------------

        THIS IS A TEST OF THE MODD INSTRUCTION'S  OVER  FLOW
        AND  UNDER FLOW CONDITIONS.  A SUBROUTINE IS USED TO
        SET UP THE OPERANDS, EXECUTE THE MODD INSTUCTION AND
        CHECK THE RESULTS.

TEST 22         INTERRUPT CORRECT FLOWS TEST
-------         ----------------------------

        THIS IS A TEST OF THE 'CORRECT' FLOWS.  THIS PART OF
        THE  MICRO  CODE  HAS  AS  ITS PURPOSE INSURING THAT
        INTERRUPT REQUESTS MADE DURING CERTAIN  LENGTHY  FPP
        INSTRUCTIONS  GET  HONORED.   THIS  IS DONE IN A WAY
        SUCH THAT IF AN INTERRUPT REQUEST OCCURS DURING  ONE
        OF    THESE   INSTRUCTIONS   THE   STATE   OF   THAT
        INSTRUCTION'S EXECUTION WILL BE THE SAME AS IF  THAT
        INSTRUCTION HAD NEVER BEEN FETCHED AND ITS EXECUTION
        NEVER STARTED.  THUS THE MICRO CODE WILL RESTORE ALL
        REGISTERS,  BACK UP THE PC AND LEAVE THE FPS AND AC0
        THROUGH AC5 UNMODIFIED.
        THE INSTRUCTIONS FOR WHICH THIS IS NECESSARY ARE:

                ADD (OR SUB)
                DIV
                MUL
                MOD
        (BOTH DOUBLE AND FLOATING)

        ALL ADDRESSING MODES WILL BE  TRIED  WITH  THE  ADDD
        INSTRUCTION.   THEN  EACH  OF THE OTHER INSTRUCTIONS
        WILL BE TRIED USING MODE 1.   NOTE  THAT  THIS  TEST
        NEEDS   A   SPECIAL  INTERRUPT  MODULE,  WHICH  WILL
        PROBABLY ONLY  BE  PRESENT  IN  DEC'S  MANUFACTURING
        ENVIRONMENT,  TO  RUN.   THIS  SPECIAL  EQUIPMENT IS
        DESIGNED  TO  RAISE  AN  INTERRUPT  REQUEST  IN  THE
        PROCESSOR IF A BIT IS SET IN ITS STATUS REGISTER AND
        ONLY  WHEN  AN  FPP  INSTRUCTION   IS   ENCOUNTERED.
        THEREFORE   THIS  TEST  WILL  BE  RUN  CONDITIONALLY
        (DEPENDENT UPON WHETHER OR NOT THE  STATUS  REGISTER
        OF  THE  TEST  EQUIPMENT TIMES OUT WHEN REFERENCED).
        THIS TEST CAN ALSO BE SELECTED  BY  TURNING SWITCH 7
        OF  THE  SWITCH  REGISTER  (PHYSICAL OR VIRTUAL) ON.
        THE TEST ASSUMES THAT THE  TEST  EQUIPMENT'S  STATUS
        REGISTER  IS  AT  LOCATION  777774  (NOTE  THAT  ALL
        REFERENCES  TO  THIS  LOCATION  ARE  MADE   INDIRECT
```

THROUGH THIS PROGRAMS LOCATION CORINT, SO THAT IF
THE USER HAS MODIFIED THE TEST EQUIPMENT'S STATUS
REGISTER TO RESPOND TO A DIFFERENT ADDRESS LOCATION
CORINT MUST BE MADE TO CONTAIN THAT STATUS
REGISTER'S NEW ADDRESS). THIS PROGRAM ASSUMES THAT
THE TRAP VECTOR FOR THE TEST EQUIPMENT IS 110.
AGAIN NOTE THAT ALL REFERENCES TO THIS TRAP VECTOR
ARE INDIRECT, THROUGH THIS PROGRAM'S LOCATION CORTRP
(IF THE TEST EQUIPMENT IS MADE TO TRAP TO A
DIFFERENT VECTOR LOCATION CORTRP MUST CONTAIN THE
ADDRESS OF THIS VECTOR).

10. LISTING

```
                        MNUMBER=267
                        PROGNUM=2
                                .LIST   ME
                                .NLIST  MD
                                .NLIST  MC
                                .NLIST  CND
                                .NLIST  BEX
                                .MCALL  .HEADER,.SWRHI,.EQUAT,.SETUP,.$CATCH,.$ACT11,.$CMTAG
                                .MCALL  NEWTST,$$NEWTEST,.$SAVE,.$TYPE
                                .MCALL  .$TYPDEC,.$TRAP,.$POWER,.$APTHDR,.$APTBLS
                                .MCALL  .$TYPE,.$APTYPE,.$READ
                                .MCALL  .EQUIV                  ;REMOVE FOR PDP-10 ASSEMBLY
                        .TITLE  CKFPBC0 FP11F FLTG PNT PRT B
                        ;*COPYRIGHT (C) 1981
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C5), JAN, 1981.
                        ;*
000001                  $TN=1
160000                  $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT

000244                  FPVECT=244
177400                  $SWR=177400
000200                  $SWRMSK=200
000011                  TAB=11
000015                  CRLF=15

                        .SBTTL  BASIC DEFINITIONS
                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
104000                          ERROR=EMT
000004                          SCOPE=IOT
                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
177776                          PSW=PS
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
```

BASIC DEFINITIONS

```
000007                  PC=     %7              ;;PROGRAM COUNTER
                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7
                        ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
001000                          SW9=SW09
000400                          SW8=SW08
000200                          SW7=SW07
000100                          SW6=SW06
000040                          SW5=SW05
000020                          SW4=SW04
000010                          SW3=SW03
000004                          SW2=SW02
000002                          SW1=SW01
000001                          SW0=SW00
                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
001000                          BIT9=BIT09
000400                          BIT8=BIT08
000200                          BIT7=BIT07
```

BASIC DEFINITIONS

```
                000100                          BIT6=BIT06
                000040                          BIT5=BIT05
                000020                          BIT4=BIT04
                000010                          BIT3=BIT03
                000004                          BIT2=BIT02
                000002                          BIT1=BIT01
                000001                          BIT0=BIT00
                                        ;*BASIC ''CPU'' TRAP VECTOR ADDRESSES
                000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
                000014                  TBITVEC=14              ;;''T'' BIT
                000014                  TRTVEC= 14              ;;TRACE TRAP
                000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
                000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                000024                  PWRVEC= 24              ;;POWER FAIL
                000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
                000034                  TRAPVEC=34              ;;''TRAP'' TRAP
                000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
                000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
                000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                                .SBTTL  FPP REGISTER DEFINITIONS
  1660
  1661          000000                  AC0     =%0
  1662          000001                  AC1     =%1
  1663          000002                  AC2     =%2
  1664          000003                  AC3     =%3
  1665          000004                  AC4     =%4
  1666          000005                  AC5     =%5
  1667          000006                  AC6     =%6
  1668          000007                  AC7     =%7
  1670
  1671                                  .SBTTL  TRAP CATCHER
                000000                          .=0
                                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ''.+2,HALT''
                                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                000174                          .=174
      000174    000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
      000176    000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                        .SBTTL  STARTING ADDRESS(ES)
      000200    000137  004346                  JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
```

```
1672                                    .SBTTL  COMMON TAGS
                                        ;;*****************************************************************
                                        ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                        ;*USED IN THE PROGRAM.
                 001100                         .=1100
001100                          $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                          .WORD   0
001102  000                     $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560                  ;;TTY KBD STATUS
001146  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                                ;;WHICH  ($REG0) WAS OBTAINED
                 000024                 .REPT   $CM3
001162  000000                  $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001164  000000                  $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001166  000000                  $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
001170  000000                  $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
001172  000000                  $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
001174  000000                  $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
001176  000000                  $REG6:  .WORD   0               ;;CONTAINS (($REGAD)+14)
001200  000000                  $REG7:  .WORD   0               ;;CONTAINS (($REGAD)+16)
001202  000000                  $REG10: .WORD   0               ;;CONTAINS (($REGAD)+20)
001204  000000                  $REG11: .WORD   0               ;;CONTAINS (($REGAD)+22)
001206  000000                  $REG12: .WORD   0               ;;CONTAINS (($REGAD)+24)
001210  000000                  $REG13: .WORD   0               ;;CONTAINS (($REGAD)+26)
001212  000000                  $REG14: .WORD   0               ;;CONTAINS (($REGAD)+30)
001214  000000                  $REG15: .WORD   0               ;;CONTAINS (($REGAD)+32)
001216  000000                  $REG16: .WORD   0               ;;CONTAINS (($REGAD)+34)
001220  000000                  $REG17: .WORD   0               ;;CONTAINS (($REGAD)+36)
001222  000000                  $REG20: .WORD   0               ;;CONTAINS (($REGAD)+40)
001224  000000                  $REG21: .WORD   0               ;;CONTAINS (($REGAD)+42)
001226  000000                  $REG22: .WORD   0               ;;CONTAINS (($REGAD)+44)
```

COMMON TAGS

```
001230  000000                  $REG23: .WORD   0               ;;CONTAINS ((SREGAD)+46)
        000024                  .REPT   24
001232  000000                  $TMP0:  .WORD   0               ;;USER DEFINED
001234  000000                  $TMP1:  .WORD   0               ;;USER DEFINED
001236  000000                  $TMP2:  .WORD   0               ;;USER DEFINED
001240  000000                  $TMP3:  .WORD   0               ;;USER DEFINED
001242  000000                  $TMP4:  .WORD   0               ;;USER DEFINED
001244  000000                  $TMP5:  .WORD   0               ;;USER DEFINED
001246  000000                  $TMP6:  .WORD   0               ;;USER DEFINED
001250  000000                  $TMP7:  .WORD   0               ;;USER DEFINED
001252  000000                  $TMP10: .WORD   0               ;;USER DEFINED
001254  000000                  $TMP11: .WORD   0               ;;USER DEFINED
001256  000000                  $TMP12: .WORD   0               ;;USER DEFINED
001260  000000                  $TMP13: .WORD   0               ;;USER DEFINED
001262  000000                  $TMP14: .WORD   0               ;;USER DEFINED
001264  000000                  $TMP15: .WORD   0               ;;USER DEFINED
001266  000000                  $TMP16: .WORD   0               ;;USER DEFINED
001270  000000                  $TMP17: .WORD   0               ;;USER DEFINED
001272  000000                  $TMP20: .WORD   0               ;;USER DEFINED
001274  000000                  $TMP21: .WORD   0               ;;USER DEFINED
001276  000000                  $TMP22: .WORD   0               ;;USER DEFINED
001300  000000                  $TMP23: .WORD   0               ;;USER DEFINED
001302  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
001304  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
001306     207      377     377 $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001312     077                 $QUES:  .ASCII  /?/             ;;QUESTION MARK
001313     015                 $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001314     012      000        $LF:    .ASCIZ  <12>            ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE
                                ;;*****************************************************************
                                .EVEN
001316                          $MAIL:                          ;;APT MAILBOX
001316  000000                  $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001320  000000                  $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001322  000000                  $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001324  000000                  $PASS:  .WORD   APASS           ;;PASS COUNT
001326  000000                  $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001330  000000                  $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001332  000000                  $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001334  000000                  $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001336                          $ETABLE:                        ;;APT ENVIRONMENT TABLE
001336     000                  $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
001337     000                  $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001340  000000                  $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
001342  000000                  $USWR:  .WORD   AUSWR           ;;USER SWITCHES
001344  000000                  $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                ;*                              BITS 15-11=CPU TYPE
                                ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                ;*                                      11/70=06,PDQ=07,Q=10
                                ;*                              BIT 10=REAL TIME CLOCK
                                ;*                              BIT  9=FLOATING POINT PROCESSOR
                                ;*                              BIT  8=MEMORY MANAGEMENT
001346     000                  $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
001347     000                  $MTYP1: .BYTE   AMTYP1          ;;MEM. TYPE,BLK#1
                                ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
                                ;*                                      900 NSEC CORE=001
```

```
                                        ;*                              300 NSEC BIPOLAR=002
                                        ;*                              500 NSEC MOS=003
001350  000000                          $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                                        ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001352      000                         $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
001353      000                         $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
001354  000000                          $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
001356      000                         $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
001357      000                         $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
001360  000000                          $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
001362      000                         $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
001363      000                         $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
001364  000000                          $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
001366  000000                          $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001370  000000                          $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001372  000000                          $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001374  000000                          $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
001376  000000                          $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
001400  000000                          $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
001402  000000                          $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
001404  000000                          $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
001406  000000                          $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
001410  000000                          $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
001412  000000                          $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
001414  000000                          $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
001416  000000                          $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
001420  000000                          $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
001422  000000                          $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
001424  000000                          $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
001426  000000                          $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
001430  000000                          $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
001432  000000                          $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
001434  000000                          $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
001436  000000                          $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
001440  000000                          $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
001442                                  $ETEND:
```

ERROR POINTER TABLE

```
                                        .SBTTL  ERROR POINTER TABLE
                                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
                                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                        ;*      DH              ;;POINTS TO THE DATA HEADER
                                        ;*      DT              ;;POINTS TO THE DATA
                                        ;*      DF              ;;POINTS TO THE DATA FORMAT
 001442                                 $ERRTB:
1676            000267                  .REPT   MNUMBER
1678
 001442  040514  067106  071474         ;ITEM 1
                                                .WORD   EM1,DH1,DT1,DF1
 001452  040546  067176  071532         ;ITEM 2
                                                .WORD   EM2,DH2,DT2,DF2
 001462  040602  067106  071474         ;ITEM 3
                                                .WORD   EM3,DH3,DT3,DF3
 001472  040707  067106  071474         ;ITEM 4
                                                .WORD   EM4,DH4,DT4,DF4
 001502  041014  067106  071474         ;ITEM 5
                                                .WORD   EM5,DH5,DT5,DF5
 001512  041121  067106  071474         ;ITEM 6
                                                .WORD   EM6,DH6,DT6,DF6
 001522  041226  067106  071474         ;ITEM 7
                                                .WORD   EM7,DH7,DT7,DF7
 001532  041333  067106  071474         ;ITEM 10
                                                .WORD   EM10,DH10,DT10,DF10
 001542  041440  067106  071474         ;ITEM 11
                                                .WORD   EM11,DH11,DT11,DF11
 001552  041547  067106  071474         ;ITEM 12
                                                .WORD   EM12,DH12,DT12,DF12
 001562  041656  067106  071474         ;ITEM 13
                                                .WORD   EM13,DH13,DT13,DF13
 001572  041772  067106  071474         ;ITEM 14
                                                .WORD   EM14,DH14,DT14,DF14
 001602  042104  067106  071474         ;ITEM 15
                                                .WORD   EM15,DH15,DT15,DF15
 001612  042216  067106  071474         ;ITEM 16
                                                .WORD   EM16,DH16,DT16,DF16
 001622  042313  067237  071560         ;ITEM 17
                                                .WORD   EM17,DH17,DT17,DF17
 001632  042370  067106  071600         ;ITEM 20
                                                .WORD   EM20,DH20,DT20,DF20
 001642  042422  067312  071622         ;ITEM 21
                                                .WORD   EM21,DH21,DT21,DF21
 001652  042454  067401  071644         ;ITEM 22
                                                .WORD   EM22,DH22,DT22,DF22
 001662  042535  067106  071662         ;ITEM 23
                                                .WORD   EM23,DH23,DT23,DF23
 001672  042612  067106  071662         ;ITEM 24
                                                .WORD   EM24,DH24,DT24,DF24
 001702  042710  067106  071662         ;ITEM 25
                                                .WORD   EM25,DH25,DT25,DF25
 001712  042775  067106  071662         ;ITEM 26
                                                .WORD   EM26,DH26,DT26,DF26
                                        ;ITEM 27
```

ERROR POINTER TABLE

```
001722  042710  067106  071662          .WORD   EM27,DH27,DT27,DF27
001732  043073  067106  071662  ;ITEM 30
                                .WORD   EM30,DH30,DT30,DF30
001742  043145  067106  071662  ;ITEM 31
                                .WORD   EM31,DH31,DT31,DF31
001752  042560  067106  071662  ;ITEM 32
                                .WORD   EM32,DH32,DT32,DF32
001762  043212  067106  071662  ;ITEM 33
                                .WORD   EM33,DH33,DT33,DF33
001772  043235  067106  071662  ;ITEM 34
                                .WORD   EM34,DH34,DT34,DF34
002002  043267  067106  071662  ;ITEM 35
                                .WORD   EM35,DH35,DT35,DF35
002012  043342  067106  071662  ;ITEM 36
                                .WORD   EM36,DH36,DT36,DF36
002022  043410  067106  071662  ;ITEM 37
                                .WORD   EM37,DH37,DT37,DF37
002032  043433  067106  071662  ;ITEM 40
                                .WORD   EM40,DH40,DT40,DF40
002042  043465  067106  071662  ;ITEM 41
                                .WORD   EM41,DH41,DT41,DF41
002052  043540  067106  071662  ;ITEM 42
                                .WORD   EM42,DH42,DT42,DF42
002062  043671  067106  071662  ;ITEM 43
                                .WORD   EM43,DH43,DT43,DF43
002072  044022  067106  071662  ;ITEM 44
                                .WORD   EM44,DH44,DT44,DF44
002102  044070  067106  071662  ;ITEM 45
                                .WORD   EM45,DH45,DT45,DF45
002112  044143  067106  071662  ;ITEM 46
                                .WORD   EM46,DH46,DT46,DF46
002122  044220  067106  071662  ;ITEM 47
                                .WORD   EM47,DH47,DT47,DF47
002132  044354  067106  071662  ;ITEM 50
                                .WORD   EM50,DH50,DT50,DF50
002142  044427  067106  071662  ;ITEM 51
                                .WORD   EM51,DH51,DT51,DF51
002152  044475  067106  071662  ;ITEM 52
                                .WORD   EM52,DH52,DT52,DF52
002162  052325  067106  071734  ;ITEM 53
                                .WORD   EM53,DH53,DT53,DF53
002172  052356  067106  071734  ;ITEM 54
                                .WORD   EM54,DH54,DT54,DF54
002202  052273  067106  071734  ;ITEM 55
                                .WORD   EM55,DH55,DT55,DF55
002212  052406  067106  071734  ;ITEM 56
                                .WORD   EM56,DH56,DT56,DF56
002222  052477  067106  071734  ;ITEM 57
                                .WORD   EM57,DH57,DT57,DF57
002232  052567  067106  071734  ;ITEM 60
                                .WORD   EM60,DH60,DT60,DF60
002242  052671  067106  071734  ;ITEM 61
                                .WORD   EM61,DH61,DT61,DF61
002252  053065  067106  071734  ;ITEM 62
                                .WORD   EM62,DH62,DT62,DF62
002262  053261  067106  071734  ;ITEM 63
                                .WORD   EM63,DH63,DT63,DF63
```

ERROR POINTER TABLE

```
002272  053372  067106  071734          ;ITEM 64
                                        .WORD   EM64,DH64,DT64,DF64
002302  053511  067106  071734          ;ITEM 65
                                        .WORD   EM65,DH65,DT65,DF65
002312  053624  067106  071734          ;ITEM 66
                                        .WORD   EM66,DH66,DT66,DF66
002322  053673  067106  071734          ;ITEM 67
                                        .WORD   EM67,DH67,DT67,DF67
002332  053756  067106  071734          ;ITEM 70
                                        .WORD   EM70,DH70,DT70,DF70
002342  054007  067106  071734          ;ITEM 71
                                        .WORD   EM71,DH71,DT71,DF71
002352  054037  067106  071734          ;ITEM 72
                                        .WORD   EM72,DH72,DT72,DF72
002362  054037  067106  071734          ;ITEM 73
                                        .WORD   EM73,DH73,DT73,DF73
002372  054071  067106  071734          ;ITEM 74
                                        .WORD   EM74,DH74,DT74,DF74
002402  054200  067106  071734          ;ITEM 75
                                        .WORD   EM75,DH75,DT75,DF75
002412  054271  067106  071734          ;ITEM 76
                                        .WORD   EM76,DH76,DT76,DF76
002422  054361  067106  071734          ;ITEM 77
                                        .WORD   EM77,DH77,DT77,DF77
002432  054471  067106  071734          ;ITEM 100
                                        .WORD   EM100,DH100,DT100,DF100
002442  054554  067106  071734          ;ITEM 101
                                        .WORD   EM101,DH101,DT101,DF101
002452  054750  067106  071734          ;ITEM 102
                                        .WORD   EM102,DH102,DT102,DF102
002462  055144  067106  071734          ;ITEM 103
                                        .WORD   EM103,DH103,DT103,DF103
002472  055256  067106  071734          ;ITEM 104
                                        .WORD   EM104,DH104,DT104,DF104
002502  055423  067106  071734          ;ITEM 105
                                        .WORD   EM105,DH105,DT105,DF105
002512  055532  067106  071734          ;ITEM 106
                                        .WORD   EM106,DH106,DT106,DF106
002522  055641  067106  071734          ;ITEM 107
                                        .WORD   EM107,DH107,DT107,DF107
002532  055750  067106  071734          ;ITEM 110
                                        .WORD   EM110,DH110,DT110,DF110
002542  044565  067106  071662          ;ITEM 111
                                        .WORD   EM111,DH111,DT111,DF111
002552  044642  067106  071662          ;ITEM 112
                                        .WORD   EM112,DH112,DT112,DF112
002562  044720  067106  071662          ;ITEM 113
                                        .WORD   EM113,DH113,DT113,DF113
002572  044776  067106  071662          ;ITEM 114
                                        .WORD   EM114,DH114,DT114,DF114
002602  045055  067447  072022          ;ITEM 115
                                        .WORD   EM115,DH115,DT115,DF115
002612  045133  067447  072022          ;ITEM 116
                                        .WORD   EM116,DH116,DT116,DF116
002622  045212  067447  072022          ;ITEM 117
                                        .WORD   EM117,DH117,DT117,DF117
                                        ;ITEM 120
```

ERROR POINTER TABLE

```
002632  045350  067447  072022          .WORD   EM120,DH120,DT120,DF120
                                ;ITEM 121
002642  045506  067447  072022          .WORD   EM121,DH121,DT121,DF121
                                ;ITEM 122
002652  045643  067447  072022          .WORD   EM122,DH122,DT122,DF122
                                ;ITEM 123
002662  046000  067106  071662          .WORD   EM123,DH123,DT123,DF123
                                ;ITEM 124
002672  046056  067106  071662          .WORD   EM124,DH124,DT124,DF124
                                ;ITEM 125
002702  046135  067106  071662          .WORD   EM125,DH125,DT125,DF125
                                ;ITEM 126
002712  046213  067106  071662          .WORD   EM126,DH126,DT126,DF126
                                ;ITEM 127
002722  046272  067447  072022          .WORD   EM127,DH127,DT127,DF127
                                ;ITEM 130
002732  046350  067447  072022          .WORD   EM130,DH130,DT130,DF130
                                ;ITEM 131
002742  046427  067447  072022          .WORD   EM131,DH131,DT131,DF131
                                ;ITEM 132
002752  046565  067106  071662          .WORD   EM132,DH132,DT132,DF132
                                ;ITEM 133
002762  046723  067447  072022          .WORD   EM133,DH133,DT133,DF133
                                ;ITEM 134
002772  047061  067447  072022          .WORD   EM134,DH134,DT134,DF134
                                ;ITEM 135
003002  047216  067106  071662          .WORD   EM135,DH135,DT135,DF135
                                ;ITEM 136
003012  047353  067447  072022          .WORD   EM136,DH136,DT136,DF136
                                ;ITEM 137
003022  047510  067447  072022          .WORD   EM137,DH137,DT137,DF137
                                ;ITEM 140
003032  047576  067447  072022          .WORD   EM140,DH140,DT140,DF140
                                ;ITEM 141
003042  044565  067447  072022          .WORD   EM141,DH141,DT141,DF141
                                ;ITEM 142
003052  044642  067447  072022          .WORD   EM142,DH142,DT142,DF142
                                ;ITEM 143
003062  047665  067447  072022          .WORD   EM143,DH143,DT143,DF143
                                ;ITEM 144
003072  047743  067447  072022          .WORD   EM144,DH144,DT144,DF144
                                ;ITEM 145
003102  050022  067106  071662          .WORD   EM145,DH145,DT145,DF145
                                ;ITEM 146
003112  050167  067106  071662          .WORD   EM146,DH146,DT146,DF146
                                ;ITEM 147
003122  050334  067106  071662          .WORD   EM147,DH147,DT147,DF147
                                ;ITEM 150
003132  050500  067106  071662          .WORD   EM150,DH150,DT150,DF150
                                ;ITEM 151
003142  050644  067447  072022          .WORD   EM151,DH151,DT151,DF151
                                ;ITEM 152
003152  050732  067447  072022          .WORD   EM152,DH152,DT152,DF152
                                ;ITEM 153
003162  046000  067447  072022          .WORD   EM153,DH153,DT153,DF153
                                ;ITEM 154
003172  046056  067447  072022          .WORD   EM154,DH154,DT154,DF154
```

ERROR POINTER TABLE

```
003202  051021  067447  072022          ;ITEM 155
                                        .WORD   EM155,DH155,DT155,DF155
003212  051077  067447  072022          ;ITEM 156
                                        .WORD   EM156,DH156,DT156,DF156
003222  051156  067106  071662          ;ITEM 157
                                        .WORD   EM157,DH157,DT157,DF157
003232  051323  067447  072022          ;ITEM 160
                                        .WORD   EM160,DH160,DT160,DF160
003242  051461  067106  071662          ;ITEM 161
                                        .WORD   EM161,DH161,DT161,DF161
003252  051626  067106  071662          ;ITEM 162
                                        .WORD   EM162,DH162,DT162,DF162
003262  051772  067447  072022          ;ITEM 163
                                        .WORD   EM163,DH163,DT163,DF163
003272  052127  067106  071662          ;ITEM 164
                                        .WORD   EM164,DH164,DT164,DF164
003302  056060  067447  072076          ;ITEM 165
                                        .WORD   EM165,DH165,DT165,DF165
003312  056144  067447  072076          ;ITEM 166
                                        .WORD   EM166,DH166,DT166,DF166
003322  056227  067447  072076          ;ITEM 167
                                        .WORD   EM167,DH167,DT167,DF167
003332  056261  067447  072076          ;ITEM 170
                                        .WORD   EM170,DH170,DT170,DF170
003342  056347  067447  072076          ;ITEM 171
                                        .WORD   EM171,DH171,DT171,DF171
003352  056472  067447  072076          ;ITEM 172
                                        .WORD   EM172,DH172,DT172,DF172
003362  056557  067447  072076          ;ITEM 173
                                        .WORD   EM173,DH173,DT173,DF173
003372  056725  067447  072076          ;ITEM 174
                                        .WORD   EM174,DH174,DT174,DF174
003402  057073  067447  072076          ;ITEM 175
                                        .WORD   EM175,DH175,DT175,DF175
003412  057205  067447  072076          ;ITEM 176
                                        .WORD   EM176,DH176,DT176,DF176
003422  057271  067546  072164          ;ITEM 177
                                        .WORD   EM177,DH177,DT177,DF177
003432  057325  067447  072076          ;ITEM 200
                                        .WORD   EM200,DH200,DT200,DF200
003442  057357  067447  072076          ;ITEM 201
                                        .WORD   EM201,DH201,DT201,DF201
003452  057446  067447  072076          ;ITEM 202
                                        .WORD   EM202,DH202,DT202,DF202
003462  057610  067447  072076          ;ITEM 203
                                        .WORD   EM203,DH203,DT203,DF203
003472  057752  067447  072076          ;ITEM 204
                                        .WORD   EM204,DH204,DT204,DF204
003502  060040  067447  072076          ;ITEM 205
                                        .WORD   EM205,DH205,DT205,DF205
003512  060206  067447  072076          ;ITEM 206
                                        .WORD   EM206,DH206,DT206,DF206
003522  060354  067647  072174          ;ITEM 207
                                        .WORD   EM207,DH207,DT207,DF207
003532  060416  067737  072246          ;ITEM 210
                                        .WORD   EM210,DH210,DT210,DF210
                                        ;ITEM 211
```

ERROR POINTER TABLE

```
003542  060460  067737  072174          .WORD   EM211,DH211,DT211,DF211
                                ;ITEM 212
003552  060624  067647  072270          .WORD   EM212,DH212,DT212,DF212
                                ;ITEM 213
003562  061010  067647  072270          .WORD   EM213,DH213,DT213,DF213
                                ;ITEM 214
003572  061174  067647  072270          .WORD   EM214,DH214,DT214,DF214
                                ;ITEM 215
003602  061360  067647  072270          .WORD   EM215,DH215,DT215,DF215
                                ;ITEM 216
003612  061544  067737  072174          .WORD   EM216,DH216,DT216,DF216
                                ;ITEM 217
003622  061726  070000  072352          .WORD   EM217,DH217,DT217,DF217
                                ;ITEM 220
003632  061770  067607  072174          .WORD   EM220,DH220,DT220,DF220
                                ;ITEM 221
003642  062220  067737  072174          .WORD   EM221,DH221,DT221,DF221
                                ;ITEM 222
003652  062464  067607  072174          .WORD   EM222,DH222,DT222,DF222
                                ;ITEM 223
003662  062715  067737  072174          .WORD   EM223,DH223,DT223,DF223
                                ;ITEM 224
003672  063162  067607  072174          .WORD   EM224,DH224,DT224,DF224
                                ;ITEM 225
003702  063413  067737  072174          .WORD   EM225,DH225,DT225,DF225
                                ;ITEM 226
003712  063660  070053  072270          .WORD   EM226,DH226,DT226,DF226
                                ;ITEM 227
003722  064013  070142  072270          .WORD   EM227,DH227,DT227,DF227
                                ;ITEM 230
003732  064146  070053  072270          .WORD   EM230,DH230,DT230,DF230
                                ;ITEM 231
003742  064302  070142  072246          .WORD   EM231,DH231,DT231,DF231
                                ;ITEM 232
003752  060416  070142  072174          .WORD   EM232,DH232,DT232,DF232
                                ;ITEM 233
003762  064436  070231  072372          .WORD   EM233,DH233,DT233,DF233
                                ;ITEM 234
003772  064475  070272  072426          .WORD   EM234,DH234,DT234,DF234
                                ;ITEM 235
004002  064561  070360  072446          .WORD   EM235,DH235,DT235,DF235
                                ;ITEM 236
004012  064627  070420  072426          .WORD   EM236,DH236,DT236,DF236
                                ;ITEM 237
004022  064662  070272  072426          .WORD   EM237,DH237,DT237,DF237
                                ;ITEM 240
004032  064746  070506  072426          .WORD   EM240,DH240,DT240,DF240
                                ;ITEM 241
004042  065002  070231  072372          .WORD   EM241,DH241,DT241,DF241
                                ;ITEM 242
004052  065105  070506  072426          .WORD   EM242,DH242,DT242,DF242
                                ;ITEM 243
004062  065141  070231  072372          .WORD   EM243,DH243,DT243,DF243
                                ;ITEM 244
004072  065244  070231  072372          .WORD   EM244,DH244,DT244,DF244
                                ;ITEM 245
004102  065303  070231  072372          .WORD   EM245,DH245,DT245,DF245
```

ERROR POINTER TABLE

```
004112  044175  067106  071662          ;ITEM 246
                                        .WORD   EM246,DH246,DT246,DF246
004122  065365  070576  072460          ;ITEM 247
                                        .WORD   EM247,DH247,DT247,DF247
004132  065421  070643  072476          ;ITEM 250
                                        .WORD   EM250,DH250,DT250,DF250
004142  065453  070643  072476          ;ITEM 251
                                        .WORD   EM251,DH251,DT251,DF251
004152  065506  067176  072510          ;ITEM 252
                                        .WORD   EM252,DH252,DT252,DF252
004162  065577  067106  072522          ;ITEM 253
                                        .WORD   EM253,DH253,DT253,DF253
004172  065663  067106  072522          ;ITEM 254
                                        .WORD   EM254,DH254,DT254,DF254
004202  065750  067106  072522          ;ITEM 255
                                        .WORD   EM255,DH255,DT255,DF255
004212  066036  067106  072522          ;ITEM 256
                                        .WORD   EM256,DH256,DT256,DF256
004222  066125  067106  072522          ;ITEM 257
                                        .WORD   EM257,DH257,DT257,DF257
004232  066213  067106  072522          ;ITEM 260
                                        .WORD   EM260,DH260,DT260,DF260
004242  066302  067106  072522          ;ITEM 261
                                        .WORD   EM261,DH261,DT261,DF261
004252  066372  067106  072522          ;ITEM 262
                                        .WORD   EM262,DH262,DT262,DF262
004262  066463  067106  072522          ;ITEM 263
                                        .WORD   EM263,DH263,DT263,DF263
004272  066550  067106  072522          ;ITEM 264
                                        .WORD   EM264,DH264,DT264,DF264
004302  066635  067106  072522          ;ITEM 265
                                        .WORD   EM265,DH265,DT265,DF265
004312  066722  070703  072510          ;ITEM 266
                                        .WORD   EM266,DH266,DT266,DF266
004322  067023  067447  072076          ;ITEM 267
                                        .WORD   EM267,DH267,DT267,DF267
1679
1680
1681                                    .SBTTL  ACT11 HOOKS
                                        ;;******************************************************************
                                        ;;
                                        ;HOOKS REQUIRED BY ACT11
        004332                                  $SVPC=.                 ;SAVE PC
        000046                                  .=46
000046  034024                                  $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
        000052                                  .=52
000052  000000                                  .WORD   0               ;;2)SET LOC.52 TO ZERO
        004332                                  .=$SVPC                 ;; RESTORE PC
1682                                    .SBTTL  APT PARAMETER BLOCK
                                        ;;******************************************************************
                                        ;;
                                        ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                        ;;******************************************************************
                                        ;;
        004332                                  .$X=.   ;;SAVE CURRENT LOCATION
        000024                                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                                  200     ;;FOR APT START UP
        000044                                  .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  004332                                  $APTHDR ;;POINT TO APT HEADER BLOCK
        004332                                  .=.$X   ;;RESET LOCATION COUNTER
```

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                                ;;*****************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.
004332                          $APTHD:
004332  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
004334  001316                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
004336  000010                  $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
004340  000040                  $PASTM: .WORD   40      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
004342  000000                  $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
004344  000052                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
   1683
   1684
   1685 004346                  START:
                                .SBTTL  INITIALIZE THE COMMON TAGS
                                ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
004346  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
004352  005026                  1$:     CLR     (R6)+           ;;CLEAR MEMORY LOCATION
004354  022706  001140                  CMP     #SWR,R6 ;;DONE?
004360  001374                          BNE     .-6             ;;LOOP BACK IF NO
004362  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                ;;INITIALIZE A FEW VECTORS
004366  012737  034110  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
004374  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
004402  012737  034426  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
004410  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
004416  012737  036570  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
004424  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
004432  012737  036654  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
004440  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
004446  013737  033404  033372          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
004454  005037  001302                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
004460  005037  001304                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
004464  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
                                ;;INITIALIZE THE "T-BIT" TRAP VECTOR. THEN LOAD LOCATION "$RTRN", IN
                                ;;THE "END-OF-PASS" ($EOP) ROUTINE, WITH A "RTI" OR "RTT".
004472  012737  034070  000014          MOV     #$RTRN,@#TBITVEC ;;SET "T" BIT VECTOR TO $RTRN
004500  012737  000340  000016          MOV     #340,@#TBITVEC+2 ;;LEVEL 7
004506  012737  000002  034070          MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
004514  012737  004542  000010          MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
004522  005046                          CLR     -(SP)           ;;DUMMY PS
004524  012746  004532                  MOV     #64$,-(SP)      ;;AND PC
004530  000006                          RTT                     ;;TRY THE RTT
004532  012737  000006  034070  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
004540  000402                          BR      66$
004542  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
004546  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
004554  005037  034076                  CLR     $TBIT           ;;CLEAR "T" BIT SWITCH
004560  012737  004560  001106          MOV     #..,$LPADR      ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
004566  012737  004566  001110          MOV     #..,$LPERR      ;;SETUP THE ERROR LOOP ADDRESS
                                ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
004574  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
004600  012737  004634  000004          MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
004606  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
004614  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
004622  022777  177777  174310          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
004630  001012                          BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
```

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INITIALIZE THE COMMON TAGS

                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
004632  000403                          BR      68$             ;;BRANCH IF NO TIMEOUT
004634  012716  004642          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
004640  000002                          RTI
004642  012737  000176  001140  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
004650  012737  000174  001142          MOV     #DISPREG,DISPLAY
004656  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
004662  005037  001324                  CLR     $PASS           ;;CLEAR PASS COUNT
004666  132737  000200  001337          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
004674  001403                          BEQ     70$             ;;YES,USE NON-APT SWITCH
004676  012737  001340  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
004704                          70$:
1686                            .SBTTL  TYPE PROGRAM NAME
                                ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
004704  005227  177777                  INC     #-1             ;;FIRST TIME?
004710  001047                          BNE     71$             ;;BRANCH IF NO
004712  022737  034024  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
004720  001443                          BEQ     71$             ;;BRANCH IF YES
004722  104401  004770                  TYPE    ,72$            ;;TYPE ASCIZ STRING
                                .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
004726  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
004732  001012                          BNE     73$             ;;BRANCH IF YES
004734  123727  001336  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
004742  001406                          BEQ     73$             ;;BRANCH IF YES
004744  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
004752  001005                          BNE     74$             ;;BRANCH IF NO
004754  104405                          GTSWR                   ;;GET SOFT-SWR SETTINGS
004756  000403                          BR      74$
004760  112737  000001  001134  73$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
004766                          74$:
004766  000420                          BR      71$             ;;GET OVER THE ASCIZ
                                ;;72$:  .ASCIZ  <CRLF>*CKFPBC0 FP11F FLTG PNT PRT B*<CRLF>
005030                          71$:
1687 005030  104401  005036            TYPE    ,76$            ;;TYPE ASCIZ STRING
     005034  000434                    BR      75$             ;;GET OVER THE ASCIZ
                                ;;76$:  .ASCIZ  !EOP MESSAGES WILL PRINT EVERY 2000 PASSES (15 SECONDS)!<CRLF>
005126                          75$:
1688 005126  104401  005134            TYPE    ,78$            ;;TYPE ASCIZ STRING
     005132  000426                    BR      77$             ;;GET OVER THE ASCIZ
                                ;;78$:  .ASCIZ  !HIT ANY KEY TO DISABLE/ENABLE EOP MESSAGES!<CRLF>
005210                          77$:
1689 005210  005037  034104            CLR     EPENDS          ;CLR EOP ENABLE/DISABLE FLAG            ;DPM002
1690 005214                     LOOP:
1691
1692
```

```
1703                                    .SBTTL  TEST # 1 - ROUND\TRUNK TEST
                                        ;;*****************************************************************
                                        ;*TEST 1         ROUND\TRUNK TEST
                                        ;*
                                        ;* THIS IS A TEST OF THE ROUND\TRUNK
                                        ;* FLOWS.  IN PARTICULAR TWO THINGS ARE TESTED:
                                        ;* FIRST A CONDITION IN WHICH ROUNDING
                                        ;* RESULTS IN THE NEED FOR RENORMALIZATION, AND
                                        ;* SECOND  THE PSW CONDITION CODES N AND
                                        ;* Z BIT COMMBINATIONS
                                        ;*
                                        ;;*****************************************************************
     005214  000004                     TST1:   SCOPE
1704
1705                                            ;ROUND AND NORMALIZE TEST
1706
1707 005216                             HH1:
     005216  104413                             LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
1708 005220  012704  003200                     MOV     #3200,R4                    ;SET FIU, FIV, AND FD
1709 005224  170104                             LDFPS   R4
1710 005226  012737  005246  001236             MOV     #HH2,$TMP2
1711 005234  012700  006776                     MOV     #HHP0,R0                    ;SET AC0 OPERAND
1712 005240  172410                             LDD     (R0),AC0
1713 005242  012700  007006                     MOV     #HHP1,R0                    ;FSPC
1714 005246  172010                     HH2:    ADDD    (R0),AC0                    ;TEST INSTRUCTION
1715 005250  170205                             STFPS   R5                          ;GET FPS
1716 005252  012700  006766                     MOV     #HHDAT0,R0                  ;GET THE RESULT
1717 005256  174010                             STD     AC0,(R0)
1718 005260  012701  007016                     MOV     #HHP2,R1                    ;IS IT CORRECT
1719 005264  012702  000004                     MOV     #4,R2
1720 005270  022021                     HH3:    CMP     (R0)+,(R1)+
1721 005272  001415                             BEQ     HH6
1722 005274  012700  006766                     MOV     #HHDAT0,R0                  ;DID FLOW GO
1723 005300  012701  007026                     MOV     #HHP3,R1                    ;FROM STATE 663
1724 005304  012702  000004                     MOV     #4,R2                       ;TO 313 INSTEAD
1725 005310  022021                     HH4:    CMP     (R0)+,(R1)+                 ;OF TO 353
1726 005312  001402                             BEQ     HH5
1727 005314  000137  006006                     JMP     HHER0
1728 005320  077205                     HH5:    SOB     R2,HH4
1729 005322  000137  006054                     JMP     HHER1
1730 005326  077220                     HH6:    SOB     R2,HH3
1731 005330  020405                             CMP     R4,R5               ;FPS CORRECT?
1732 005332  001402                             BEQ     HH7
1733 005334  000137  006122                     JMP     HHER00
1734
1735                                    ;THIS IS A TEST OF THE ABILITY
1736                                    ;OF NORMALIZE TO PRODUCE A ZERO EXP. AND
1737                                    ;OF THE R\T ALGORITHM TO PORPERLY SET THE FPS
1738
1739 005340                             HH7:
     005340  104413                             LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
1740 005342  012704  043200                     MOV     #043200,R4                  ;SET FIU,FIV,AND FD
1741                                                                                 ;FID
1742 005346  170104                             LDFPS   R4
1743 005350  012737  005376  001236             MOV     #HH8,$TMP2                  ;IN CASE UNDERFLOW
1744 005356  012737  006716  000244             MOV     #HHTRAP,FPVECT  ;TRAP OCCURS
1745 005364  012700  007046                     MOV     #HHP5,R0                    ;SET AC0 OPERAND
```

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1746 005370  172410                        LDD     (R0),AC0
1747 005372  012700  007056                MOV     #HHP6,R0                ;FSPC
1748 005376  172010                HH8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
1749 005400  170205                        STFPS   R5                      ;GET FPS
1750 005402  012700  006766                MOV     #HHDAT0,R0              ;GET THE RESULT
1751 005406  174010                        STD     AC0,(R0)
1752 005410  012701  007036                MOV     #HHP4,R1                ;IS IT CORRECT
1753 005414  012702  000004                MOV     #4,R2
1754 005420  022021                HH9:    CMP     (R0)+,(R1)+
1755 005422  001402                        BEQ     HH10
1756 005424  000137  006170                JMP     HHER2
1757 005430  077205                HH10:   SOB     R2,HH9
1758 005432  052704  100004                BIS     #100004,R4              ;FPS CORRECT?
1759 005436  020405                        CMP     R4,R5
1760 005440  001402                        BEQ     HH11
1761 005442  000137  006236                JMP     HHER3
1762                               ;THIS IS A TEST OF THE R\T ALGORITHM'S
1763                               ;ABILITY TO SET BOTH N AND Z ON A - 0 RESULT.
1764 005446                        HH11:
     005446  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1765                                                                ;SET FIV, FIV, AND FD
1766 005450  012704  043200                MOV     #043200,R4
1767 005454  170104                        LDFPS   R4
1768 005456  012737  005476  001236        MOV     #HH12,$TMP2
1769 005464  012700  007076                MOV     #HHP8,R0                ;SET AC0 OPERAND
1770 005470  172410                        LDD     (R0),AC0
1771 005472  012700  007106                MOV     #HHP9,R0                ;FSPC
1772 005476  172010                HH12:   ADDD    (R0),AC0                ;TEST INSTRUCTION
1773 005500  170205                        STFPS   R5                      ;GET FPS
1774 005502  012700  006766                MOV     #HHDAT0,R0              ;GET THE RESULT
1775 005506  174010                        STD     AC0,(R0)
1776 005510  012701  007066                MOV     #HHP7,R1                ;IS IT CORRECT
1777 005514  012702  000004                MOV     #4,R2
1778 005520  022021                HH13:   CMP     (R0)+,(R1)+
1779 005522  001415                        BEQ     HH16
1780 005524  012700  006766                MOV     #HHDAT0,R0
1781 005530  012701  007036                MOV     #HHP4,R1
1782 005534  012702  000004                MOV     #4,R2
1783 005540  022021                HH14:   CMP     (R0)+,(R1)+
1784 005542  001402                        BEQ     HH15
1785 005544  000137  006304                JMP     HHER4
1786 005550  077205                HH15:   SOB     R2,HH14
1787 005552  000137  006352                JMP     HHER5
1788 005556  077220                HH16:   SOB     R2,HH13
1789 005560  052704  100014                BIS     #100014,R4              ;FPS CORRECT?
1790 005564  020405                        CMP     R4,R5
1791 005566  001402                        BEQ     HH17
1792 005570  000137  006420                JMP     HHER6
1793                               ;TEST THAT CC ARE CLEARED BY R\T
1794 005574                        HH17:
     005574  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1795 005576  012704  000200                MOV     #00200,R4               ;SET FIV, FIV, AND FD
1796 005602  170104                        LDFPS   R4
1797 005604  012737  005632  001236        MOV     #HH18,$TMP2
1798 005612  012737  037450  000244        MOV     #FPSPUR,FPVECT
1799 005620  012700  007076                MOV     #HHP8,R0                ;SET AC0 OPERAND
1800 005624  172410                        LDD     (R0),AC0
```

```
1801 005626  012700  007076                HH18:   MOV     #HHP8,R0                ;FSPC
1802 005632  172010                               ADDD    (R0),AC0                ;TEST INSTRUCTION
1803 005634  170205                               STFPS   R5                      ;GET FPS
1804 005636  012700  006766                       MOV     #HHDAT0,R0              ;GET THE RESULT
1805 005642  174010                               STD     AC0,(R0)
1806 005644  012701  007116                       MOV     #HHP10,R1               ;IS IT CORRECT
1807 005650  012702  000004                       MOV     #4,R2
1808 005654  022021                       HH19:   CMP     (R0)+,(R1)+
1809 005656  001402                               BEQ     HH20
1810 005660  000137  006466                       JMP HHER7
1811 005664  077205                       HH20:   SOB     R2,HH19
1812 005666  052704  000000                       BIS     #00000,R4               ;FPS CORRECT?
1813 005672  020405                               CMP     R4,R5
1814 005674  001402                               BEQ     HH21
1815 005676  000137  006534                       JMP     HHER8
1816                                      ;TEST THAT N IS SET BY R\T
1817 005702                               HH21:
     005702  104413                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1818 005704  012704  003200                       MOV     #3200,R4                ;SET FIV, FIV, AND FD
1819 005710  170104                               LDFPS   R4
1820 005712  012737  005732  001236               MOV     #HH22,$TMP2
1821 005720  012700  007046                       MOV     #HHP5,R0                ;SET AC0 OPERAND
1822 005724  172410                               LDD     (R0),AC0
1823 005726  012700  007046                       MOV     #HHP5,R0                ;FSPC
1824 005732  172010                       HH22:   ADDD    (R0),AC0                ;TEST INSTRUCTION
1825 005734  170205                               STFPS   R5                      ;GET FPS
1826 005736  012700  006766                       MOV     #HHDAT0,R0              ;GET THE RESULT
1827 005742  174010                               STD     AC0,(R0)
1828 005744  012701  007126                       MOV     #HHP11,R1               ;IS IT CORRECT
1829 005750  012702  000004                       MOV     #4,R2
1830 005754  022021                       HH23:   CMP     (R0)+,(R1)+
1831 005756  001402                               BEQ     HH24
1832 005760  000137  006602                       JMP     HHER9
1833 005764  077205                       HH24:   SOB     R2,HH23
1834 005766  052704  000010                       BIS     #10,R4
1835 005772  020405                               CMP     R4,R5                   ;FPS CORRECT?
1836 005774  001402                               BEQ     HH25
1837 005776  000137  006650                       JMP     HHER10
1838 006002  000137  007136               HH25:   JMP     HHDONE
1839 006006                               HHER0:
     006006  010537  001252                       MOV     R5,$TMP10
     006012  010437  001254                       MOV     R4,$TMP11
     006016  012737  007006  001240               MOV     #HHP1,$TMP3
     006024  012737  006776  001242               MOV     #HHP0,$TMP4
     006032  012737  006766  001244               MOV     #HHDAT0,$TMP5
     006040  012737  007016  001246               MOV     #HHP2,$TMP6
     006046  104207                       1$:     ERROR   +207
     006050  000137  007136                       JMP     HHDONE
1840 006054                               HHER1:
     006054  010537  001252                       MOV     R5,$TMP10
     006060  010437  001254                       MOV     R4,$TMP11
     006064  012737  007006  001240               MOV     #HHP1,$TMP3
     006072  012737  006776  001242               MOV     #HHP0,$TMP4
     006100  012737  006766  001244               MOV     #HHDAT0,$TMP5
     006106  012737  007016  001246               MOV     #HHP2,$TMP6
     006114  104211                       1$:     ERROR   +211
     006116  000137  007136                       JMP     HHDONE
```

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1841 006122                                    HHER00:
     006122  010537  001252                            MOV     R5,$TMP10
     006126  010437  001254                            MOV     R4,$TMP11
     006132  012737  007006  001240                    MOV     #HHP1,$TMP3
     006140  012737  006776  001242                    MOV     #HHP0,$TMP4
     006146  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006154  012737  007016  001246                    MOV     #HHP2,$TMP6
     006162  104210                            1$:     ERROR   +210
     006164  000137  007136                            JMP     HHDONE
1842 006170                                    HHER2:
     006170  010537  001252                            MOV     R5,$TMP10
     006174  010437  001254                            MOV     R4,$TMP11
     006200  012737  007056  001240                    MOV     #HHP6,$TMP3
     006206  012737  007046  001242                    MOV     #HHP5,$TMP4
     006214  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006222  012737  007036  001246                    MOV     #HHP4,$TMP6
     006230  104207                            1$:     ERROR   +207
     006232  000137  007136                            JMP     HHDONE
1843 006236                                    HHER3:
     006236  010537  001252                            MOV     R5,$TMP10
     006242  010437  001254                            MOV     R4,$TMP11
     006246  012737  007056  001240                    MOV     #HHP6,$TMP3
     006254  012737  007046  001242                    MOV     #HHP5,$TMP4
     006262  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006270  012737  007036  001246                    MOV     #HHP4,$TMP6
     006276  104214                            1$:     ERROR   +214
     006300  000137  007136                            JMP     HHDONE
1844 006304                                    HHER4:
     006304  010537  001252                            MOV     R5,$TMP10
     006310  010437  001254                            MOV     R4,$TMP11
     006314  012737  007106  001240                    MOV     #HHP9,$TMP3
     006322  012737  007076  001242                    MOV     #HHP8,$TMP4
     006330  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006336  012737  007066  001246                    MOV     #HHP7,$TMP6
     006344  104207                            1$:     ERROR   +207
     006346  000137  007136                            JMP     HHDONE
1845 006352                                    HHER5:
     006352  010537  001252                            MOV     R5,$TMP10
     006356  010437  001254                            MOV     R4,$TMP11
     006362  012737  007106  001240                    MOV     #HHP9,$TMP3
     006370  012737  007076  001242                    MOV     #HHP8,$TMP4
     006376  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006404  012737  007066  001246                    MOV     #HHP7,$TMP6
     006412  104216                            1$:     ERROR   +216
     006414  000137  007136                            JMP     HHDONE
1846 006420                                    HHER6:
     006420  010537  001252                            MOV     R5,$TMP10
     006424  010437  001254                            MOV     R4,$TMP11
     006430  012737  007106  001240                    MOV     #HHP9,$TMP3
     006436  012737  007076  001242                    MOV     #HHP8,$TMP4
     006444  012737  006766  001244                    MOV     #HHDAT0,$TMP5
     006452  012737  007066  001246                    MOV     #HHP7,$TMP6
     006460  104215                            1$:     ERROR   +215
     006462  000137  007136                            JMP     HHDONE
1847 006466                                    HHER7:
     006466  010537  001252                            MOV     R5,$TMP10
     006472  010437  001254                            MOV     R4,$TMP11
```

```
                006476  012737  007076  001240          MOV     #HHP8,$TMP3
                006504  012737  007076  001242          MOV     #HHP8,$TMP4
                006512  012737  006766  001244          MOV     #HHDAT0,$TMP5
                006520  012737  007116  001246          MOV     #HHP10,$TMP6
                006526  104207                  1$:     ERROR   +207
                006530  000137  007136                  JMP     HHDONE
          1848  006534                          HHER8:
                006534  010537  001252                  MOV     R5,$TMP10
                006540  010437  001254                  MOV     R4,$TMP11
                006544  012737  007076  001240          MOV     #HHP8,$TMP3
                006552  012737  007076  001242          MOV     #HHP8,$TMP4
                006560  012737  006766  001244          MOV     #HHDAT0,$TMP5
                006566  012737  007116  001246          MOV     #HHP10,$TMP6
                006574  104212                  1$:     ERROR   +212
                006576  000137  007136                  JMP     HHDONE
          1849  006602                          HHER9:
                006602  010537  001252                  MOV     R5,$TMP10
                006606  010437  001254                  MOV     R4,$TMP11
                006612  012737  007046  001240          MOV     #HHP5,$TMP3
                006620  012737  007046  001242          MOV     #HHP5,$TMP4
                006626  012737  006766  001244          MOV     #HHDAT0,$TMP5
                006634  012737  007126  001246          MOV     #HHP11,$TMP6
                006642  104207                  1$:     ERROR   +207
                006644  000137  007136                  JMP     HHDONE
          1850  006650                          HHER10:
                006650  010537  001252                  MOV     R5,$TMP10
                006654  010437  001254                  MOV     R4,$TMP11
                006660  012737  007046  001240          MOV     #HHP5,$TMP3
                006666  012737  007046  001242          MOV     #HHP5,$TMP4
                006674  012737  006766  001244          MOV     #HHDAT0,$TMP5
                006702  012737  007126  001246          MOV     #HHP11,$TMP6
                006710  104213                  1$:     ERROR   +213
                006712  000137  007136                  JMP     HHDONE
          1851  006716  013703  C01236  HHTRAP: MOV     $TMP2,R3        ;WAS THE TRAP TO 264
          1852  006722  062703  000002          ADD     #2,R3           ;ON THE INSTRUCTION
          1853  006726  020316                  CMP     R3,(SP)         ;BEING TESTED?
          1854  006730  001402                  BEQ     1$
          1855  006732  000137  037450          JMP     FPSPUR
          1856  006736  011637  001236  1$:     MOV     (SP),$TMP2      ;FAILURE OF FPS INTERRUPT
          1857                                                          ;DISABLE BIT (FID=1)
          1858  006742  022626                  CMP     (SP)+,(SP)+     ;TO INHIBIT TRAP.
          1859  006744  170201                  STFPS   R1
          1860  006746  010137  001240          MOV     R1,$TMP3
          1861  006752  170301                  STST    R1
          1862  006754  010137  001242          MOV     R1,$TMP4
          1863  006760  104217          2$:     ERROR   +217
          1864  006762  000137  007136                  JMP     HHDONE
          1865  006766  000000          HHDAT0: 0
          1866  006770  000000                  0
          1867  006772  000000                  0
          1868  006774  000000                  0
          1869  006776  000452          HHP0:   452
          1870  007000  125252                  125252
          1871  007002  125252                  125252
          1872  007004  125253                  125253
          1873  007006  000252          HHP1:   252
          1874  007010  125252                  125252
```

TEST # 1 - ROUND\TRUNK TEST

```
1875 007012  125252                        125252
1876 007014  125252                        125252
1877 007016  000600              HHP2:     600                ;HHP0 + HHP1 WITH
1878 007020  000000                        0                  ;PROPER NORMALIZATION
1879 007022  000000                        0
1880 007024  000000                        0
1881 007026  000400              HHP3:     400                ;HHP0 + HHP1 WITH
1882 007030  000000                        0                  ;BAD NORMALIZATION
1883 007032  000000                        0
1884 007034  000000                        0
1885 007036  000000              HHP4:     0
1886 007040  000000                        0
1887 007042  000000                        0
1888 007044  000000                        0
1889 007046  100200              HHP5:     100200
1890 007050  000000                        0
1891 007052  000000                        0
1892 007054  000000                        0
1893 007056  000300              HHP6:     300
1894 007060  000000                        0
1895 007062  000000                        0
1896 007064  000000                        0
1897 007066  100000              HHP7:     100000             ;HHP7 = HHP8 + HHP9
1898 007070  000000                        0                  ;      = HHP5 + HHP6
1899 007072  000000                        0
1900 007074  000000                        0
1901 007076  000200              HHP8:     200
1902 007100  000000                        0
1903 007102  000000                        0
1904 007104  000000                        0
1905 007106  100300              HHP9:     100300
1906 007110  000000                        0
1907 007112  000000                        0
1908 007114  000000                        0
1909 007116  000400              HHP10:    400                ;HHP10 = HHP8 + HHP8
1910 007120  000000                        0
1911 007122  000000                        0
1912 007124  000000                        0
1913 007126  100400              HHP11:    100400             ;HHP11 = HHP5 + HHP5
1914 007130  000000                        0
1915 007132  000000                        0
1916 007134  000000                        0
1917 007136                      HHDONE:
     007136  104412                        RSETUP             ;GO INITIALIZE THE FPS AND STACK; AND
                                                               ;SEE IF THE USER HAS EXPRESSED
                                                               ;THE DESIRE TO CHANGE THE SOFTWARE
                                                               ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                               ;THE USER TYPED CONTROL G?).

1918
1932
```

TEST # 2 - OVER\UNDER TEST

```
1933                                    .SBTTL  TEST # 2 - OVER\UNDER TEST
                                        ;;*****************************************************************
                                        ;*TEST 2         OVER\UNDER TEST
                                        ;*
                                        ;*THIS IS A PARTIAL TEST OF THE OVER\UNDER
                                        ;*FLOWS.  ONE OVERFLOW AND TWO UNDERFLOW
                                        ;*CONDITIONS ARE CHECKED.  THE REMAINING
                                        ;*UNDERFLOW COND. AND THE REMAINING OVERFLOW
                                        ;*COND. WILL BE CHECKED LATER USING THE
                                        ;*XXX INSTRUCTION.  HERE EACH CONDITION TESTED
                                        ;*IS CHECKED BOTH WITH TRAPS ENABLED
                                        ;*(FIU=1 OR FIV=1) AND ALSO WITH TRAPS
                                        ;*DISABLED (FIU=0 OR FIV=0).
                                        ;*
                                        ;;*****************************************************************
     007140  000004                     TST2:   SCOPE
1934
1935                                    ;TEST OVERFLOW CONDITION WITH TRAP DISABLER FIV=0
1936 007142                             GG1:
     007142  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1937 007144  012704  000200                     MOV     #200,R4         ;CLEAR FIU, FIV, AND SET FD
1938 007150  170104                             LDFPS   R4
1939 007152  012737  007200  001236             MOV     #GG2,$TMP2
1940 007160  012737  010232  000244             MOV     #GGER0,FPVECT
1941 007166  012700  012004                     MOV     #GGP5,R0        ;SET AC0 OPERAND
1942 007172  172410                             LDD     (R0),AC0
1943 007174  012700  012004                     MOV     #GGP5,R0        ;FSRC
1944 007200  172010                     GG2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
1945 007202  170205                             STFPS   R5              ;GET FPS
1946 007204  012700  011734                     MOV     #GGDAT0,R0      ;GET THE RESULT
1947 007210  174010                             STD     AC0,(R0)
1948 007212  012701  012014                     MOV     #GGP6,R1        ;IS IT CORRECT
1949 007216  012702  000004                     MOV     #4,R2
1950 007222  022021                     GG3:    CMP     (R0)+,(R1)+
1951 007224  001402                             BEQ     GG4
1952 007226  000137  010330                     JMP     GGER1
1953 007232  077205                     GG4:    SOB     R2,GG3
1954 007234  052704  000006                     BIS     #6,R4           ;FPS CORRECT?
1955 007240  020405                             CMP     R4,R5
1956 007242  001402                             BEQ     GG5
1957 007244  000137  010376                     JMP     GGER2
1958                                    ;TEST OVERFLOW WITH TRAPS ENABLED
1959                                    ;FIV = 1
1960 007250                             GG5:
     007250  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
1961 007252  012704  001200                     MOV     #1200,R4        ;CLEAR FIU, SET FIV, AND FD
1962 007256  170104                             LDFPS   R4
1963 007260  012737  007306  001236             MOV     #GG6,$TMP2
1964 007266  012737  007324  000244             MOV     #GG7,FPVECT
1965 007274  012700  012004                     MOV     #GGP5,R0        ;SET AC0 OPERAND
1966 007300  172410                             LDD     (R0),AC0
1967 007302  012700  012004                     MOV     #GGP5,R0        ;FSPC
1968 007306  172010                     GG6:    ADDD    (R0),AC0        ;TEST INSTRUCTION
1969 007310  170000                             CFCC
1970 007312  012700  011734                     MOV     #GGDAT0,R0
1971 007316  174010                             STD     AC0,(R0)
1972 007320  000137  010444                     JMP     GGER3
```

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1973 007324  013703  001236          GG7:    MOV     $TMP2,R3
1974 007330  062703  000002                  ADD     #2,R3
1975 007334  020316                          CMP     R3,(SP)
1976 007336  001402                          BEQ     1$
1977 007340  000137  037450                  JMP     FPSPUR
1978 007344  011637  001236          1$:     MOV     (SP),$TMP2
1979 007350  022626                          CMP     (SP)+,(SP)+
1980 007352  170205                          STFPS   R5
1981 007354  012700  011734                  MOV     #GGDATO,R0      ;GET THE RESULT
1982 007360  174010                          STD     AC0,(R0)
1983 007362  012701  012014                  MOV     #GGP6,R1        ;IS IT CORRECT
1984 007366  012702  000004                  MOV     #4,R2
1985 007372  022021                  GG8:    CMP     (R0)+,(R1)+
1986 007374  001402                          BEQ     GG9
1987 007376  000137  010512                  JMP     GGER4
1988 007402  077205                  GG9:    SOB     R2,GG8
1989 007404  052704  100006                  BIS     #100006,R4
1990 007410  020405                          CMP     R4,R5           ;FPS CORRECT?
1991 007412  001402                          BEQ     1$
1992 007414  000137  010562                  JMP     GGER6
1993 007420  012704  000010          1$:     MOV     #10,R4
1994                                 ;CHECK FEC
1995 007424  170305                          STST    R5
1996 007426  020405                          CMP     R4,R5
1997 007430  001402                          BEQ     GG10
1998 007432  000137  010514                  JMP     GGER5
1999                                 ;CHECK UNDER FLOW CONDITION WITH
2000                                 ;TRAPS DISABLED (FIU = 0)
2001 007436                          GG10:
     007436  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2002 007440  012704  000200                  MOV     #0200,R4        ;SET FIU, FIV, AND FD
2003 007444  170104                          LDFPS   R4
2004 007446  012737  007474  001236          MOV     #GG11,$TMP2
2005 007454  012737  010630  000244          MOV     #GGER7,FPVECT
2006 007462  012700  011754                  MOV     #GGP2,R0        ;SET AC0 OPERAND
2007 007466  172410                          LDD     (R0),AC0        ;FSRC
2008 007470  012700  011764                  MOV     #GGP3,R0
2009 007474  172010                  GG11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
2010 007476  170205                          STFPS   R5              ;GET FPS
2011 007500  012700  011734                  MOV     #GGDATO,R0      ;GET THE RESULT
2012 007504  174010                          STD     AC0,(R0)
2013 007506  012701  012014                  MOV     #GGP6,R1        ;IS IT CORRECT
2014 007512  012702  000004                  MOV     #4,R2
2015 007516  022021                  GG12:   CMP     (R0)+,(R1)+
2016 007520  001402                          BEQ     GG13
2017 007522  000137  010726                  JMP     GGER8
2018 007526  077205                  GG13:   SOB     R2,GG12
2019 007530  052704  000004                  BIS     #4,R4           ;FPS CORRECT?
2020 007534  020405                          CMP     R4,R5
2021 007536  001402                          BEQ     GG14
2022 007540  000137  010774                  JMP     GGER9
2023                                 ;CHECK UNDERFLOW CONDITION WITH
2024                                 ;TRAP ENABLED (FIU = 1)
2025 007544                          GG14:
     007544  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2026 007546  012704  002200                  MOV     #2200,R4        ;SET FIU, FIV, AND FD
2027 007552  170104                          LDFPS   R4
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2028 007554  012737  007602  001236          MOV     #GG15,$TMP2
2029 007562  012737  007620  000244          MOV     #GG16,FPVECT
2030 007570  012700  011754                  MOV     #GGP2,R0        ;SET AC0 OPERAND
2031 007574  172410                          LDD     (R0),AC0        ;FSPC
2032 007576  012700  011764                  MOV     #GGP3,R0
2033 007602  172010                  GC15:   ADDD    (R0),AC0        ;TEST INSTRUCTION
2034 007604  170000                          CFCC
2035 007606  012700  011734                  MOV     #GGDAT0,R0
2036 007612  174010                          STD     AC0,(R0)
2037 007614  000137  011042                  JMP     GGER10
2038 007620  013703  001236          GG16:   MOV     $TMP2,R3
2039 007624  062703  000002                  ADD     #2,R3
2040 007630  021603                          CMP     (SP),R3
2041 007632  001402                          BEQ     1$
2042 007634  000137  037450                  JMP     FPSPUR
2043 007640  011637  001236          1$:     MOV     (SP),$TMP2
2044 007644  022626                          CMP     (SP)+,(SP)+
2045 007646  170205                          STFPS   R5              ;GET FPS
2046 007650  012700  011734                  MOV     #GGDAT0,R0      ;GET THE RESULT
2047 007654  174010                          STD     AC0,(R0)
2048 007656  012701  012024                  MOV     #GGP7,R1        ;IS IT CORRECT
2049 007662  012702  000004                  MOV     #4,R2
2050 007666  022021                  GG17:   CMP     (R0)+,(R1)+
2051 007670  001402                          BEQ     GG18
2052 007672  000137  011110                  JMP     GGER11
2053 007676  077205                  GG18:   SOB     R2,GG17
2054 007700  052704  100000                  BIS     #100000,R4
2055 007704  020405                          CMP     R4,R5           ;FPS CORRECT?
2056 007706  001402                          BEQ     2$
2057 007710  000137  011156                  JMP     GGER12
2058 007714                          2$:
2059 007714  012704  000012          1$:     MOV     #12,R4
2060                                 ;CHECK FEC
2061 007720  170305                          STST    R5
2062 007722  020405                          CMP     R4,R5
2063 007724  001402                          BEQ     GG19
2064 007726  000177  001272                  JMP     @GGER13
2065                                 ;CHECK UNDERFLOW CONDITION WITH TRAPS
2066                                 ;DISABLED (FIU = 0)
2067 007732                          GG19:
     007732  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2068 007734  012704  000200                  MOV     #0200,R4        ;SET FIU, FIV, AND FD
2069 007740  170104                          LDFPS   R4
2070 007742  012737  007770  001236          MOV     #GG20,$TMP2
2071 007750  012737  011272  000244          MOV     #GGER14,FPVECT
2072 007756  012700  011754                  MOV     #GGP2,R0        ;SET AC0 OPERAND
2073 007762  172410                          LDD     (R0),AC0
2074 007764  012700  012034                  MOV     #GGP8,R0        ;FSPC
2075 007770  172010                  GG20:   ADDD    (R0),AC0        ;TEST INSTRUCTION
2076 007772  170205                          STFPS   R5              ;GET FPS
2077 007774  012700  011734                  MOV     #GGDAT0,R0      ;GET THE RESULT
2078 010000  174010                          STD     AC0,(R0)
2079 010002  012701  012014                  MOV     #GGP6,R1        ;IS IT CORRECT
2080 010006  012702  000004                  MOV     #4,R2
2081 010012  022021                  GG21:   CMP     (R0)+,(R1)+
2082 010014  001402                          BEQ     GG22
2083 010016  000137  011370                  JMP     GGER15
```

```
2084 010022  077205                GG22:   SOB     R2,GG21
2085 010024  052704  000004                BIS     #4,R4          ;FPS CORRECT?
2086 010030  020405                        CMP     R4,R5
2087 010032  001402                        BEQ     GG23
2088 010034  000137  011436                JMP     GGER16
```

```
2090                                    ;CHECK UNDERFLOW CONDITION WITH TRAP
```

```
                                                ;ENABLED (FIU = 1)
010040                                  GG23:
010040  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
010042  012704  002200                          MOV     #2200,R4        ;SET FIU, FIV, AND FD
010046  170104                                  LDFPS   R4
010050  012737  010076  001236                  MOV     #GG24,$TMP2
010056  012737  010114  000244                  MOV     #GG25,FPVECT
010064  012700  011754                          MOV     #GGP2,R0        ;SET AC0 OPERAND
010070  172410                                  LDD     (R0),AC0
010072  012700  012034                          MOV     #GGP8,R0        ;FSRC
010076  172010                          GG24:   ADDD    (R0),AC0        ;TEST INSTRUCTION
010100  170000                                  CFCC
010102  012700  011734                          MOV     #GGDAT0,R0
010106  174010                                  STD     AC0,(R0)
010110  000137  011504                          JMP     GGER17
010114  013700  001236                  GG25:   MOV     $TMP2,R0
010120  062700  000002                          ADD     #2,R0
010124  020016                                  CMP     R0,(SP)
010126  001402                                  BEQ     1$
010130  000137  037450                          JMP     FPSPUR
010134  011637  001236                  1$:     MOV     (SP),$TMP2
010140  022626                                  CMP     (SP)+,(SP)+
010142  170205                                  STFPS   R5              ;GET FPS
010144  012700  011734                          MOV     #GGDAT0,R0      ;GET THE RESULT
010150  174010                                  STD     AC0,(R0)
010152  012701  012044                          MOV     #GGP9,R1        ;IS IT CORRECT
010156  012702  000004                          MOV     #4,R2
010162  022021                          GG26:   CMP     (R0)+,(R1)+
010164  001402                                  BEQ     GG27
010166  000137  011552                          JMP     GGER18
010172  077205                          GG27:   SOB     R2,GG26
010174  052704  100004                          BIS     #100004,R4
010200  020405                                  CMP     R4,R5           ;FPS CORRECT?
010202  001402                                  BEQ     1$
010204  000137  011666                          JMP     GGER20
010210  012704  000012                  1$:     MOV     #12,R4
                                                ;CHECK FEC
010214  170305                                  STST    R5
010216  020405                                  CMP     R4,R5
010220  001402                                  BEQ     GG28
010222  000137  011620                          JMP     GGER19

010226  000137  012054                  GG28:   JMP     GGDONE

010232  013701  001236                  GGER0:  MOV     $TMP2,R1
010236  062701  000002                          ADD     #2,R1
010242  020116                                  CMP     R1,(SP)
010244  001402                                  BEQ     10$
010246  000137  037450                  5$:     JMP     FPSPUR
010252                                  10$:
010252  170301                                  STST    R1
010254  020127  000010                          CMP     R1,#10
010260  001372                                  BNE     5$
010262  022626                                  CMP     (SP)+,(SP)+
010264  012700  011734                          MOV     #GGDAT0,R0
010270  174010                                  STD     AC0,(R0)
010272  012737  012004  001240                  MOV     #GGP5,$TMP3
```

```
                010300  012737  012004  001242          MOV     #GGP5,$TMP4
                010306  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010314  012737  012014  001246          MOV     #GGP6,$TMP6
                010322  104220                  1$:     ERROR   +220
                010324  000137  012054                  JMP     GGDONE
          2148
          2149  010330                          GGER1:
                010330  010537  001252                  MOV     R5,$TMP10
                010334  010437  001254                  MOV     R4,$TMP11
                010340  012737  012004  001240          MOV     #GGP5,$TMP3
                010346  012737  012004  001242          MOV     #GGP5,$TMP4
                010354  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010362  012737  012014  001246          MOV     #GGP6,$TMP6
                010370  104207                  1$:     ERROR   +207
                010372  000137  012054                  JMP     GGDONE
          2150
          2151  010376                          GGER2:
                010376  010537  001252                  MOV     R5,$TMP10
                010402  010437  001254                  MOV     R4,$TMP11
                010406  012737  012004  001240          MOV     #GGP5,$TMP3
                010414  012737  012004  001242          MOV     #GGP5,$TMP4
                010422  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010430  012737  012014  001246          MOV     #GGP6,$TMP6
                010436  104232                  1$:     ERROR   +232
                010440  000137  012054                  JMP     GGDONE
          2152
          2153  010444                          GGER3:
                010444  010537  001252                  MOV     R5,$TMP10
                010450  010437  001254                  MOV     R4,$TMP11
                010454  012737  012004  001240          MOV     #GGP5,$TMP3
                010462  012737  012004  001242          MOV     #GGP5,$TMP4
                010470  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010476  012737  012014  001246          MOV     #GGP6,$TMP6
                010504  104221                  1$:     ERROR   +221
                010506  000137  012054                  JMP     GGDONE
          2154
          2155  010512  000706                  GGER4:  BR      GGER1
          2156
          2157  010514                          GGER5:
                010514  010537  001252                  MOV     R5,$TMP10
                010520  010437  001254                  MOV     R4,$TMP11
                010524  012737  012004  001240          MOV     #GGP5,$TMP3
                010532  012737  012004  001242          MOV     #GGP5,$TMP4
                010540  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010546  012737  012014  001246          MOV     #GGP6,$TMP6
                010554  104226                  1$:     ERROR   +226
                010556  000137  012054                  JMP     GGDONE
          2158
          2159  010562                          GGER6:
                010562  010537  001252                  MOV     R5,$TMP10
                010566  010437  001254                  MOV     R4,$TMP11
                010572  012737  012004  001240          MOV     #GGP5,$TMP3
                010600  012737  012004  001242          MOV     #GGP5,$TMP4
                010606  012737  011734  001244          MOV     #GGDAT0,$TMP5
                010614  012737  012014  001246          MOV     #GGP6,$TMP6
                010622  104227                  1$:     ERROR   +227
                010624  000137  012054                  JMP     GGDONE
```

```
2160
2161 010630  013701  001236          GGER7:  MOV     $TMP2,R1
2162 010634  062701  000002                  ADD     #2,R1
2163 010640  020116                          CMP     R1,(SP)
2164 010642  001402                          BEQ     10$
2165 010644  000137  037450          5$:     JMP     FPSPUR
2166 010650                          10$:
2167 010650  170301                        STST    R1
2168 010652  020127  000012                CMP     R1,#12
2169 010656  001372                        BNE     5$
2170 010660  022626                        CMP     (SP)+,(SP)+
2171 010662  012700  011734                MOV     #GGDATO,R0
2172 010666  174010                        STD     AC0,(R0)
2173 010670  012737  011764  001240        MOV     #GGP3,$TMP3
     010676  012737  011754  001242        MOV     #GGP2,$TMP4
     010704  012737  011734  001244        MOV     #GGDATO,$TMP5
     010712  012737  012014  001246        MOV     #GGP6,$TMP6
     010720  104224                1$:     ERROR   +224
     010722  000137  012054                JMP     GGDONE
2174
2175 010726                          GGER8:
     010726  010537  001252                MOV     R5,$TMP10
     010732  010437  001254                MOV     R4,$TMP11
     010736  012737  011764  001240        MOV     #GGP3,$TMP3
     010744  012737  011754  001242        MOV     #GGP2,$TMP4
     010752  012737  011734  001244        MOV     #GGDATO,$TMP5
     010760  012737  012014  001246        MOV     #GGP6,$TMP6
     010766  104207                1$:     ERROR   +207
     010770  000137  012054                JMP     GGDONE
2176
2177 010774                          GGER9:
     010774  010537  001252                MOV     R5,$TMP10
     011000  010437  001254                MOV     R4,$TMP11
     011004  012737  011764  001240        MOV     #GGP3,$TMP3
     011012  012737  011754  001242        MOV     #GGP2,$TMP4
     011020  012737  011734  001244        MOV     #GGDATO,$TMP5
     011026  012737  012014  001246        MOV     #GGP6,$TMP6
     011034  104232                1$:     ERROR   +232
     011036  000137  012054                JMP     GGDONE
2178
2179 011042                          GGER10:
     011042  010537  001252                MOV     R5,$TMP10
     011046  010437  001254                MOV     R4,$TMP11
     011052  012737  011764  001240        MOV     #GGP3,$TMP3
     011060  012737  011754  001242        MOV     #GGP2,$TMP4
     011066  012737  011734  001244        MOV     #GGDATO,$TMP5
     011074  012737  012024  001246        MOV     #GGP7,$TMP6
     011102  104225                1$:     ERROR   +225
     011104  000137  012054                JMP     GGDONE
2180
2181 011110                          GGER11:
     011110  010537  001252                MOV     R5,$TMP10
     011114  010437  001254                MOV     R4,$TMP11
     011120  012737  011764  001240        MOV     #GGP3,$TMP3
     011126  012737  011754  001242        MOV     #GGP2,$TMP4
     011134  012737  011734  001244        MOV     #GGDATO,$TMP5
     011142  012737  012024  001246        MOV     #GGP7,$TMP6
```

```
                011150  104207                  1$:     ERROR   +207
                011152  000137  012054                  JMP     GGDONE
     2182
     2183       011156                          GGER12:
                011156  010537  001252                  MOV     R5,$TMP10
                011162  010437  001254                  MOV     R4,$TMP11
                011166  012737  011764  001240          MOV     #GGP3,$TMP3
                011174  012737  011754  001242          MOV     #GGP2,$TMP4
                011202  012737  011734  001244          MOV     #GGDATO,$TMP5
                011210  012737  012024  001246          MOV     #GGP7,$TMP6
                011216  104231                  1$:     ERROR   +231
                011220  000137  012054                  JMP     GGDONE
     2184
     2185       011224                          GGER13:
                011224  010537  001252                  MOV     R5,$TMP10
                011230  010437  001254                  MOV     R4,$TMP11
                011234  012737  011764  001240          MOV     #GGP3,$TMP3
                011242  012737  011754  001242          MOV     #GGP2,$TMP4
                011250  012737  011734  001244          MOV     #GGDATO,$TMP5
                011256  012737  012024  001246          MOV     #GGP7,$TMP6
                011264  104230                  1$:     ERROR   +230
                011266  000137  012054                  JMP     GGDONE
     2186
     2187       011272  013701  001236          GGER14: MOV     $TMP2,R1
     2188       011276  062701  000002                  ADD     #2,R1
     2189       011302  020116                          CMP     R1,(SP)
     2190       011304  001402                          BEQ     10$
     2191       011306  000137  037450          5$:     JMP     FPSPUR
     2192       011312                          10$:
     2193       011312  170301                          STST    R1
     2194       011314  020127  000012                  CMP     R1,#12
     2195       011320  00137<                          BNE     5$
     2196       011322  022626                          CMP     (SP)+,(SP)+
     2197       011324  012700  011734                  MOV     #GGDATO,R0
     2198       011330  174010                          STD     AC0,(R0)
     2199
     2200       011332  012737  011744  001240          MOV     #GGP1,$TMP3
                011340  012737  011764  001242          MOV     #GGP3,$TMP4
                011346  012737  011734  001244          MOV     #GGDATO,$TMP5
                011354  012737  012014  001246          MOV     #GGP6,$TMP6
                011362  104222                  1$:     ERROR   +222
                011364  000137  012054                  JMP     GGDONE
     2201
     2202       011370                          GGER15:
                011370  010537  001252                  MOV     R5,$TMP10
                011374  010437  001254                  MOV     R4,$TMP11
                011400  012737  011754  001240          MOV     #GGP2,$TMP3
                011406  012737  012034  001242          MOV     #GGP8,$TMP4
                011414  012737  011734  001244          MOV     #GGDATO,$TMP5
                011422  012737  012014  001246          MOV     #GGP6,$TMP6
                011430  104207                  1$:     ERROR   +207
                011432  000137  012054                  JMP     GGDONE
     2203
     2204       011436                          GGER16:
                011436  010537  001252                  MOV     R5,$TMP10
                011442  010437  001254                  MOV     R4,$TMP11
                011446  012737  011754  001240          MOV     #GGP2,$TMP3
```

```
        011454  012737  012034  001242          MOV     #GGP8,$TMP4
        011462  012737  011734  001244          MOV     #GGDATO,$TMP5
        011470  012737  012014  001246          MOV     #GGP6,$TMP6
        011476  104232                  1$:     ERROR   +232
        011500  000137  012054                  JMP     GGDONE
  2205
  2206  011504                          GGER17:
        011504  010537  001252                  MOV     R5,$TMP10
        011510  010437  001254                  MOV     R4,$TMP11
        011514  012737  011754  001240          MOV     #GGP2,$TMP3
        011522  012737  012034  001242          MOV     #GGP8,$TMP4
        011530  012737  011734  001244          MOV     #GGDATO,$TMP5
        011536  012737  012044  001246          MOV     #GGP9,$TMP6
        011544  104223                  1$:     ERROR   +223
        011546  000137  012054                  JMP     GGDONE
  2207
  2208  011552                          GGER18:
        011552  010537  001252                  MOV     R5,$TMP10
        011556  010437  001254                  MOV     R4,$TMP11
        011562  012737  011754  001240          MOV     #GGP2,$TMP3
        011570  012737  012034  001242          MOV     #GGP8,$TMP4
        011576  012737  011734  001244          MOV     #GGDATO,$TMP5
        011604  012737  012044  001246          MOV     #GGP9,$TMP6
        011612  104207                  1$:     ERROR   +207
        011614  000137  012054                  JMP     GGDONE
  2209
  2210  011620                          GGER19:
        011620  010537  001252                  MOV     R5,$TMP10
        011624  010437  001254                  MOV     R4,$TMP11
        011630  012737  011754  001240          MOV     #GGP2,$TMP3
        011636  012737  012034  001242          MOV     #GGP8,$TMP4
        011644  012737  011734  001244          MOV     #GGDATO,$TMP5
        011652  012737  012044  001246          MOV     #GGP9,$TMP6
        011660  104230                  1$:     ERROR   +230
        011662  000137  012054                  JMP     GGDONE
  2211
  2212  011666                          GGER20:
        011666  010537  001252                  MOV     R5,$TMP10
        011672  010437  001254                  MOV     R4,$TMP11
        011676  012737  011754  001240          MOV     #GGP2,$TMP3
        011704  012737  012034  001242          MOV     #GGP8,$TMP4
        011712  012737  011734  001244          MOV     #GGDATO,$TMP5
        011720  012737  012044  001246          MOV     #GGP9,$TMP6
        011726  104231                  1$:     ERROR   +231
        011730  000137  012054                  JMP     GGDONE
  2213
  2214  011734  000000                  GGDATO: 0
  2215  011736  000000                          0
  2216  011740  000000                          0
  2217  011742  000000                          0
  2218
  2219  011744  000300                  GGP1:   300
  2220  011746  000000                          0
  2221  011750  000000                          0
  2222  011752  000000                          0
  2223  011754  100200                  GGP2:   100200
  2224  011756  000000                          0
```

```
2225 011760  000000                        0
2226 011762  000000                        0
2227 011764  000200              GGP3:     200
2228 011766  000000                        0
2229 011770  000000                        0
2230 011772  000001                        1
2231 011774  010200              GGP4:     10200
2232 011776  000000                        0
2233 012000  000000                        0
2234 012002  000000                        0
2235 012004  077600              GGP5:     77600          ;OVER FLOW = GGP5 + GGP5
2236 012006  000000                        0
2237 012010  000000                        0
2238 012012  000000                        0
2239 012014  000000              GGP6:     0              ;OVERFLOW RESULT
2240 012016  000000                        0              ;UNDERFLOW RESULT
2241 012020  000000                        0              ;GGP6 = GGP4 + GGP5
2242 012022  000000                        0              ;      = GGP3 + GGP2 (FIU = 0)
2243                                                       ;      = GGP3 + GGP1
2244 012024  062400              GGP7:     62400          ;GGP7 = GGP3 + GGP2 (FIU = 1)
2245 012026  000000                        0
2246 012030  000000                        0
2247 012032  000000                        0
2248 012034  000340              GGP8:     340
2249 012036  000000                        0
2250 012040  000000                        0
2251 012042  000000                        0
2252 012044  000100              GGP9:     100
2253 012046  000000                        0
2254 012050  000000                        0
2255 012052  000000                        0
2256 012054                      GGDONE:
     012054  104412                        RSETUP         ;GO INITIALIZE THE FPS AND STACK; AND
                                                           ;SEE IF THE USER HAS EXPRESSED
                                                           ;THE DESIRE TO CHANGE THE SOFTWARE
                                                           ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                           ;THE USER TYPED CONTROL G?).

2257
2263
```

TEST # 3 - LDCFD AND LDCDF TEST

```
                                        .SBTTL  TEST # 3 - LDCFD AND LDCDF TEST
                                        ;*****************************************************************
                                        ;*TEST 3        LDCFD AND LDCDF TEST
                                        ;*
                                        ;*THIS IS A TEST OF LDCFD AND LDCDF.
                                        ;*
                                        ;*****************************************************************
 012056  000004                         TST3:   SCOPE
                                        ;TEST FOR CORRECT AUTO INCREMENT CONSTANT.
                                        HX1:
 012060  104413                                 LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 012062  012704  000200                         MOV     #200,R4
 012066  170104                                 LDFPS   R4
 012070  012700  013474                         MOV     #HXP1,R0
 012074  172410                                 LDD     (R0),AC0
 012076  012700  013504                         MOV     #HXP2,R0
 012102  012737  012110  001236                 MOV     #HX2,$TMP2
 012110  177420                         HX2:    LDCFD   (R0)+,AC0
 012112  020027  013510                         CMP     R0,#HXP2+4      ;IS R0 CORRECT
 012116  001402                                 BEQ     HX3
 012120  000137  013052                         JMP     HXER1
 012124                                 HX3:
 012124  170205                                 STFPS   R5              ;GET FPS
 012126  012700  013464                         MOV     #HXDAT0,R0
 012132  174010                                 STD     AC0,(R0)        ;GET AC0
 012134  012701  013554                         MOV     #HXP7,R1        ;SEE IF RESULT IS
 012140  012702  000004                         MOV     #4,R2           ;CORRECT
 012144  022120                         HX4:    CMP     (R1)+,(R0)+
 012146  001415                                 BEQ     HX7
 012150  012701  013504                         MOV     #HXP2,R1        ;DID FD GET
 012154  012700  013464                         MOV     #HXDAT0,R0      ;COMPLIMENTED?
 012160  012702  000004                         MOV     #4,R2
 012164  022120                         HX5:    CMP     (R1)+,(R0)+
 012166  001402                                 BEQ     HX6
 012170  000137  013112                         JMP     HXER2
 012174  077205                         HX6:    SOB     R2,HX5
 012176  000137  013142                         JMP     HXER3
 012202  077220                         HX7:    SOB     R2,HX4
 012204  012704  000200                         MOV     #200,R4         ;FPS CORRECT?
 012210  020405                                 CMP     R4,R5
 012212  001402                                 BEQ     HX8
 012214  000137  013210                         JMP     HXER8
                                        ;NOW    TEST    LDCDF
 012220                                 HX8:
 012220  104413                                 LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 012222  012704  000200                                 MOV #200,R4
 012226  170104                                 LDFPS R4

 012230  012700  013474                         MOV     #HXP1,R0
 012234  172410                                 LDD     (R0),AC0

 012236  012700  013504                         MOV     #HXP2,R0
 012242  012737  012252  001236                 MOV     #HX9,$TMP2

 012250  170001                                 SETF

 012252  177420                         HX9:    LDCDF   (R0)+,AC0       ;TEST INSTRUCTION
```

```
                                                                H 4
2312
2313 012254  020027  013514                    CMP     R0,#HXP2+10     ;WAS A GOOD
2314 012260  001402                            BEQ     HX10            ;CONSTANT USED
2315 012262  000137  013072                    JMP     HXER5           ;TO INCREMENT R0?
2316
2317 012266                            HX10:
2318 012266  170205                            STFPS   R5
2319 012270  012700  013464                    MOV     #HXDAT0,R0
2320 012274  170011                            SETD
2321 012276  174010                            STD     AC0,(R0)        ;GET RESULT
2322 012300  012701  013564                    MOV     #HXP8,R1
2323 012304  012702  000004                    MOV     #4,R2
2324 012310  022120                    HX11:   CMP     (R1)+,(R0)+     ;IS IT CORRECT?
2325 012312  001415                            BEQ     HX14
2326
2327 012314  012701  013554                    MOV     #HXP7,R1
2328 012320  012700  013464                    MOV     #HXDAT0,R0
2329 012324  012702  000004                    MOV     #4,R2
2330 012330  022110                    HX12:   CMP     (R1)+,(R0)      ;DID FD FAIL TO GET
2331 012332  001402                            BEQ     HX13            ;COMPLIMENTED?
2332 012334  000137  013226                    JMP     HXER6
2333 012340  077205                    HX13:   SOB     R2,HX12
2334 012342  000137  013256                    JMP     HXER7
2335
2336 012346  077220                    HX14:   SOB     R2,HX11
2337
2338 012350  012704  000000                    MOV     #0,R4           ;FPS CORRECT?
2339 012354  020405                            CMP     R4,R5
2340 012356  001402                            BEQ     HX15
2341 012360  000137  013210                    JMP     HXER8
2342
2343                                   ;TEST GR7 IMMEDIATE MODE CONSTANT
2344
2345 012364                            HX15:
     012364  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2346
2347 012366  012704  000200                    MOV     #200,R4
2348 012372  170104                            LDFPS   R4              ;SET FD
2349 012374  012737  012412  001236            MOV     #HX16,$TMP2
2350 012402  012737  013306  000004            MOV     #HXER9,ERRVECT
2351 012410  005001                            CLR     R1
2352 012412  177427  043243            HX16:   LDCFD   #5201,AC0
2353 012416  005201                    HX165:  INC     R1
2354 012420  005201                            INC     R1
2355 012422  005201                            INC     R1
2356 012424  012737  037502  000004            MOV     #CPSPUR,ERRVECT
2357 012432  020127  000003                    CMP     R1,#3           ;SEE IF PC WAS
2358 012436  001402                            BEQ     HX17            ;CORRECT
2359 012440  000137  013342                    JMP     HXER10
2360
2361 012444                            HX17:
     012444  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2362
2363 012446  012704  000200                    MOV     #200,R4
2364 012452  170104                            LDFPS   R4
2365 012454  012737  012502  001236            MOV     #HX18,$TMP2
2366 012462  012700  013544                    MOV     #HXP6,R0
```

TEST # 3 - LDCFD AND LDCDF TEST

```
2367 012466  172410                        LDD     (R0),AC0
2368 012470  012737  037502  000004        MOV     #CPSPUR,ERRVECT
2369 012476  012700  013504                MOV     #HXP2,R0
2370 012502  177410                HX18:   LDCFD   (R0),AC0
2371
2372 012504  012700  013464                MOV     #HXDATO,R0
2373 012510  174010                        STD     AC0,(R0)        ;GET RESULT.
2374 012512  012701  013554                MOV     #HXP7,R1
2375 012516  012702  000004                MOV     #4,R2
2376 012522  022021                HX19:   CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
2377 012524  001402                        BEQ     HX20
2378 012526  000137  013112                JMP     HXER2
2379 012532  077205                HX20:   SOB     R2,HX19
2380
2381                               ;TEST LDCFD WITH NEGATIVE OPERAND
2382 012534                        HX21:
     012534  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2383 012536  012704  000200                MOV     #200,R4
2384 012542  170104                        LDFPS   R4
2385 012544  012737  012564  001236        MOV     #HX22,$TMP2
2386 012552  012700  013544                MOV     #HXP6,R0
2387 012556  172410                        LDD     (R0),AC0
2388 012560  012700  013524                MOV     #HXP4,R0
2389 012564  177410                HX22:   LDCFD   (R0),AC0
2390
2391 012566  012700  013464                MOV     #HXDATO,R0
2392 012572  174010                        STD     AC0,(R0)        ;GET RESULT
2393
2394 012574  012701  013534                MOV     #HXP5,R1
2395 012600  012702  000004                MOV     #4,R2
2396 012604  022120                HX23:   CMP     (R1)+,(R0)+
2397 012606  001415                        BEQ     HX26
2398
2399 012610  012701  013554                MOV     #HXP7,R1
2400 012614  012700  013464                MOV     #HXDATO,R0
2401 012620  012702  000004                MOV     #4,R2
2402 012624  022120                HX24:   CMP     (R1)+,(R0)+     ;WAS SIGN INCORRECT
2403 012626  001402                        BEQ     HX25
2404 012630  000137  013374                JMP     HXER11
2405 012634  077205                HX25:   SOB     R2,HX24
2406 012636  000137  013414                JMP     HXER12
2407
2408 012642  077220                HX26:   SOB     R2,HX23
2409
2410                               ;TEST   LDCFD   0
2411
2412 012644                        HX27:
     012644  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2413 012646  012704  000200                MOV     #200,R4
2414 012652  170104                        LDFPS   R4
2415
2416 012654  012700  013474                MOV     #HXP1,R0
2417 012660  172410                        LDD     (R0),AC0
2418 012662  172010                        ADDD    (R0),AC0
2419
2420 012664  012737  012676  001236        MOV     #HX28,$TMP2
2421 012672  012700  013474                MOV     #HXP1,R0
```

```
2422 012676  177410                  HX28:   LDCFD   (R0),AC0
2423
2424 012700  170205                          STFPS   R5
2425
2426 012702  012700  013464                  MOV     #HXDAT0,R0
2427 012706  174010                          STD     AC0,(R0)        ;GET RESULT
2428
2429 012710  012701  013474                  MOV     #HXP1,R1
2430 012714  012702  000004                  MOV     #4,R2
2431 012720  022120                  HX29:   CMP     (R1)+,(R0)+     ;IS IT 0?
2432 012722  001402                          BEQ     HX30
2433 012724  000137  013444                  JMP     HXER13
2434 012730  077205                  HX30:   SOB     R2,HX29
2435
2436 012732  012704  000204                  MOV     #204,R4         ;FPS CORRECT
2437 012736  020405                          CMP     R4,R5
2438 012740  001402                          BEQ     HX31
2439 012742  000137  0'3172                  JMP     HXER4
2440
2441                                 ;TEST   LDCFD   0
2442
2443 012746                          HX31:
     012746  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2444 012750  012704  000200                  MOV     #200,R4
2445 012754  170104                          LDFPS   R4
2446
2447 012756  012700  013544                  MOV     #HXP6,R0
2448 012762  172410                          LDD     (R0),AC0
2449
2450 012764  012737  012776  001236          MOV     #HX32,$TMP2
2451 012772  012700  013474                  MOV     #HXP1,R0
2452 012776  177410                  HX32:   LDCFD   (R0),AC0
2453
2454 013000  170205                          STFPS   R5
2455
2456 013002  012700  013464                  MOV     #HXDAT0,R0
2457 013006  174010                          STD     AC0,(R0)        ;GET RESULT
2458
2459 013010  012701  013474                  MOV     #HXP1,R1
2460 013014  012702  000004                  MOV     #4,R2
2461 013020  022120                  HX33:   CMP     (R1)+,(R0)+     ;IS IT ZERO?
2462 013022  001402                          BEQ     HX34
2463 013024  000137  013444                  JMP     HXER13
2464 013030  077205                  HX34:   SOB     R2,HX33
2465
2466 013032  012704  000204                  MOV     #204,R4         ;FPS CORRECT?
2467 013036  020405                          CMP     R4,R5
2468 013040  001402                          BEQ     HX35
2469 013042  000137  013172                  JMP     HXER4
2470 013046  000137  013574          HX35:   JMP     HXDONE
2471
2472                                 ;R0 INCORRECT
2473
2474 013052  012737  013510  001242  HXER1:  MOV     #HXP2+4,$TMP4
2475 013060  010037  001240                  MOV     R0,$TMP3
2476 013064  104234                  1$:     ERROR   +234
2477 013066  000137  013574                  JMP     HXDONE
```

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                                                                    K 4
2478
2479 013072  012737  013514  001242  HXER5:  MOV     #HXP2+10,$TMP4
2480 013100  010037  001240                  MOV     R0,$TMP3
2481 013104  104237                  1$:     ERROR   +237
2482 013106  000137  013574                  JMP     HXDONE
2483                                 ;REPORT BAD DATA
2484 013112  012737  013504  001244  HXER2:  MOV     #HXP2,$TMP5
2485 013120  012737  013554  001250          MOV     #HXP7,$TMP7
2486 013126  012737  013464  001246  HXER22: MOV     #HXDATO,$TMP6
2487 013134  104233                  1$:     ERROR   +233
2488 013136  000137  013574                  JMP     HXDONE
2489                                 ;
2490 013142  012737  013504  001244  HXER3:  MOV     #HXP2,$TMP5
2491 013150  012737  013554  001250          MOV     #HXP7,$TMP7
2492 013156  012737  013464  001246  HXER33: MOV     #HXDATO,$TMP6
2493 013164  104241                  1$:     ERROR   +241
2494 013166  000137  013574                  JMP     HXDONE
2495
2496 013172  010537  001240          HXER4:  MOV     R5,$TMP3
2497 013176  010437  001242                  MOV     R4,$TMP4
2498 013202  104240                  1$:     ERROR   +240
2499 013204  000137  013574                  JMP     HXDONE
2500
2501 013210  010537  001240          HXER8:  MOV     R5,$TMP3
2502 013214  010437  001242                  MOV     R4,$TMP4
2503 013220  104242                  1$:     ERROR   +242
2504 013222  000137  013574                  JMP     HXDONE
2505 013226  012737  013504  001244  HXER6:  MOV     #HXP2,$TMP5
2506 013234  012737  013564  001250          MOV     #HXP8,$TMP7
2507 013242  012737  013464  001246  HXER66: MOV     #HXDATO,$TMP6
2508 013250  104244                  1$:     ERROR   +244
2509 013252  000137  013574                  JMP     HXDONE
2510
2511 013256  012737  013504  001244  HXER7:  MOV     #HXP2,$TMP5
2512 013264  012737  013564  001250          MOV     #HXP8,$TMP7
2513 013272  012737  013464  001246          MOV     #HXDATO,$TMP6
2514 013300  104243                  1$:     ERROR   +243
2515 013302  000137  013574                  JMP     HXDONE
2516
2517 013306  032716  000001          HXER9:  BIT     #1,(SP)         ;SEE IF IT
2518 013312  001005                          BNE     1$              ;AN ODD ADDRESS
2519 013314  022716  012416                  CMP     #HX165,(SP)
2520 013320  001402                          BEQ     1$
2521 013322  000137  037502                  JMP     CPSPUR
2522
2523 013326  011637  001236          1$:     MOV     (SP),$TMP2
2524 013332  022626                          CMP     (SP)+,(SP)+
2525 013334  104235                  2$:     ERROR   +235
2526 013336  000137  013574                  JMP     HXDONE
2527
2528 013342  162701  000003          HXER10: SUB     #3,R1
2529 013346  006301                          ASL     R1
2530 013350  012702  012416                  MOV     #HX165,R2
2531 013354  010237  001242                  MOV     R2,$TMP4
2532 013360  160102                          SUB     R1,R2
2533 013362  010237  001240                  MOV     R2,$TMP3
2534 013366  104236                  1$:     ERROR   +236
```

```
2535 013370  000137  013574                    JMP     HXDONE
2536
2537 013374  012737  013524  001244  HXER11:   MOV     #HXP4,$TMP5
2538 013402  012737  013534  001250            MOV     #HXP5,$TMP7
2539 013410  000137  013126                    JMP     HXER22
2540 013414  012737  013524  001244  HXER12:   MOV     #HXP4,$TMP5
2541 013422  012737  013534  001250            MOV     #HXP5,$TMP7
2542 013430  012737  013464  001246            MOV     #HXDAT0,$TMP6
2543 013436  104245                    1$:     ERROR   +245
2544 013440  000137  013574                    JMP     HXDONE
2545
2546 013444  012737  013474  001244  HXER13:   MOV     #HXP1,$TMP5
2547 013452  012737  013474  001250            MOV     #HXP1,$TMP7
2548 013460  000137  013126                    JMP     HXER22
2549
2550 013464  000000                  HXDAT0:   0
2551 013466  000000                            0
2552 013470  000000                            0
2553 013472  000000                            0
2554
2555 013474  000000                  HXP1:     0
2556 013476  000000                            0
2557 013500  000000                            0
2558 013502  000000                            0
2559
2560 013504  000577                  HXP2:     577
2561 013506  177776                            177776
2562 013510  177777                            177777
2563 013512  177776                            177776
2564 013514  005201                  HXP3:     5201
2565 013516  000000                            0
2566 013520  000000                            0
2567 013522  000000                            0
2568 013524  100577                  HXP4:     100577
2569 013526  177776                            177776
2570 013530  177777                            177777
2571 013532  177776                            177776
2572 013534  100577                  HXP5:     100577
2573 013536  177776                            177776
2574 013540  000000                            0
2575 013542  000000                            0
2576 013544  000252                  HXP6:     252
2577 013546  125252                            125252
2578 013550  125252                            125252
2579 013552  125252                            125252
2580
2581 013554  000577                  HXP7:     577
2582 013556  177776                            177776
2583 013560  000000                            0
2584 013562  000000                            0
2585 013564  000577                  HXP8:     577
2586 013566  177777                            177777
2587 013570  000000                            0
2588 013572  000000                            0
2589
2590 013574                           HXDONE:
     013574  104412                            RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
```

```
                                                ;SEE IF THE USER HAS EXPRESSED
                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                ;THE USER TYPED CONTROL G?).

   2591
   2592
   2593
   2601
```

```
                                .SBTTL  TEST # 4 - CMPD TEST
                                ;;*****************************************************************
                                ;*TEST 4         CMPD TEST
                                ;*
                                ;*THIS IS A TEST OF THE CMPD INSTRUCTION. NOTE THAT A SUBROUTINE
                                ;*IS USED TO SET UP OPERANDS, EXECUTE THE INSTRUCTION AND CHECK THE
                                ;*RESULTS
                                ;*
                                ;;*****************************************************************
013576  000004                  TST4:   SCOPE

                                ;TEST THE CMPD INSTRUCTION WITH (FSRC=AC=0)
013600                          AAA1:
013600  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
013602  004737  014412                  JSR     PC,CMPSUB
013606  000000  000000  000000  1$:     .WORD   0,0,0,0                 ;AC0
013616  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;FSRC
013626  000200                  3$:     200                             ;FPS BEFORE EXECUTION
013630  000204                          204                             ;FPS AFTER EXECUTION
013632  000200                          200                             ;ERROR FPS
013634  104001                  4$:     ERROR   +1                      ;FPS ERROR


                                ;TEST CMPD WITH (AC=0) AND FSRC POSITIVE.
013636                          AAA2:
013636  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
013640  004737  014412                  JSR     PC,CMPSUB
013644  000000  000000  000000  1$:     .WORD   0,0,0,0                 ;AC
013654  025252                  2$:     25252                           ;FSRC
013656  052525                          52525
013660  125252                          125252
013662  052525                          52525
013664  000200                  3$:     200                             ;FPS BEFORE EXECUTION
013666  000200                          200                             ;FPS AFTER EXECUTION
013670  000210                          210                             ;ERROR FPS
013672  104003                  4$:     ERROR   +3                      ;FPS ERROR

                                ;TEST CMPD WITH (AC=0) AND FSRC NEGATIVE
013674                          AAA3:
013674  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
013676  004737  014412                  JSR     PC,CMPSUB
013702  000000  000000  000000  1$:     .WORD   0,0,0,0                 ;AC
013712  125252                  2$:     125252                          ;FSRC
013714  125252                          125252
013716  052525                          52525
013720  125252                          125252
013722  000200                  3$:     200                             ;FPS BEFORE EXECUTION
013724  000210                          210                             ;FPS AFTER EXECUTION
013726  000200                          200                             ;ERROR FPS
013730  104004                  4$:     ERROR   +4                      ;FPS ERROR.

                                ;TEST CMPD WITH (FSRC=0) AND AC POSITIVE
013732                          AAA4:
013732  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
013734  004737  014412                  JSR     PC,CMPSUB
013740  025252                  1$:     25252                           ;AC
013742  052525                          52525
```

```
2646 013744  125252                          125252
2647 013746  052525                          52525
2648 013750  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;FSRC
2649 013760  000200                  3$:     200                             ;FPS BEFORE EXECUTION
2650 013762  000210                          210                             ;FPS AFTER EXECUTION
2651 013764  000200                          200                             ;ERROR FPS
2652 013766  104005                  4$:     ERROR   +5                      ;FPS ERROR
2653
2654
2655                                  ;TEST CMPD WITH (FSRC=0) AND AC NEGATIVE
2656 013770                          AAA5:
     013770  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2657 013772  004737  014412                  JSR     PC,CMPSUB
2658 013776  125252                  1$:     125252                          ;AC
2659 014000  125252                          125252
2660 014002  052525                          52525
2661 014004  125252                          125252
2662 014006  000000  000000  000000  2$:     .WORD   0,0,0,0                 ;FSRC
2663 014016  000200                  3$:     200                             ;FPS BEFORE EXECUTION
2664 014020  000200                          200                             ;FPS AFTER EXECUTION
2665 014022  000210                          210                             ;ERROR FPS
2666 014024  104006                  4$:     ERROR   +6                      ;FPS ERROR
2667
2668                                  ;TEST CMPD WITH AC POSITIVE AND FSRC NEGATIVE
2669 014026                          AAA6:
     014026  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2670 014030  004737  014412                  JSR     PC,CMPSUB
2671 014034  052525                  1$:     52525                           ;AC
2672 014036  125252                          125252
2673 014040  052525                          52525
2674 014042  125252                          125252
2675 014044  125252                  2$:     125252                          ;;FSRC
2676 014046  052525                          52525
2677 014050  125252                          125252
2678 014052  052525                          52525
2679 014054  000200                  3$:     200                             ;FPS BEFORE EXECUTION
2680 014056  000210                          210                             ;FPS AFTER EXECUTION
2681 014060  000200                          200                             ;ERROR FPS
2682 014062  104007                  4$:     ERROR   +7                      ;FPS ERROR
2683
2684
2685                                  ;TEST CMPD WITH AC NEGATIVE AND FSRC POSITIVE
2686 014064                          AAA7:
     014064  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2687 014066  004737  014412                  JSR     PC,CMPSUB
2688 014072  125252                  1$:     125252                          ;AC
2689 014074  052525                          52525
2690 014076  125252                          125252
2691 014100  052525                          52525
2692 014102  052525                  2$:     52525                           ;FSRC
2693 014104  125252                          125252
2694 014106  052525                          52525
2695 014110  125252                          125252
2696 014112  000200                  3$:     200                             ;FPS BEFORE EXECUTION
2697 014114  000200                          200                             ;FPS AFTER EXECUTION
2698 014116  000210                          210                             ;ERROR FPS
2699 014120  104010                  4$:     ERROR   +10                     ;FPS ERROR.
```

TEST # 4 - CMPD TEST

```
                                        ;TEST CMPD WITH AC POSITIVE AND FSRC POSITIVE
                                        ;AND EAC LESS THAN EFSRC.
014122                                  AAA8:
014122  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
014124  004737  014412                          JSR     PC,CMPSUB
014130  012345                          1$:     12345                   ;AC
014132  067654                                  67654
014134  032101                                  32101
014136  023456                                  23456
014140  023456                          2$:     23456                   ;FSRC
014142  076543                                  76543
014144  021012                                  21012
014146  034567                                  34567
014150  000200                          3$:     200                     ;FPS BEFORE EXECUTION
014152  000200                                  200                     ;FPS AFTER EXECUTION
014154  000210                                  210                     ;ERROR FPS
014156  104011                          4$:     ERROR   +11             ;FPS ERROR

                                        ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND EAC GREATER THAN EFSRC
014160                                  AAA9:
014160  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
014162  004737  014412                          JSR     PC,CMPSUB
014166  045676                          1$:     45676                   ;AC
014170  054321                                  54321
014172  012345                                  12345
014174  067654                                  67654
014176  034567                          2$:     34567                   ;FSRC
014200  065432                                  65432
014202  101234                                  101234
014204  056765                                  56765
014206  000200                          3$:     200                     ;FPS BEFORE EXECUTION
014210  000210                                  210                     ;FPS AFTER EXECUTION
014212  000200                                  200                     ;ERROR FPS
014214  104012                          4$:     ERROR   +12

                                        ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE AND AC EQUAL TO FSRC
014216                                  AAA10:
014216  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
014220  004737  014412                          JSR     PC,CMPSUB
014224  012345                          1$:     12345                   ;AC
014226  067012                                  67012
014230  034567                                  34567
014232  012345                                  012345
014234  012345                          2$:     12345                   ;FSRC
014236  067012                                  67012
014240  034567                                  34567
014242  012345                                  012345
014244  000200                          3$:     200                     ;FPS BEFORE EXECUTION
```

TEST # 4 - CMPD TEST

```
 2748 014246  000204                          204                             ;FPS AFTER EXECUTION
 2749 014250  000200                          200                             ;ERROR FPS
 2750 014252  104013                  4$:     ERROR   +13                     ;FPS ERROR
 2751
 2752                                 ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
 2753                                 ;AND FSRC GREATER THAN AC.
 2754 014254                          AAA11:
      014254  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 2755 014256  004737  014412                  JSR     PC,CMPSUB
 2756 014262  012345                  1$:     12345                           ;AC
 2757 014264  067012                          67012
 2758 014266  034567                          34567
 2759 014270  012345                          012345
 2760 014272  012345                  2$:     12345                           ;FSRC
 2761 014274  070123                          70123
 2762 014276  045670                          45670
 2763 014300  123456                          123456
 2764 014302  000200                  3$:     200                             ;FPS BEFORE EXECUTION
 2765 014304  000200                          200                             ;FPS AFTER EXECUTION
 2766 014306  000210                          210                             ;ERROR FPS
 2767 014310  104014                  4$:     ERROR   +14                     ;FPS ERROR
 2768
 2769                                 ;TEST CMPD WITH AC POSITIVE, FSRC POSITIVE, EAC EQUAL TO EFSRC,
 2770                                 ;AND AC GREATER THAN FSRC.
 2771 014312                          AAA12:
      014312  104413                          LPERR                   ;SFT UP THE LOOP ON ERROR ADDRESS.
 2772 014314  004737  014412                  JSR     PC,CMPSUB
 2773 014320  054321                  1$:     54321                           ;AC
 2774 014322  076543                          76543
 2775 014324  021076                          21076
 2776 014326  054321                          54321
 2777 014330  054321                  2$:     54321                           ;FSRC
 2778 014332  065432                          65432
 2779 014334  107654                          107654
 2780 014336  032107                          32107
 2781 014340  000200                  3$:     200                             ;FPS BEFORE EXECUTION
 2782 014342  000210                          210                             ;FPS AFTER EXECUTION
 2783 014344  000200                          200                             ;ERROR FPS
 2784 014346  104015                  4$.     ERROR   +15                     ;FPS ERROR
 2785
 2786                                 ;TEST CMPD WITH AC NEGATIVE, FSRC NEGATIVE, EAC EQUAL TO EFSRC,
 2787                                 ;AND AC GREATER THAN FSRC
 2788 014350                          AAA13:
      014350  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 2789 014352  004737  014412                  JSR     PC,CMPSUB
 2790 014356  112345                  1$:     112345                          ;AC
 2791 014360  043210                          43210
 2792 014362  076543                          76543
 2793 014364  021076                          21076
 2794 014366  112345                  2$:     112345                          ;FSRC
 2795 014370  054321                          54321
 2796 014372  007654                          07654
 2797 014374  032107                          32107
 2798 014376  000200                  3$:     200                             ;FPS BEFORE EXECUTION
 2799 014400  000210                          210                             ;FPS AFTER EXECUTION
 2800 014402  000200                          200                             ;ERROR FPS
 2801 014404  104016                  4$:     ERROR   +16                     ;FPS ERROR
```

TEST # 4 - CMPD TEST

```
2802
2803
2804 014406  000137  014602                    JMP     AAADONE         ;FINISHED CMPD TEST.
2805
2806
2807                                  ;THIS SUBROUTINE, CMPSUB, IS CALLED TO SET UP, EXECUTE
2808                                  ;AND CHECK THE RESULTS OF A CMPD INSTRUCTION.
2809                                  ;IT IS CALLED THUS:
2810                                  ;
2811                                  ;               JSR     PC,CMPSUB
2812                                  ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
2813                                  ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
2814                                  ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
2815                                  ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
2816                                  ;       FPSE:   .WORD   X                       ;ERROR FPS
2817                                  ;       ERR:    ERROR   +X                      ;FPS ERROR
2818                                  ;       CONT:                                   ;RETURN ADDRESS
2819                                  ;
2820                                  ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
2821                                  ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, CMPD, IS EXECUTED.
2822                                  ;AFTER THE EXECUTION THE FPS IS CHECKED AGAINST FPSA. IF IT IS A MATCH
2823                                  ;THEN THERE WAS NO ERROR AND CONTROL IS RETURNED TO CONT. IF
2824                                  ;THE FPS IS INCORRECT IT IS COMPARED WITH FPSE IN AN ATTEMPT TO ANALYSE
2825                                  ;THE FAILURE. IF THE FPS IS THE SAME AS FPSE THEN CONTROL IS
2826                                  ;RETURNED TO THE ERROR CALL AT LOCATION ERR. IF THE FPS WAS
2827                                  ;NOT CORRECT BUT DIDN'T MATCH FPSE A GENERAL ERROR IS REPORTED
2828                                  ;AND CONTROL IS PASSED TO CONT.
2829
2830 014412  012601                  CMPSUB: MOV     (SP)+,R1                ;PICK UP A POINTER TO THE
2831                                                                          ;ARGUMENTS.
2832 014414  016100  000020                  MOV     20(R1),R0               ;GET THE FPS BEFORE EXECUTION.
2833 014420  170100                          LDFPS   R0                      ;LOAD IT INTO THE FPS.
2834
2835 014422  012737  014444  001236          MOV     #1$,$TMP2               ;SAVE ADDRESS OF CMPD INSTRUCTION.
2836 014430  010100                          MOV     R1,R0                   ;GET ADDRESS OF AC OPERAND.
2837 014432  172410                          LDD     (R0),AC0                ;LOAD AC0 OPERAND
2838
2839 014434  010100                          MOV     R1,R0                   ;COMPUTE FSRC OPERAND
2840 014436  062700  000010                  ADD     #10,R0                  ;ADDRESS
2841
2842 014442  000240                          NOP                             ;FOR SCOPING.
2843 014444  173410                  1$:     CMPD    (R0),AC0                ;EXECUTE THE TEST INSTRUCTION.
2844
2845 014446  170205                          STFPS   R5                      ;SAVE FPS AFTER INSTRUCTION.
2846
2847 014450  016104  000022                  MOV     22(R1),R4               ;GET EXPECTED FPS.
2848                                                                          ;IF INCORRECT SET UP FOR
2849 014454  010137  001240                  MOV     R1,$TMP3                ;AN ERROR CALL.
2850 014460  010137  001242                  MOV     R1,$TMP4
2851 014464  062737  000010  001242          ADD     #10,$TMP4
2852 014472  010537  001244                  MOV     R5,$TMP5
2853 014476  010437  001246                  MOV     R4,$TMP6
2854 014502  020405                          CMP     R4,R5                   ;WAS FPS CORRECT?
2855 014504  001410                          BEQ     3$                      ;BRANCH IF YES.
2856
2857
2858 014506  026105  000024                  CMP     24(R1),R5               ;WAS THE FPS THE SAME
```

```
                                                                        ;AS THE EXPECTED INCORRECT FPS?
014512  001003                        BNE     2$                      ;BRANCH IF NO MATCH.

014514  062701  000026                ADD     #26,R1                  ;IF THE EXPECTED INCORRECT
                                                              ;FPS MATCHED THE RESULTANT FPS
014520  000111                        JMP     (R1)                    ;RETURN TO THE ERROR CALL
                                                                        ;IN THE CALLING ROUTINE.

014522  104001              2$:       ERROR   +1                      ;OTHERWISE REPORT INCORRECT FPS
014524  000411                        BR      5$

014526  012700  014572      3$:       MOV     #CMPTMP,R0              ;IF FPS WAS CORRECT MAKE SURE
014532  174010                        STD     AC0,(R0)                ;AC0 WAS NOT AFFECTED BY CMPD.
014534  010102                        MOV     R1,R2
014536  012703  000004                MOV     #4,R3
014542  022220              4$:       CMP     (R2)+,(R0)+
014544  001003                        BNE     6$
014546  077303                        SOB     R3,4$

014550  000161  000030      5$:       JMP     30(R1)                  ;RETURN

014554                      6$:                                       ;REPORT AC0 MODIFIED BY CMPD
014554  010137  001240                MOV     R1,$TMP3
014560  012737  014572  001242        MOV     #CMPTMP,$TMP4
014566  104002              7$:       ERROR   +2
014570  000767                        BR      5$                      ;RETURN

014572  000000  000000  000000  CMPTMP: .WORD   0,0,0,0


014602                      AAADONE:
        014602  104412                RSETUP                          ;GO INITIALIZE THE FPS AND STACK; AND
                                                                        ;SEE IF THE USER HAS EXPRESSED
                                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                        ;THE USER TYPED CONTROL G?).
```

TEST # 5 - DIVD WITH (FSRC=0) AND (BUT FD) TEST

```
2902                                    .SBTTL  TEST # 5 - DIVD WITH (FSRC=0) AND (BUT FD) TEST
                                        ;;*****************************************************************
                                        ;*TEST 5        DIVD WITH (FSRC=0) AND (BUT FD) TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE DIVD INSTRUCTION WITH A
                                        ;*ZERO DIVISOR. THE CONDITION IS CHECKED WITH BOTH
                                        ;*TRAP ENABLED AND TRAPS DISABLED.
                                        ;*
                                        ;;*****************************************************************
     014604  000004                     TST5:   SCOPE
2903
2904                                    ;FIRST TEST DIVD WITH (FSRC=AC=0) AND TRAPS DISABLED.
2905 014606  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2906 014610  012704  040200             BBB0:   MOV     #40200,R4       ;SET UP FPS
2907                                             ;WITH INTERRUPTS
2908                                             ;DISABLED.
2909 014614  170104                             LDFPS   R4
2910 014616  012737  015060  000244             MOV     #BBBER1,FPVECT;SET UP FOR ANY FP INTERRUPTS.
2911 014624  012737  014644  001236             MOV     #BBB1,$TMP2
2912 014632  012700  015264                     MOV     #BBBP1,R0       ;SET UP AC0 = 0
2913 014636  172410                             LDD     (R0),AC0
2914 014640  012701  015264                     MOV     #BBBP1,R1       ;FSRC = 0
2915
2916 014644  174411                     BBB1:   DIVD    (R1),AC0        ;TEST INSTRUCTION
2917
2918 014646  170205                             STFPS   R5              ;GET FPS
2919 014650  170303                             STST    R3              ;GET FEC
2920
2921 014652  012704  140204                     MOV     #140204,R4      ;EXPECTED FPS.
2922 014656  020405                             CMP     R4,R5           ;IS FPS CORRECT.
2923 014660  001131                             BNE     BBBER2          ;IF INCORRECT BRANCH.
2924
2925 014662  012702  000004                     MOV     #4,R2           ;EXPECTED FEC.
2926 014666  020203                             CMP     R2,R3           ;IS FEC CORRECT?
2927 014670  001140                             BNE     BBBER3          ;IF INCORRECT BRANCH.
2928
2929                                    ;TEST DIVD WITH (FSRC=0) AND TRAPS DISABLED.
2930 014672                             BBB2:
     014672  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2931 014674  012704  040200                     MOV     #40200,R4       ;LOAD FPS WITH TRAPS DISABLED.
2932 014700  170104                             LDFPS   R4
2933
2934 014702  012737  014722  001236             MOV     #BBB3,$TMP2
2935 014710  012700  015274                     MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
2936 014714  172410                             LDD     (R0),AC0
2937 014716  012700  015264                     MOV     #BBBP1,R0       ;FSRC=0
2938 014722  174410                     BBB3:   DIVD    (R0),AC0
2939
2940 014724  170205                             STFPS   R5              ;GET FPS.
2941 014726  170303                             STST    R3              ;GET FEC.
2942
2943 014730  012704  140200                     MOV     #140200,R4              ;EXPECTED FPS.
2944 014734  020405                             CMP     R4,R5           ;IS FPS CORRECT?
2945 014736  001102                             BNE     BBBER2          ;IF INCORRECT BRANCH.
2946
2947 014740  012702  000004                     MOV     #4,R2           ;EXPECTED FEC.
2948 014744  020203                             CMP     R2,R3           ;WAS FEC CORRECT?
```

TEST # 5 - DIVD WITH (FSRC=0) AND (BUT FD) TEST

```
2949 014746  001111                          BNE     BBBER3          ;IF INCORRECT BRANCH.
2950
2951                                ;TEST DIVD WITH FSRC=0) AND TRAPS ENABLED.
2952 014750                         BBB4:
     014750  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
2953 014752  012704  000200                 MOV     #200,R4         ;SET UP FPS. TRAP ENABLED.
2954 014756  170104                         LDFPS   R4
2955
2956 014760  012737  015006  001236         MOV     #BBB5,$TMP2
2957 014766  012700  015274                 MOV     #BBBP2,R0       ;SET UP AC0 OPERAND (NON ZERO).
2958 014772  172410                         LDD     (R0),AC0
2959
2960 014774  012737  015014  000244         MOV     #BBB6,FPVECT    ;SET UP FOR THE EXPECTED INTERRUPT.
2961 015002  012700  015264                 MOV     #BBBP1,R0       ;FSRC=0
2962
2963 015006  174410                 BBB5:   DIVD    (R0),AC0        ;TEST INSTRUCTION (SHOULD RESULT IN TRAP).
2964 015010  170000                         CFCC
2965
2966 015012  000502                         BR      BBBER4          ;GO REPORT FAILURE, NO TRAP.
2967
2968 015014  022716  015010         BBB6:   CMP     #BBB5+2,(SP)    ;TRAP TO HERE WHEN THE DIVISION BY 0
2969                                                                 ;OCCURS. FIRST SEE IF THE ADDRESS OF
2970                                                                 ;THE TRAP IS 2+THE ADDRESS OF THE TEST
2971                                                                 ;DIVD INSTRUCTION.
2972 015020  001402                         BEQ     1$
2973 015022  000137  037450                 JMP     FPSPUR  ;IF NOT THEN REPORT AN UNEXPECTED
2974                                                                 ;FP TRAP.
2975 015026  170205                 1$:     STFPS   R5              ;GET FPS.
2976 015030  170303                         STST    R3              ;GET FEC.
2977 015032  022626                         CMP     (SP)+,(SP)+     ;RESET THE STACK.
2978
2979 015034  012704  100200                 MOV     #100200,R4      ;EXPECTED FPS.
2980 015040  020405                         CMP     R4,R5           ;IS FPS CORRECT?
2981 015042  001040                         BNE     BBBER2          ;IF INCORRECT BRANCH.
2982
2983 015044  012702  000004                 MOV     #4,R2           ;EXPECTED FEC.
2984 015050  020203                         CMP     R2,R3           ;IS FEC CORRECT?
2985 015052  001047                         BNE     BBBER3          ;IF INCORRECT BRANCH.
2986
2987 015054  000137  015304                 JMP     BBBDONE         ;OTHERWISE GO TO NEXT TEST.
2988
2989
2990                                ;TRAP HERE IF AN UNEXPECTED INTERRUPT OCCURS.
2991 015060  062737  000002  001236 BBBER1: ADD     #2,$TMP2        ;SEE IF THE INTERRUPT OCCURRED
2992                                                                 ;DURING THE EXECUTION OF THE DIVD
2993                                                                 ;INSTRUCTION BEING TESTED.
2994 015066  021637  001236                 CMP     (SP),$TMP2
2995 015072  001402                         BEQ     1$
2996 015074  000137  037450                 JMP     FPSPUR  ;IF NOT REPORT UNEXPECTED FP TRAP.
2997
2998 015100  022626                 1$:     CMP     (SP)+,(SP)+     ;RESET THE STACK.
2999 015102  170303                         STST    R3              ;GET FEC.
3000 015104  170205                         STFPS   R5              ;GET FPS.
3001 015106  012737  000004  001240         MOV     #4,$TMP3        ;EXPECTED FEC.
3002 015114  010337  001242                 MOV     R3,$TMP4
3003 015120  010537  001244                 MOV     R5,$TMP5
3004 015124  010037  001250                 MOV     R0,$TMP7
```

TEST # 5 - DIVD WITH (FSRC=0) AND (BUT FD) TEST

```
3005 015130  012737  140200  001246          MOV     #140200,$TMP6
3006 015136  104017                  2$:     ERROR   +17             ;REPORT (BUT FD) FAILED RESULTING IN AN FP TRAP
3007                                                                  ;WITH TRAPS DISABLED.
3008 015140  000137  015304                  JMP     BBBDONE
3009
3010                                 ;REPORT FPS INCORRECT:
3011 015144  010537  001242          BBBER2: MOV     R5,$TMP4
3012 015150  010437  001244                  MOV     R4,$TMP5
3013 015154  010037  001246                  MOV     R0,$TMP6
3014 015160  010137  001250                  MOV     R1,$TMP7
3015 015164  104020                  1$:     ERROR   +20
3016 015166  000137  015304                  JMP     BBBDONE
3017
3018                                 ;REPORT FEC INCORRECT:
3019 015172  010337  001242          BBBER3: MOV     R3,$TMP4
3020 015176  010237  001240                  MOV     R2,$TMP3
3021 015202  010037  001246                  MOV     R0,$TMP6
3022 015206  010137  001250                  MOV     R1,$TMP7
3023 015212  104021                  1$:     ERROR   +21
3024 015214  000137  015304                  JMP     BBBDONE
3025
3026                                 ;REPORT NO TRAP OCCURRED AFTER TRYING TO DIVIDE
3027                                 ;BY ZERO WITH ALL TRAPS ENABLED.
3028 015220  170303                  BBBER4: STST    R3              ;GET FEC.
3029 015222  170205                          STFPS   R5              ;GET FPS.
3030 015224  012737  000004  001242          MOV     #4,$TMP4
3031 015232  010337  001240                  MOV     R3,$TMP3
3032 015236  010537  001244                  MOV     R5,$TMP5
3033 015242  012737  100200  001246          MOV     #100200,$TMP6
3034 015250  010037  001250                  MOV     R0,$TMP7
3035 015254  010137  001252                  MOV     R1,$TMP10
3036 015260  104022                  1$:     ERROR   +22
3037 015262  000410                          BR      BBBDONE
3038
3039 015264  000000  000000  000000  BBBP1:  .WORD   0,0,0,0
3040 015274  012345  054321  023456  BBBP2:  .WORD   12345,54321,23456,76543
3041
3042
3043
3044 015304                           BBBDONE:
     015304  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                      ;SEE IF THE USER HAS EXPRESSED
                                                                      ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                      ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                      ;THE USER TYPED CONTROL G?).
3045
3046
3054
```

```
                                        .SBTTL  TEST # 6 - DIVF TEST
                                        ;*****************************************************************
                                        ;*TEST 6        DIVF TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE DIVF INSTRUCTION. NOTE THAT A SUBROUTINE IS
                                        ;*USED TO SET UP THE OPERANDS, EXECUTE THE INSTRUCTION AND CHECK THE
                                        ;*RESULTS.
                                        ;*
                                        ;*****************************************************************
015306  000004                          TST6:   SCOPE

                                        ;CHECK DIVF WITH (AC=0).
015310                                  CCC1:
015310  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015312  004737  016070                          JSR     PC,DIVFSUB
015316  000000  000000              1$:     .WORD   0,0                     ;AC
015322  012345  067012              2$:     .WORD   12345,67012             ;FSRC
015326  000000  000000              3$:     .WORD   0,0                     ;RES
015332  000000                      4$:     0                               ;FPS BEFORE EXECUTION.
015334  000004                              4                               ;FPS AFTER EXECUTION
015336  012345  067012              5$:     .WORD   12345,67012             ;ERROR RESULT
015342  104023                      6$:     ERROR   +23                     ;RESULT BAD.

                                        ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE AND IN ROUND MODE.
015344                                  CCC2:
015344  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015346  004737  016070                          JSR     PC,DIVFSUB
015352  065652  125252              1$:     .WORD   65652,125252            ;AC
015356  065600  000000              2$:     .WORD   65600,0                 ;FSRC
015362  040252  125252              3$:     .WORD   40252,125252            ;RES
015366  003000                      4$:     3000                            ;FPS BEFORE EXECUTION.
015370  003000                              3000                            ;FPS AFTER EXECUTION.
015372  040052  125252              5$:     .WORD   40052,125252            ;ERROR RESULT.
015376  104024                      6$:     ERROR   +24                     ;DIV NORMALIZE FAILURE

                                        ;TEST DIVF WITH AC POSITIVE, FSRC POSITIVE.
015400                                  CCC3:
015400  104413                                  LPERR                   ;SE1 UP THE LOOP ON ERROR ADDRESS.
015402  004737  016070                          JSR     PC,DIVFSUB
015406  076400  000000              1$:     .WORD   76400,0                 ;AC
015412  076400  000000              2$:     .WORD   76400,0                 ;FSRC
015416  040200  000000              3$:     .WORD   40200,0                 ;RES
015422  001000                      4$:     1000                            ;FPS BEFORE EXECUTION.
015424  001000                              1000                            ;FPS AFTER EXECUTION.
015426  140200  000000              5$:     .WORD   140200,0                ;ERROR RES.

015432  104025                      6$:     ERROR   +25                     ;SIGN BAD.

                                        ;TEST DIVF WITH BOTH OPERANDS POSITIVE.
015434                                  CCC4:
015434  104413                                  LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015436  004737  016070                          JSR     PC,DIVFSUB
015442  056777  177777              1$:     .WORD   56777,177777            ;AC
015446  054200  000000              2$:     .WORD   54200,0                 ;FSRC
015452  042777  177777              3$:     .WORD   42777,177777            ;RES
015456  000000                      4$:     0                               ;FPS BEFORE EXECUTION.
015460  000000                              0                               ;FPS AFTER EXECUTION.
```

```
015462  002000  002000          5$:     .WORD   2000,2000       ;ERROR RES.
015466  104023                  6$:     ERROR   +23

                                ;TEST THE DIVF INSTRUCTION:
015470                          CCC5:
015470  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015472  004737  016070                  JSR     PC,DIVFSUB
015476  012377  177777          1$:     .WORD   12377,177777    ;AC
015502  012300  000000          2$:     .WORD   12300,0         ;FSRC
015506  040252  125252          3$:     .WORD   40252,125252    ;RES
015512  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
015514  000000                          0                       ;FPS AFTER EXECUTION.
015516  177777  177777          5$:     .WORD   -1,-1           ;ERROR RES.
015522  104023                  6$:     ERROR   +23

                                ;TEST DIVIDE ALGORITHM. TEST ROUND CONSTANT.
015524                          CCC6:
015524  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015526  004737  016070                  JSR     PC,DIVFSUB
015532  064600  000001          1$:     .WORD   64600,1         ;AC
015536  066600  000000          2$:     .WORD   66600,0         ;FSRC
015542  036200  000001          3$:     .WORD   36200,1         ;RES
015546  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
015550  000000                          0                       ;FPS AFTER EXECUTION.
015552  003000  003000          5$:     .WORD   3000,3000       ;ERROR RES.
015556  104023                  6$:     ERROR   +23

                                ;TEST DIVF.
015560                          CCC7:
015560  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015562  004737  016070                  JSR     PC,DIVFSUB
015566  034577  177776          1$:     .WORD   34577,177776    ;AC
015572  023400  000000          2$:     .WORD   23400,0         ;FSRC
015576  051377  177776          3$:     .WORD   51377,177776    ;RES
015602  000017                  4$:     17                      ;FPS BEFORE EXECUTION.
015604  000000                          0                       ;FPS AFTER EXECUTION.
015606  003400  003400          5$:     .WORD   3400,3400       ;ERROR RES.
015612  104023                  6$:     ERROR   +23


                                ;DIVF TEST.
015614                          CCC8:
015614  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015616  004737  016070                  JSR     PC,DIVFSUB
015622  067652  125252          1$:     .WORD   67652,125252    ;AC
015626  056500  000000          2$:     .WORD   56500,0         ;FSRC
015632  051343  107070          3$:     .WORD   51343,107070    ;RES
015636  000000                  4$:     0                       ;FPS BEFORE EXECUTION.
015640  000000                          0                       ;FPS AFTER EXECUTION.
015642  051543  107070          5$:     .WORD   51543,107070    ;ERROR RES.
015646  104026                  6$:     ERROR   +26             ;DIDN'T INCREMENT THE EXPONENT
                                                                ;AFTER DIVID NORMALIZATION.

                                ;DIVF WITH AC NEGATIVE, FSRC NEGATIVE.
015650                          CCC9:
015650  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
015652  004737  016070                  JSR     PC,DIVFSUB
```

```
3151 015656  140400  000000          1$:     .WORD   140400,0         ;AC
3152 015662  140500  000000          2$:     .WORD   140500,0         ;FSRC
3153 015666  040052  125253          3$:     .WORD   040052,125253    ;RES
3154 015672  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
3155 015674  000000                          0                        ;FPS AFTER EXECUTION.
3156 015676  140052  125253          5$:     .WORD   140052,125253    ;ERROR RES.
3157 015702  104027                  6$:     ERROR   +27              ;BAD SIGN.
3158
3159                                  ;DIVF WITH AC NEGATIVE AND FSRC POSITIVE.
3160 015704                           CCC10:
     015704  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3161 015706  004737  016070                  JSR     PC,DIVFSUB
3162 015712  160077  000000          1$:     .WORD   160077,0         ;AC
3163 015716  040277  000000          2$:     .WORD   40277,0          ;FSRC
3164 015722  160000  000000          3$:     .WORD   160000,0         ;RES
3165 015726  000007                  4$:     7                        ;FPS BEFORE EXECUTION.
3166 015730  000010                          10                       ;FPS AFTER EXECUTION.
3167 015732  060000  000000          5$:     .WORD   60000,0          ;ERROR RES.
3168 015736  104027                  6$:     ERROR   +27              ;BAD SIGN.
3169
3170                                  ;DIVF WITH AC POSITIVE AND FSRC NEGATIVE.
3171 015740                           CCC11:
     015740  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3172 015742  004737  016070                  JSR     PC,DIVFSUB
3173 015746  040400  000000          1$:     .WORD   40400,0          ;AC
3174 015752  140500  000000          2$:     .WORD   140500,0         ;FSRC
3175 015756  140052  125253          3$:     .WORD   140052,125253    ;RES
3176 015762  000017                  4$:     17                       ;FPS BEFORE EXECUTION.
3177 015764  000010                          10                       ;FPS AFTER EXECUTION.
3178 015766  040052  125253          5$:     .WORD   40052,125253     ;ERROR RES.
3179 015772  104027                  6$:     ERROR   +27              ;BAD SIGN.
3180
3181
3182                                  ;TEST DIVF BOTH OPERANDS POSITIVE AND TRUNCATE MODE.
3183 015774                           CCC12:
     015774  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3184 015776  004737  016070                  JSR     PC,DIVFSUB
3185 016002  060100  000001          1$:     .WORD   60100,1          ;AC
3186 016006  040300  000000          2$:     .WORD   40300,0          ;FSRC
3187 016012  060000  000000          3$:     .WORD   60000,0          ;RES
3188 016016  000052                  4$:     52                       ;FPS BEFORE EXECUTION.
3189 016020  000040                          40                       ;FPS AFTER EXECUTION.
3190 016022  060000  000001          5$:     .WORD   60000,1          ;ERROR RES.
3191 016026  104030                  6$:     ERROR   +30              ;TRUNCATION ERROR
3192
3193                                  ;DIVF WITH POSITIVE OPERANDS AND ROUND MODE.
3194 016030                           CCC13:
     016030  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3195 016032  004737  016070                  JSR     PC,DIVFSUB
3196 016036  060100  000001          1$:     .WORD   60100,1          ;AC
3197 016042  040300  000000          2$:     .WORD   40300,0          ;FSRC
3198 016046  060000  000001          3$:     .WORD   60000,1          ;RES
3199 016052  000005                  4$:     5                        ;FPS BEFORE EXECUTION.
3200 016054  000000                          0                        ;FPS AFTER EXECUTION.
3201 016056  060000  000000          5$:     .WORD   60000,0          ;ERROR RES.
3202 016062  104031                  6$:     ERROR   +31              ;ROUND ERROR.
3203
```

```
3204 016064  000137  016314                    JMP     CCCDONE ;GO TO NEXT TEST.
3205
3206                                    ;THIS SUBROUTINE, DIVFSUB, IS CALLED TO SET UP, EXECUTE
3207                                    ;AND CHECK THE RESULT OF A DIVF INSTRUCTION. IT IS CALLED THUS:
3208                                    ;
3209                                    ;       JSR     PC,DIVFSUB
3210                                    ;ACARG: .WORD   X,X                     ;AC OPERAND
3211                                    ;FSRCARG:.WORD  X,X                     ;FSRC OPERAND
3212                                    ;RES:   .WORD   X,X                     ;EXPECTED RESULT
3213                                    ;FPSB:  .WORD   X                       ;FPS BEFORE EXECUTION
3214                                    ;FPSA:  .WORD   X                       ;FPS AFTER EXECUTION
3215                                    ;ERRES: .WORD   X,X                     ;ERROR RESULT
3216                                    ;ERR:   ERROR   +X                      ;RESULT ERROR
3217                                    ;CONT:                                  ;RETURN ADDRESS
3218                                    ;
3219                                    ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
3220                                    ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVF IS EXECUTED.
3221                                    ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
3222                                    ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
3223                                    ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
3224                                    ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
3225                                    ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
3226                                    ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
3227                                    ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
3228                                    ;THEN THE FAILURE IS REPORTED IN DIVFSUB AND CONTROL IS PASSED TO
3229                                    ;CONT. IF NO ERRORS ARE DETECTED THEN DIVFSUB RETURNS CONTROL
3230                                    ;TO CONT.
3231
3232 016070  012601                    DIVFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
3233 016072  012700  000200                    MOV     #200,R0         ;SET FD MODE.
3234 016076  170100                    LDFPS   R0
3235 016100  010100                    MOV     R1,R0           ;LOAD THE AC OPERAND.
3236 016102  172410                    LDD     (R0),AC0
3237 016104  016100  000014                    MOV     14(R1),R0       ;LOAD THE FPS
3238 016110  170100                    LDFPS   R0
3239 016112  012737  016126  001236            MOV     #1$,$TMP2
3240 016120  010100                    MOV     R1,R0
3241 016122  062700  000004                    ADD     #4,R0           ;ESTABLISH A POINTER TO FSRC.
3242
3243 016126  174410                    1$:     DIVF    (R0),AC0        ;TEST INSTRUCTION.
3244
3245 016130  170204                    STFPS   R4              ;GET THE FPS.
3246 016132  012700  000200                    MOV     #200,R0         ;SET FD MODE
3247 016136  170100                    LDFPS   R0
3248
3249 016140  012700  016304                    MOV     #DIVFT,R0       ;GET THE RESULT OF THE DIVF.
3250 016144  174010                    STD     AC0,(R0)
3251
3252 016146  010102                    MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
3253 016150  010237  001240                    MOV     R2,$TMP3
3254 016154  062702  000004                    ADD     #4,R2
3255 016160  010237  001242                    MOV     R2,$TMP4
3256 016164  062702  000004                    ADD     #4,R2
3257 016170  010237  001244                    MOV     R2,$TMP5
3258 016174  012737  016304  001246            MOV     #DIVFT,$TMP6
3259 016202  010437  001250                    MOV     R4,$TMP7
3260 016206  016137  000016  001252            MOV     16(R1),$TMP.0
```

```
3261
3262 016214  021061  000010                  CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
3263 016220  001011                          BNE     10$             ;IF INCORRECT BRANCH.
3264 016222  026061  000002  000012          CMP     2(R0),12(R1)
3265 016230  001005                          BNE     10$
3266
3267 016232  026104  000016                  CMP     16(R1),R4       ;IS FPS CORRECT?
3268 016236  001020                          BNE     15$             ;IF INCORRECT BRANCH.
3269 016240  000161  000026                  JMP     26(R1)          ;IF NO ERRORS OCCURRED RETURN.
3270
3271 016244  021061  000020          10$:    CMP     (R0),20(R1)     ;DOES THE INCORRECT RESULT
3272 016250  001010                          BNE     11$             ;MATCH THE ANTICIPATED INCORRECT RESULT.
3273 016252  026061  000002  000022          CMP     2(R0),22(R1)
3274 016260  001004                          BNE     11$             ;BRANCH IF NO.
3275
3276 016262  010102                          MOV     R1,R2           ;IT MATCHED SO RETURN TO THE ERROR
3277                                                                  ;REPORT AT THE CALLING ROUTINE.
3278 016264  062702  000024                  ADD     #24,R2
3279 016270  000112                          JMP     (R2)
3280
3281 016272                          11$:                            ;REPORT RESULT INCORRECT.
3282 016272  104023                  12$:    ERROR   +23
3283 016274  000167  000026          13$:    JMP     26(R1)
3284
3285 016300                          15$:                            ;REPORT FPS INCORRECT.
3286 016300  104032                  16$:    ERROR   +32
3287 016302  000774                          BR      13$
3288
3289 016304  000000  000000  000000  DIVFT:  .WORD   0,0,0,0
3290
3291 016314                          CCCDONE:
     016314  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                      ;SEE IF THE USER HAS EXPRESSED
                                                                      ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                      ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                      ;THE USER TYPED CONTROL G?).
3292
3293
3300
```

```
3301                                    .SBTTL  TEST # 7 - DIVD TEST
                                        ;*****************************************************************
                                        ;*TEST 7        DIVD TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE DIVD INSTRUCTION. NOTE THAT A SUBROUTINE IS
                                        ;*USED TO SET UP THE OPERANDS. EXECUTE THE INSTRUCTION AND CHECK THE RESULTS.
                                        ;*
                                        ;*****************************************************************
    016316  000004                      TST7:   SCOPE
3302
3303                                    ;DIVD TEST WITH POSITIVE OPERANDS AND IN ROUND MODE.
3304 016320                             DDD1:
    016320  104413                              LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3305 016322  004737  017010                    JSR     PC,DIVDSUB
3306 016326  034277  000000  000000    1$:     .WORD   34277,0,0,0     ;AC
3307 016336  040277  000000  000000    2$:     .WORD   40277,0,0,0     ;FSRC
3308 016346  034200  000000  000000    3$:     .WORD   34200,0,0,0     ;RES
3309 016356  000200                    4$:     200                     ;FPS BEFORE EXECUTION.
3310 016360  000200                            200                     ;FPS AFTER EXECUTION.
3311 016362  177777  177777  177777    5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
3312 016372  104033                    6$:     ERROR   +33
3313
3314                                    ;DIVD WITH AC NEGATIVE AND FSRC POSITIVE IN TRUNCATE MODE.
3315 016374                             DDD2:
    016374  104413                              LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3316 016376  004737  017010                    JSR     PC,DIVDSUB
3317 016402  134277  000000  000000    1$:     .WORD   134277,0,0,0    ;AC
3318 016412  040277  000000  000000    2$:     .WORD   40277,0,0,0     ;FSRC
3319 016422  134200  000000  000000    3$:     .WORD   134200,0,0,0    ;RES
3320 016432  000207                    4$:     207                     ;FPS BEFORE EXECUTION.
3321 016434  000210                            210                     ;FPS AFTER EXECUTION.
3322 016436  177777  177777  177777    5$:     .WORD   -1,-1,-1,-1     ;ERROR RESULT.
3323 016446  104033                    6$:     ERROR   +33
3324
3325                                    ;DIVD TEST WITH OPERANDS BOTH NEGATIVE AND IN TRUNCATE MODE.
3326 016450                             DDD3:
    016450  104413                              LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3327 016452  004737  017010                    JSR     PC,DIVDSUB
3328 016456  134300  000000  000000    1$:     .WORD   134300,0,0,1    ;AC
3329 016466  140300  000000  000000    2$:     .WORD   140300,0,0,0    ;FSRC
3330 016476  034200  000000  000000    3$:     .WORD   34200,0,0,0     ;RES
3331 016506  000250                    4$:     250                     ;FPS BEFORE EXECUTION.
3332 016510  000240                            240                     ;FPS AFTER EXECUTION.
3333 016512  034200  000000  000000    5$:     .WORD   34200,0,0,1     ;ERROR RES.
3334 016522  104035                    6$:     ERROR   +35             ;TRUNCATION ERROR.
3335
3336                                    ;DIVD WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
3337 016524                             DDD4:
    016524  104413                              LPERR                   ;SET UP THE LOOP O  ERROR ADDRESS.
3338 016526  004737  017010                    JSR     PC,DIVDSUB
3339 016532  034300  000000  000000    1$:     .WORD   34300,0,0,1     ;AC
3340 016542  140300  000000  000000    2$:     .WORD   140300,0,0,0    ;FSRC
3341 016552  134200  000000  000000    3$:     .WORD   134200,0,0,1    ;RES
3342 016562  000207                    4$:     207                     ;FPS BEFORE EXECUTION.
3343 016564  000210                            210                     ;FPS AFTER EXECUTION.
3344 016566  134200  000000  000000    5$:     .WORD   134200,0,0,0    ;ERROR RES.
3345 016576  104036                    6$:     ERROR   +36             ;ROUND ERROR.
```

```
                                        ;DIVD TEST.
016600                                  DDD5:
016600  104413                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
016602  004737  017010                        JSR     PC,DIVDSUB
016606  100400  000000  000000        1$:     .WORD   100400,0,0,0    ;AC
016616  000500  000000  000000        2$:     .WORD   500,0,0,0       ;FSRC
016626  140052  125252                3$:     .WORD   140052,125252   ;RES
016632  125252  125252                        .WORD   125252,125252
016636  007647                        4$:     7647                    ;FPS BEFORE EXECUTION.
016640  007650                                7650                    ;FPS AFTER EXECUTION.
016642  177777  177777  177777        5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
016652  104033                        6$:     ERROR   +33

                                        ;DIVD TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
016654                                  DDD6:
016654  104413                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
016656  004737  017010                        JSR     PC,DIVDSUB
016662  000400  000000  000000        1$:     .WORD   400,0,0,0       ;AC
016672  100500  000000  000000        2$:     .WORD   100500,0,0,0    ;FSRC
016702  140052  125252                3$:     .WORD   140052,125252   ;RES
016706  125252  125253                        .WORD   125252,125253
016712  007707                        4$:     7707                    ;FPS BEFORE EXECUTION.
016714  007710                                7710                    ;FPS AFTER EXECUTION.
016716  177777  177777  177777        5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
016726  104033                        6$:     ERROR   +33

                                        ;DIVD TEST.
016730                                  DDD7:
016730  104413                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
016732  004737  017010                        JSR     PC,DIVDSUB
016736  170360  170360                1$:     .WORD   170360,170360   ;AC
016742  170360  170360                        .WORD   170360,170360
016746  170360  170360                2$:     .WORD   170360,170360   ;FSRC
016752  170360  170360                        .WORD   170360,170360
016756  040200  000000  000000        3$:     .WORD   40200,0,0,0     ;RES
016766  007717                        4$:     7717                    ;FPS BEFORE EXECUTION.
016770  007700                                7700                    ;FPS AFTER EXECUTION.
016772  177777  177777  177777        5$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
017002  104033                        6$:     ERROR   +33

017004  000137  017250                        JMP     DDDDONE ;GO TO NEXT TEST.


                                        ;THIS SUBROUTINE, DIVDSUB, IS CALLED TO SET UP, EXECUTE
                                        ;AND CHECK THE RESULT OF A DIVD INSTRUCTION. IT IS CALLED THUS:
                                        ;
                                        ;               JSR     PC,DIVDSUB
                                        ;       ACARG:  .WORD   X,X,X,X         ;AC OPERAND
                                        ;       FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
                                        ;       RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
                                        ;       FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
                                        ;       FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                        ;       ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
                                        ;       ERR:    ERROR   +X              ;RESULT ERROR
                                        ;       CONT:                           ;RETURN ADDRESS
```

TEST # 7 - DIVD TEST

```
3400                                    ;
3401                                    ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
3402                                    ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, DIVD IS EXECUTED.
```

```
                                        ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
                                        ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
                                        ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
                                        ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
                                        ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
                                        ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
                                        ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
                                        ;THEN THE FAILURE IS REPORTED IN DIVDSUB AND CONTROL IS PASSED TO
                                        ;CONT. IF NO ERRORS ARE DETECTED THEN DIVDSUB RETURNS CONTROL
                                        ;TO CONT.

017010  012601                  DIVDSUB:    MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
017012  012700  000200                      MOV     #200,R0         ;SET FD MODE.
017016  170100                              LDFPS   R0

017020  010100                              MOV     R1,R0           ;SET UP THE AC0 OPERAND.
017022  172410                              LDD     (R0),AC0
017024  016100  000030                      MOV     30(R1),R0       ;LOAD THE FPS.
017030  170100                              LDFPS   R0

017032  012737  017046  001236              MOV     #1$,$TMP2
017040  010100                              MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
017042  062700  000010                      ADD     #10,R0

017046  174410                  1$:         DIVD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.

017050  170204                              STFPS   R4              ;GET THE FPS.
017052  012700  000200                      MOV     #200,R0         ;SET FD MODE.
017056  170100                              LDFPS   R0

017060  012700  017240                      MOV     #DIVDT,R0       ;GET THE RESULT.
017064  174010                              STD     AC0,(R0)

017066  010102                              MOV     R1,R2           ;SAVE DATA IN CASE OF ERROR.
017070  010237  001240                      MOV     R2,$TMP3
017074  062702  000010                      ADD     #10,R2
017100  010237  001242                      MOV     R2,$TMP4
017104  062702  000010                      ADD     #10,R2
017110  010237  001244                      MOV     R2,$TMP5
017114  012737  017240  001246              MOV     #DIVDT,$TMP6
017122  010437  001250                      MOV     R4,$TMP7
017126  016137  000032  001252              MOV     32(R1),$TMP10

017134  010102                              MOV     R1,R2           ;CHECK THE RESULT.
017136  062702  000020                      ADD     #20,R2
017142  012703  017240                      MOV     #DIVDT,R3
017146  012705  000004                      MOV     #4,R5
017152  022223                  2$:         CMP     (R2)+,(R3)+
017154  001006                              BNE     10$             ;BRANCH IF RESULT INCORRECT.
017156  077503                              SOB     R5,2$

017160  026104  000032                      CMP     32(R1),R4       ;IS FPS CORRECT?
017164  001023                              BNE     15$             ;BRANCH IF INCORRECT.
017166  000161  000046                      JMP     46(R1)          ;RETURN.

017172  010102                  10$:        MOV     R1,R2           ;WAS INCORRECT RESULT ANTICIPATED?
017174  062702  000034                      ADD     #34,R2
```

```
3461 017200  012703  017240            MOV     #DIVDT,R3
3462 017204  012705  000004            MOV     #4,R5
3463 017210  022223              11$:  CMP     (R2)+,(R3)+
3464 017212  001005                    BNE     12$             ;BRANCH IF NO.
3465 017214  077503                    SOB     R5,11$
3466 017216  010102                    MOV     R1,R2           ;IF THE INCORRECT RESULT WAS
3467 017220  062702  000044            ADD     #44,R2          ;ANTICIPATED RETURN TO THE
3468                                                           ;ERROR REPORT IN THE CALLING
3469 017224  000112                    JMP     (R2)            ;ROUTINE.
3470
3471 017226                      12$:                          ;REPORT RESULT INCORRECT.
3472 017226  104033              13$:  ERROR   +33
3473 017230  000161  000046      14$:  JMP     46(R1)
3474
3475 017234                      15$:                          ;REPORT FPS INCORRECT.
3476 017234  104034              16$:  ERROR   +34
3477 017236  000774                    BR      14$
3478
3479 017240  000000  000000  000000  DIVDT:  .WORD   0,0,0,0
3480
3481 017250                      DDDDONE:
     017250  104412                    RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                               ;SEE IF THE USER HAS EXPRESSED
                                                               ;THE DESIRE TO CHANGE THE SOFTWARE
                                                               ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                               ;THE USER TYPED CONTROL G?).
3482
3483
3491
```

```
                                .SBTTL  TEST # 10 - MULF TEST
                                ;;*****************************************************************
                                ;*TEST 10        MULF TEST
                                ;*
                                ;*THIS IS A TEST OF THE MULF INSTRUCTION. IT MAKES USE OF A SUBROUTINE
                                ;*TO SET UP THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND CHECK THE
                                ;*RESULTS.
                                ;*
                                ;;*****************************************************************
     017252  000004             TST10:  SCOPE

                                ;MULF WITH (FSRC=AC=0)
                                EEE1:
     017254  104413                     LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
     017256  004737  020034             JSR     PC,MULFSUB
     017262  000000  000000     1$:     .WORD   0,0             ;AC
     017266  000000  000000     2$:     .WORD   0,0             ;FSRC
     017272  000000  000000     3$:     .WORD   0,0             ;RES
     017276  007517             4$:     7517                    ;FPS BEFORE EXECUTION.
     017300  007504                     7504                    ;FPS AFTER EXECUTION.
     017302  177777  177777     5$:     .WORD   -1,-1
     017306  104037             6$:     ERROR   +37

                                ;MULF WITH (FSRC=0).
                                EEE2:
     017310  104413                     LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
     017312  004737  020034             JSR     PC,MULFSUB
     017316  071625  034435     1$:     .WORD   71625,34435     ;AC
     017322  000000  000000     2$:     .WORD   0,0             ;FSRC
     017326  000000  000000     3$:     .WORD   0,0             ;RES
     017332  000013             4$:     13                      ;FPS BEFORE EXECUTION.
     017334  000004                     4                       ;FPS AFTER EXECUTION.
     017336  177777  177777     5$:     .WORD   -1,-1           ;ERROR RES.
     017342  104037             6$:     ERROR   +37

                                ;MULF WITH (AC=0)
                                EEE3:
     017344  104413                     LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
     017346  004737  020034             JSR     PC,MULFSUB
     017352  000000  000000     1$:     .WORD   0,0             ;AC
     017356  071625  153443     2$:     .WORD   071625,153443   ;FSRC
     017362  000000  000000     3$:     .WORD   0,0             ;RES
     017366  007500             4$:     7500                    ;FPS BEFORE EXECUTION.
     017370  007504                     7504                    ;FPS AFTER EXECUTION.
     017372  177777  177777     5$:     .WORD   -1,-1           ;ERROR RES.
     017376  104037             6$:     ERROR   +37

                                ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
                                EEE4:
     017400  104413                     LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
     017402  004737  020034             JSR     PC,MULFSUB
     017406  040200  000000     1$:     .WORD   40200,0         ;AC
     017412  040177  177777     2$:     .WORD   40177,-1        ;FSRC
     017416  040177  177777     3$:     .WORD   40177,-1        ;RES
     017422  000017             4$:     17                      ;FPS BEFORE EXECUTION.
     017424  000000                     0                       ;FPS AFTER EXECUTION.
     017426  140177  177777     5$:     .WORD   140177,-1       ;ERROR RES.
```

```
                                                                    M 6
3536 017432  104041                 6$:     ERROR   +41             ;BAD SIGN.
3537
3538                                ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN TRUNCATE MODE.
3539 017434                         EEE5:
     017434  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3540 017436  004737  020034                 JSR     PC,MULFSUB
3541 017442  040177  177777         1$:     .WORD   40177,-1        ;AC
3542 017446  040200  000000         2$:     .WORD   40200,0         ;FSRC
3543 017452  040177  177777         3$:     .WORD   40177,-1        ;RES
3544 017456  000040                 4$:     40                      ;FPS BEFORE EXECUTION.
3545 017460  000040                         40                      ;FPS AFTER EXECUTION.
3546 017462  037777  177777         5$:     .WORD   37777,-1        ;ERROR RES.
3547 017466  104042                 6$:     ERROR   +42             ;ST 252 TO 044 INTO 444 (BUT Y62)
3548                                                                 ;MUL. NORMALIZATION FAILURE.
3549
3550                                ;MULF WITH BOTH OPERANDS POSITIVE NORMALIZE TEST.
3551 017470                         EEE6:
     017470  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3552 017472  004737  020034                 JSR     PC,MULFSUB
3553 017476  040100  000000         1$:     .WORD   40100,0         ;AC
3554 017502  040100  000000         2$:     .WORD   40100,0         ;FSRC
3555 017506  040020  000000         3$:     .WORD   40020,0         ;RES
3556 017512  000012                 4$:     12                      ;FPS BEFORE EXECUTION.
3557 017514  000000                         0                       ;FPS AFTER EXECUTION.
3558 017516  042040  000000         5$:     .WORD   42040,0         ;ERROR RES.
3559 017522  104043                 6$:     ERROR   +43             ;ST 252 TO 444 INTO 042 (BUT Y62)
3560                                                                 ;MUL. NORMALIZATION FAILURE.
3561
3562                                ;MULF WITH BOTH OPERANDS POSITIVE IN ROUND MODE.
3563 017524                         EEE7:
     017524  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3564 017526  004737  020034                 JSR     PC,MULFSUB
3565 017532  017500  000000         1$:     .WORD   17500,0         ;AC
3566 017536  023652  125252         2$:     .WORD   23652,125252    ;FSRC
3567 017542  003177  177777         3$:     .WORD   3177,-1         ;RES
3568 017546  007417                 4$:     7417                    ;FPS BEFORE EXECUTION.
3569 017550  007400                         7400                    ;FPS AFTER EXECUTION.
3570 017552  177777  177777         5$:     .WORD   -1,-1
3571 017556  104037                 6$:     ERROR   +37
3572
3573                                ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
3574 017560                         EEE8:
     017560  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3575 017562  004737  020034                 JSR     PC,MULFSUB
3576 017566  040342  000000         1$:     .WORD   40342,0         ;AC
3577 017572  176542  000000         2$:     .WORD   176542,0        ;FSRC
3578 017576  176707  102000         3$:     .WORD   176707,102000   ;RES
3579 017602  000007                 4$:     7                       ;FPS BEFORE EXECUTION.
3580 017604  000010                         10                      ;FPS AFTER EXECUTION.
3581 017606  076507  102000         7$:     .WORD   76507,102000    ;ERROR RES.
3582 017612  104041                 6$:     ERROR   +41             ;BAD SIGN.
3583
3584                                ;MULF WITH AC NEGATIVE AND FSRC POSITIVE IN ROUND MODE.
3585 017614                         EEE9:
     017614  104413                         LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3586 017616  004737  020034                 JSR     PC,MULFSUB
3587 017622  140200  000000         1$:     .WORD   140200,0        ;AC
```

```
3588 017626  007417  007417          2$:     .WORD   7417,7417         ;FSRC
3589 017632  107417  007417          3$:     .WORD   107417,7417      ;RES
3590 017636  000000                  4$:     0                        ;FPS BEFORE EXECUTION.
3591 017640  000010                          10                       ;FPS AFTER EXECUTION.
3592 017642  007417  007417          5$:     .WORD   7417,7417        ;ERROR RES.
3593 017646  104041                  6$:     ERROR   +41              ;BAD SIGN.
3594
3595                                 ;MULF WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
3596 017650                          EEE10:
     017650  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3597 017652  004737  020034                  JSR     PC,MULFSUB
3598 017656  144600  000000          1$:     .WORD   144600,0         ;AC
3599 017662  154000  000000          2$:     .WORD   154000,0         ;FSRC
3600 017666  060400  000000          3$:     .WORD   60400,0          ;RES
3601 017672  000017                  4$:     17                       ;FPS BEFORE EXECUTION.
3602 017674  000000                          0                        ;FPS AFTER EXECUTION.
3603 017676  160400  000000          5$:     .WORD   160400,0         ;ERROR RES.
3604 017702  104041                  6$:     ERROR   +41              ;BAD SIGN.
3605
3606                                 ;MULF BOTH OPERANDS NEGATIVE IN ROUND MODE.
3607 017704                          EEE11:
     017704  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3608 017706  004737  020034                  JSR     PC,MULFSUB
3609 017712  140300  000000          1$:     .WORD   140300,0         ;AC
3610 017716  160000  000001          2$:     .WORD   160000,1         ;FSRC
3611 017722  060100  000002          3$:     .WORD   60100,2          ;RES
3612 017726  000010                  4$:     10                       ;FPS BEFORE EXECUTION.
3613 017730  000000                          0                        ;FPS AFTER EXECUTION.
3614 017732  060100  000001          5$:     .WORD   60100,1          ;ERROR RES.
3615 017736  104044                  6$:     ERROR   +44              ;ROUND FAILURE.
3616
3617                                 ;MULF WITH AC POSITIVE AND FSRC NEGATIVE IN TRUNCATE MODE.
3618 017740                          EEE12:
     017740  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3619 017742  004737  020034                  JSR     PC,MULFSUB
3620 017746  060000  000001          1$:     .WORD   60000,1          ;AC
3621 017752  140300  000000          2$:     .WORD   140300,0         ;FSRC
3622 017756  160100  000001          3$:     .WORD   160100,1         ;RES
3623 017762  007547                  4$:     7547                     ;FPS BEFORE EXECUTION.
3624 017764  007550                          7550                     ;FPS AFTER EXECUTION.
3625 017766  160100  000001          5$:     .WORD   160100,1         ;ERROR RES.
3626 017772  104045                  6$:     ERROR   +45              ;TRUNCATION ERROR.
3627
3628                                 ;MULF WITH AC POSITIVE AND FSRC POSITIVE IN ROUND MODE.
3629 017774                          EEE13:
     017774  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
3630 017776  004737  020034                  JSR     PC,MULFSUB
3631 020002  040277  000000          1$:     .WORD   40277,0          ;AC
3632 020006  060000  000001          2$:     .WORD   60000,1          ;FSRC
3633 020012  060077  000001          3$:     .WORD   60077,1          ;RES
3634 020016  000014                  4$:     14                       ;FPS BEFORE EXECUTION.
3635 020020  000000                          0                        ;FPS AFTER EXECUTION.
3636 020022  060077  000002          5$:     .WORD   60077,2          ;ERROR RES.
3637 020026  104044                  6$:     ERROR   +44              ;ROUND FAILURE. CONSTANT BAD.
3638
3639 020030  000137  020260                  JMP     EEEDONE          ;GO TO THE NEXT TEST.
3640
```

```
3641                                    ;THIS SUBROUTINE, MULFSUB, IS CALLED TO SET UP, EXECUTE
3642                                    ;AND CHECK THE RESULT OF A MULF INSTRUCTION. IT IS CALLED THUS:
3643                                    ;
3644                                    ;       JSR     PC,MULFSUB
3645                                    ;ACARG: .WORD   X,X                     ;AC OPERAND
3646                                    ;FSRCARG:.WORD  X,X                     ;FSRC OPERAND
3647                                    ;RES:   .WORD   X,X                     ;EXPECTED RESULT
3648                                    ;FPSB:  .WORD   X                       ;FPS BEFORE EXECUTION
3649                                    ;FPSA:  .WORD   X                       ;FPS AFTER EXECUTION
3650                                    ;ERRES: .WORD   X,X                     ;ERROR RESULT
3651                                    ;ERR:   ERROR   +X                      ;RESULT ERROR
3652                                    ;CONT:                                  ;RETURN ADDRESS
3653                                    ;
3654                                    ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
3655                                    ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULF IS EXECUTED.
3656                                    ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
3657                                    ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
3658                                    ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
3659                                    ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
3660                                    ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
3661                                    ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
3662                                    ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
3663                                    ;THEN THE FAILURE IS REPORTED IN MULFSUB AND CONTROL IS PASSED TO
3664                                    ;CONT. IF NO ERRORS ARE DETECTED THEN MULFSUB RETURNS CONTROL
3665                                    ;TO CONT.
3666
3667 020034  012601                    MULFSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
3668 020036  012700  000200                    MOV     #200,R0         ;SET FD MODE.
3669 020042  170100                            LDFPS   R0
3670 020044  010100                            MOV     R1,R0           ;LOAD THE AC OPERAND.
3671 020046  172410                            LDD     (R0),AC0
3672 020050  016100  000014                    MOV     14(R1),R0       ;LOAD THE FPS
3673 020054  170100                            LDFPS   R0
3674 020056  012737  020072  001236            MOV     #1$,$TMP2
3675 020064  010100                            MOV     R1,R0
3676 020066  062700  000004                    ADD     #4,R0           ;ESTABLISH A POINTER TO FSRC.
3677
3678 020072  171010                    1$:     MULF    (R0),AC0        ;TEST INSTRUCTION.
3679
3680 020074  170204                            STFPS   R4              ;GET THE FPS.
3681 020076  012700  000200                    MOV     #200,R0         ;SET FD MODE
3682 020102  170100                            LDFPS   R0
3683
3684 020104  012700  020250                    MOV     #MULFT,R0       ;GET THE RESULT OF THE MULF.
3685 020110  174010                            STD     AC0,(R0)
3686
3687 020112  010102                            MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
3688 020114  010237  001240                    MOV     R2,$TMP3
3689 020120  062702  000004                    ADD     #4,R2
3690 020124  010237  001242                    MOV     R2,$TMP4
3691 020130  062702  000004                    ADD     #4,R2
3692 020134  010237  001244                    MOV     R2,$TMP5
3693 020140  012737  020250  001246            MOV     #MULFT,$TMP6
3694 020146  010437  001250                    MOV     R4,$TMP7
3695 020152  016137  000016  001252            MOV     16(R1),$TMP10
3696
3697 020160  021061  000010                    CMP     (R0),10(R1)     ;IS THE RESULT CORRECT?
```

```
3698 020164  001011                        BNE     10$             ;IF INCORRECT BRANCH.
3699 020166  026061  000002  000012        CMP     2(R0),12(R1)
3700 020174  001005                        BNE     10$
3701
3702 020176  026104  000016                CMP     16(R1),R4       ;IS FPS CORRECT?
3703 020202  001020                        BNE     15$             ;IF INCORRECT BRANCH.
3704 020204  000161  000026                JMP     26(R1)          ;IF NO ERRORS OCCURRED RETURN.
3705
3706 020210  021061  000020        10$:    CMP     (R0),20(R1)     ;DOES THE INCORRECT RESULT
3707 020214  001010                        BNE     11$             ;MATCH THE ANTICIPATED INCORRECT RESULT.
3708 020216  026061  000002  000022        CMP     2(R0),22(R1)
3709 020224  001004                        BNE     11$             ;BRANCH IF NO.
3710
3711 020226  010102                        MOV     R1,R2           ;IT MATCHED SO RETURN TO THE ERROR
3712                                                                ;REPORT AT THE CALLING ROUTINE.
3713 020230  062702  000024                ADD     #24,R2
3714 020234  000112                        JMP     (R2)
3715
3716 020236                        11$:                            ;REPORT RESULT INCORRECT.
3717 020236  104037                12$:    ERROR   +37
3718 020240  000161  000026        13$:    JMP     26(R1)
3719
3720 020244                        15$:                            ;REPORT FPS INCORRECT.
3721 020244  104040                16$:    ERROR   +40
3722 020246  000774                        BR      13$
3723
3724 020250  000000  000000  000000  MULFT:  .WORD   0,0,0,0
3725
3726 020260                        EEEDUNE:
     020260  104412                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                    ;SEE IF THE USER HAS EXPRESSED
                                                                    ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                    ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                    ;THE USER TYPED CONTROL G?).
3727
3728
3736
```

```
3737                                    .SBTTL  TEST # 11 - MULD TEST
                                        ;;*****************************************************************
                                        ;*TEST 11       MULD TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE MULD INSTRUCTION. NOTE THAT A SUBROUTINE IS
                                        ;*USED TO SET UP THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND
                                        ;*CHECK THE RESULTS.
                                        ;*
                                        ;;*****************************************************************
     020262  000004                     TST11:  SCOPE
3738
3739                                    ;MULD TEST WITH AC POSITIVE AND FSRC POSITIVE.
3740 020264                             FFF1:
     020264  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3741 020266  004737  020550                     JSR     PC,MULDSUB
3742 020272  040200  000000  000000  1$:       .WORD   40200,0,0,0     ;AC
3743 020302  023777  177777  177777  2$:       .WORD   23777,-1,-1,-1  ;FSRC
3744 020312  023777  177777  177777  3$:       .WORD   23777,-1,-1,-1  ;RES
3745 020322  000217                     4$:     217                     ;FPS BEFORE EXECUTION.
3746 020324  000200                             200                     ;FPS AFTER ECECUTION.
3747 020326  023777  177777  000000  5$:       .WORD   23777,-1,0,0    ;ERROR RES.
3748 020336  104047                     6$:     ERROR   +47             ;BAD CONSTANT USED IN ALGORITHM
3749                                                                     ;USED 24 INSTEAD OF 56.
3750
3751                                    ;MULD TEST WITH BOTH OPERANDS POSITIVE TRUNCATION TEST.
3752 020340                             FFF2:
     020340  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3753 020342  004737  020550                     JSR     PC,MULDSUB
3754 020346  065400  000000  000000  1$:       .WORD   65400,0,0,1     ;AC
3755 020356  037577  177777  177777  2$:       .WORD   37577,-1,-1,-2  ;FSRC
3756 020366  064777  177777  177777  3$:       .WORD   64777,-1,-1,-1  ;RES
3757 020376  000247                     4$:     247                     ;FPS BEFORE EXECUTION.
3758 020400  000240                             240                     ;FPS AFTER EXECUTION.
3759 020402  065000  000000  000000  5$:       .WORD   65000,0,0,0     ;ERROR RES.
3760 020412  104050                     6$:     ERROR   +50             ;TRUNCATION ERROR.
3761
3762                                    ;MULD TEST WITH BOTH OPERANDS NEGATIVE IN ROUND MODE.
3763 020414                             FFF3:
     020414  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3764 020416  004737  020550                     JSR     PC,MULDSUB
3765 020422  137577  177777  177777  1$:       .WORD   137577,-1,-1,-2 ;AC
3766 020432  165400  000000  000000  2$:       .WORD   165400,0,0,1    ;FSRC
3767 020442  065000  000000  000000  3$:       .WORD   65000,0,0,0     ;RES
3768 020452  007717                     4$:     7717                    ;FPS BEFORE EXECUTION.
3769 020454  007700                             7700                    ;FPS AFTER EXECUTION.
3770 020456  064777  177777  177777  5$:       .WORD   64777,-1,-1,-1  ;ERROR RES.
3771 020466  104051                     6$:     ERROR   +51             ;ROUND ERROR.
3772
3773                                    ;MULD   TEST WITH AC POSITIVE AND FSRC NEGATIVE IN ROUND MODE.
3774 020470                             FFF4:
     020470  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3775 020472  004737  020550                     JSR     PC,MULDSUB
3776 020476  017500  000000  000000  1$:       .WORD   17500,0,0,0     ;AC
3777 020506  123652  125252                   2$:     .WORD   123652,125252   ;FSRC
3778 020512  125252  125252                           .WORD   125252,125252
3779 020516  103177  177777  177777  3$:       .WORD   103177,-1,-1,-1 ;RES
3780 020526  000200                     4$:     200                     ;FPS BEFORE EXECUTION.
```

```
3781 020530  000210                          210                     ;FPS AFTER EXECUTION.
3782 020532  103200  000000  000000  5$:     .WORD   103200,0,0,0    ;ERROR RES.
3783 020542  104052                  6$:     ERROR   +52             ;ROUND ERROR (BAD CONSTANT).
3784
3785 020544  000137  021010                  JMP     FFFDONE
3786
3787                                 ;THIS SUBROUTINE, MULDSUB, IS CALLED TO SET UP, EXECUTE
3788                                 ;AND CHECK THE RESULT OF A MULD INSTRUCTION. IT IS CALLED THUS:
3789                                 ;
3790                                 ;               JSR     PC,MULDSUB
3791                                 ;       ACARG:  .WORD   X,X,X,X                 ;AC OPERAND
3792                                 ;       FSRCARG:.WORD   X,X,X,X                 ;FSRC OPERAND
3793                                 ;       RES:    .WORD   X,X,X,X                 ;EXPECTED RESULT
3794                                 ;       FPSB:   .WORD   X                       ;FPS BEFORE EXECUTION
3795                                 ;       FPSA:   .WORD   X                       ;FPS AFTER EXECUTION
3796                                 ;       ERRES:  .WORD   X,X,X,X                 ;ERROR RESULT
3797                                 ;       ERR:    ERROR   +X                      ;RESULT ERROR
3798                                 ;       CONT:                                   ;RETURN ADDRESS
3799                                 ;
3800                                 ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC OPERAND). THEN
3801                                 ;FPSB IS LOADED INTO THE FPS. THE INSTRUCTION, MULD IS EXECUTED.
3802                                 ;AFTER THE EXECUTION THE RESULT IS CHECKED AGAINST THE
3803                                 ;EXPECTED CORRECT RESULT, RES. IF IT IS CORRECT THEN THE FPS
3804                                 ;IS CHECKED WITH THE EXPECTED CORRECT FPS, FPSA. IF THE FPS WAS
3805                                 ;INCORRECT THEN IT IS REPORTED. IF THE RESULT WAS INCORRECT IT
3806                                 ;IS COMPARED WITH ERRES IN AN ATTEMPT TO ANALYSE THE ERROR. IF
3807                                 ;THE INCORRECT RESULT MATCHED ERRES THEN CONTROL IS PASSED TO
3808                                 ;THE ERROR CALL AT ERR. IF THE INCORRECT RESULT DID NOT MATCH ERRES
3809                                 ;THEN THE FAILURE IS REPORTED IN MULDSUB AND CONTROL IS PASSED TO
3810                                 ;CONT. IF NO ERRORS ARE DETECTED THEN MULDSUB RETURNS CONTROL
3811                                 ;TO CONT.
3812
3813 020550  012601                  MULDSUB:        MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
3814 020552  012700  000200                  MOV     #200,R0         ;SET FD MODE.
3815 020556  170100                          LDFPS   R0
3816
3817 020560  010100                          MOV     R1,R0           ;SET UP THE AC0 OPERAND.
3818 020562  172410                          LDD     (R0),AC0
3819 020564  016100  000030                  MOV     30(R1),R0       ;LOAD THE FPS.
3820 020570  170100                          LDFPS   R0
3821
3822 020572  012737  020606  001236          MOV     #1$,$TMP2
3823 020600  010100                          MOV     R1,R0           ;ESTABLISH A POINTER TO FSRC.
3824 020602  062700  000010                  ADD     #10,R0
3825
3826 020606  171010                  1$:     MULD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
3827
3828 020610  170204                          STFPS   R4              ;GET THE FPS.
3829 020612  012700  000200                  MOV     #200,R0         ;SET FD MODE.
3830 020616  170100                          LDFPS   R0
3831
3832 020620  012700  021000                  MOV     #MULDT,R0       ;GET THE RESULT.
3833 020624  174010                          STD     AC0,(R0)
3834
3835 020626  010102                          MOV     R1,R2           ;SAVE DATA IN CASE OF ERROR.
3836 020630  010237  001240                  MOV     R2,$TMP3
3837 020634  062702  000010                  ADD     #10,R2
```

TEST # 11 - MULD TEST

```
3838 020640  010237  001242                    MOV     R2,$TMP4
3839 020644  062702  000010                    ADD     #10,R2
3840 020650  010237  001244                    MOV     R2,$TMP5
3841 020654  012737  021000  0012-6            MOV     #MULDT,$TMP6
3842 020662  010437  001250                    MOV     R4,$TMP7
3843 020666  016137  000032  001252            MOV     32(R1),$TMP10
3844
3845 020674  010102                            MOV     R1,R2           ;CHECK THE RESULT.
3846 020676  062702  000020                    ADD     #20,R2
3847 020702  012703  021000                    MOV     #MULDT,R3
3848 020706  012705  000004                    MOV     #4,R5
3849 020712  022223                  2$:       CMP     (R2)+,(R3)+
3850 020714  001006                            BNE     10$             ;BRANCH IF RESULT INCORRECT.
3851 020716  077503                            SOB     R5,2$
3852
3853 020720  026104  000032                    CMP     32(R1),R4       ;IS FPS CORRECT?
3854 020724  001023                            BNE     15$             ;BRANCH IF INCORRECT.
3855 020726  000161  000046                    JMP     46(R1)          ;RETURN.
3856
3857 020732  010102                  10$:      MOV     R1,R2           ;WAS INCORRECT RESULT ANTICIPATED?
3858 020734  062702  000034                    ADD     #34,R2
3859 020740  012703  021000                    MOV     #MULDT,R3
3860 020744  012705  000004                    MOV     #4,R5
3861 020750  022223                  11$:      CMP     (R2)+,(R3)+
3862 020752  001005                            BNE     12$             ;BRANCH IF NO.
3863 020754  077503                            SOB     R5,11$
3864 020756  010102                            MOV     R1,R2           ;IF THE INCORRECT RESULT WAS
3865 020760  062702  000044                    ADD     #44,R2          ;ANTICIPATED RETURN TO THE
3866                                                                   ;ERROR REPORT IN THE CALLING
3867 020764  000112                            JMP     (R2)            ;ROUTINE.
3868
3869 020766                        12$:                                ;REPORT RESULT INCORRECT.
3870 020766  104246                13$:      ERROR   +246
3871 020770  000161  000046        14$:      JMP     46(R1)
3872
3873 020774                        15$:                                ;REPORT FPS INCORRECT.
3874 020774  104046                16$:      ERROR   +46
3875 020776  000774                          BR      14$
3876
3877 021000  000000  000000  000000  MULDT:  .WORD   0,0,0,0
3878
3879 021010                        FFFDONE:
     021010  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                     ;SEE IF THE USER HAS EXPRESSED
                                                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                     ;THE USER TYPED CONTROL G?).
3880
3881
3890
3891                                             ;TEST TITLE:UNDER/OVERFLOW, USING MULF WITH TRAPS DISABLED
```

```
3892                                    .SBTTL  TEST # 12 - SEE COMMENT ABOVE FOR TEST TITLE
                                        ;**********************************************************
                                        ;*TEST 12       SEE COMMENT ABOVE FOR TEST TITLE
                                        ;*
                                        ;*THIS IS A TEST OF THE OVERFLOW AND UNDERFLOW CONDITIONS USING
                                        ;*THE MULF INSTRUCTION WITH TRAPS DISABLED. NOTE THAT A SUBROUTINE
                                        ;*IS USED TO SET UP THE OPERANDS, EXECUTE THE MULF INSTRUCTION AND
                                        ;*CHECK THE RESULTS.
                                        ;*
                                        ;**********************************************************
     021012  000004                     TST12:  SCOPE
3893
3894
3895 021014                             ;UNDERFLOW, WITH EXPONENT OF RESULT = -129
     021014  104413                     1111:   LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3896 021016  004737  021240                     JSR     PC,OVUNFNT
3897 021022  020200  000000             1$:     .WORD   20200,0         ;AC
3898 021026  020000  000000             2$:     .WORD   20000,0         ;FSRC
3899 021032  000000  000000             3$:     .WORD   0,0             ;RES
3900 021036  177777  177777             4$:     .WORD   -1,-1           ;ERROR RES.
3901 021042  000000                     5$:     0                       ;FPS BEFORE EXECUTION.
3902 021044  000004                             4                       ;FPS AFTER EXECUTION.
3903 021046  000012                     6$:     12                      ;FEC
3904 021050  177777                             -1                      ;FLAG
3905 021052  104117                     7$:     ERROR   +117            ;ST 331 TO 155 INTO 115 (BUT FIU)
3906 021054  000401                             BR      8$
3907 021056  104114                             ERROR   +114
3908 021060                             8$:
3909
3910                                    ;UNDERFLOW, WITH EXPONENT OF RESULT = -193
3911 021060                             1112:
     021060  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3912 021062  004737  021240                     JSR     PC,OVUNFNT
3913 021066  010200  000000             1$:     .WORD   10200,0         ;AC
3914 021072  010000  000000             2$:     .WORD   10000,0         ;FSRC
3915 021076  000000  000000             3$:     .WORD   0,0             ;RES
3916 021102  010000  000000             4$:     .WORD   10000,0         ;ERROR RES.
3917 021106  005013                     5$:     5013                    ;FPS BEFORE EXECUTION.
3918 021110  005004                             5004                    ;FPS AFTER EXECUTION.
3919 021112  000012                     6$:     12                      ;FEC
3920 021114  177777                             -1                      ;FLAG
3921 021116  104120                     7$:     ERROR   +120            ;SETTING FIUV OR FIV CAUSES TRAP
3922                                             ;WITH FIU CLEAR.
3923 021120  000401                             BR      8$
3924 021122  104114                             ERROR   +114
3925 021124                             8$:
3926
3927                                    ;OVERFLOW, EXPONENT OF RESULT = 128
3928 021124                             1113:
     021124  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3929 021126  004737  021240                     JSR     PC,OVUNFNT
3930 021132  060200  000000             1$:     .WORD   60200,0         ;AC
3931 021136  060000  000000             2$:     .WORD   60000,0         ;FSRC
3932 021142  000000  000000             3$:     .WORD   0,0             ;RES
3933 021146  060000  000000             4$:     .WORD   60000,0         ;ERROR RES.
3934 021152  000000                     5$:     0                       ;FPS BEFORE EXECUTION.
3935 021154  000006                             6                       ;FPS AFTER EXECUTION.
```

```
3936 021156  000010                  6$:     10                      ;FEC
3937 021160  000000                          0                       ;FLAG
3938 021162  104121                  7$:     ERROR   +121            ;ST 333 TO 136 INTO 116 (BUT FIV).
3939 021164  000401                          BR      8$
3940 021166  104113                          ERROR   +113
3941 021170                          8$:
3942
3943                                 ;OVERFLOW, EXPONENT OF RESULT = 130
3944 021170                          1114:
     021170  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
3945 021172  004737  021240                  JSR     PC,OVUNFNT
3946 021176  060200  000000          1$:     .WORD   60200,0         ;AC
3947 021202  060200  000000          2$:     .WORD   60200,0         ;FSRC
3948 021206  000000  000000          3$:     .WORD   0,0             ;RES
3949 021212  177777  177777          4$:     .WORD   -1,-1           ;ERROR RES.
3950 021216  006011                  5$:     6011                    ;FPS BEFORE EXECUTION.
3951 021220  006006                          6006                    ;FPS AFTER EXECUTION.
3952 021222  000010                  6$:     10                      ;FEC
3953 021224  000000                          0                       ;FLAG
3954 021226  104122                  7$:     ERROR   +122            ;SETTING FIUV OR FIU WITH
3955                                                                 ;FIV CLEAR CAUSES TRAP.
3956 021230  000401                          BR      8$
3957 021232  104113                          ERROR   +113
3958 021234  000137  021650          8$:     JMP     1114DONE        ;GO TO NEXT TEST.
3959
3960
3961
3962                                 ;THIS SUBROUTINE, OVUNFNT, IS USED TO SET UP THE OPERANDS, EXECUTE
3963                                 ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
3964                                 ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
3965                                 ;TO IT IS MADE THUS:
3966                                 ;
3967                                 ;       ACARG:   .WORD   X,X            ;AC OPERAND
3968                                 ;       FSRCARG: .WORD   X,X            ;FSRC OPERAND
3969                                 ;       RES:     .WORD   X,X            ;EXPECTED RESULT
3970                                 ;       ERRES:   .WORD   X,X            ;ERROR RESULT
3971                                 ;       FPSB:    .WORD   X              ;FPS BEFORE EXECUTION
3972                                 ;       FPSA:    .WORD   X              ;FPS AFTER EXECUTION
3973                                 ;       FEC:     .WORD   X              ;EXPECTED FEC
3974                                 ;       FLAG:    .WORD   X              ;0/-1,OVER/UNDER FLOW FLAG
3975                                 ;       ERR1:    ERROR   +X             ;TRAP ERROR.
3976                                 ;       BR       CONT
3977                                 ;       ERR2:    ERROR   +X             ;DATA, RESULT ERROR
3978                                 ;       CONT:                           ;RETURN ADDRESS
3979                                 ;
3980                                 ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
3981                                 ;THE MULF INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
3982                                 ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
3983                                 ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFNT RETURNS CONTROL
3984                                 ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFNT
3985                                 ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
3986                                 ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
3987                                 ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
3988                                 ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFNT
3989                                 ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
3990                                 ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFNT WILL
3991                                 ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
```

```
                                        ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNFNT WILL READ THE FEC.
                                        ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNFNT WILL
                                        ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
                                        ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNFNT WILL REPORT
                                        ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNFNT USES THE FLAG
                                        ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                        ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

021240  012601                  OVUNFNT:      MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
021242  012700  000200                MOV     #200,R0         ;SET FD MODE.
021246  170100                      LDFPS   R0

021250  010100                      MOV     R1,R0           ;LOAD AC0, OPERAND.
021252  172410                      LDD     (R0),AC0

021254  010102                      MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
021256  010237  001240              MOV     R2,$TMP3        ;ERROR.
021262  062702  000004              ADD     #4,R2
021266  010237  001242              MOV     R2,$TMP4
021272  062702  000004              ADD     #4,R2
021276  010237  001244              MOV     R2,$TMP5
021302  016137  000022  001252      MOV     22(R1),$TMP10
021310  012737  021640  001246      MOV     #OVFNTT,$TMP6

021316  016100  000020              MOV     20(R1),R0       ;LOAD THE FPS.
021322  170100                      LDFPS   R0
021324  012737  021346  001236      MOV     #1$,$TMP2
021332  012737  021532  000244      MOV     #25$,FPVECT     ;SET UP THE FP TRAP VECTOR IN CASE
                                                            ;OF ERROR.
021340  010100                      MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
021342  062700  000004              ADD     #4,R0

021346  171010              1$:     MULF    (R0),AC0        ;TEST INSTRUCTION.

021350  170204              2$:     STFPS   R4              ;GET FPS.
021352  170305                      STST    R5              ;GET FEC.
021354  012700  000200              MOV     #200,R0         ;SET FD MODE.
021360  170100                      LDFPS   R0
021362  012700  021640              MOV     #OVFNTT,R0      ;GET THE RESULT.
021366  174010                      STD     AC0,(R0)
021370  010437  001250              MOV     R4,$TMP7
021374  010537  001254              MOV     R5,$TMP11

021400  012700  021640              MOV     #OVFNTT,R0      ;CHECK THE RESULT.
021404  010102                      MOV     R1,R2
021406  062702  000010              ADD     #10,R2
021412  012703  000002              MOV     #2,R3
021416  022022              3$:     CMP     (R0)+,(R2)+
021420  001015                      BNE     15$             ;BRANCH IF INCORRECT.
021422  077303                      SOB     R3,3$

021424  026104  000022              CMP     22(R1),R4       ;WAS FPS CORRECT?
021430  001002                      BNE     10$             ;BRANCH IF FPS IS INCORRECT.

021432  000161  000036      4$:     JMP     36(R1)          ;RETURN, TEST COMPLETED.

                                        ;REPORT INCORRECT FPS.
```

TFST # 12 - SEE COMMENT ABOVE FOR TEST TITLE

```
4049 021436  005761  000026          10$:    TST     26(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
4050 021442  001002                          BNE     12$             ;BRANCH IF UNDERFLOW.
4051
4052                                                                 ;REPORT FPS BAD AFTER OVERFLOW.
4053 021444  104111                  11$:    ERROR   +111
4054 021446  000771                          BR      4$
4055
4056 021450                          12$:                            ;REPORT FPS BAD AFTER UNDERFLOW.
4057 021450  104112                  13$:    ERROR   +112
4058 021452  000767                          BR      4$
4059
```

```
                                        ;RESULT INCORRECT.
021454  012700  021640          15$:    MOV     #OVFNTT,R0      ;SEE IF FAILURE IS ANTICIPATED
021460  010102                          MOV     R1,R2           ;FAILURE.
021462  062702  000014                  ADD     #14,R2
021466  012703  000002                  MOV     #2,R3
021472  022022                  16$:    CMP     (R0)+,(R2)+
021474  001007                          BNE     17$             ;BRANCH IF NOT ANTICIPATED.
021476  077303                          SOB     R3,16$
                                        MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
021500  010102                          ADD     #34,R2          ;TO THE ERROR REPORT IN THE CALLING
021502  062702  000034                  MOV     R2,$TMP2        ;ROUTINE.
021506  010237  001236                  JMP     (R2)
021512  000112
021514  005761  000026          17$:    TST     26(R1)          ;RESULT WAS NOT ANTICIPATED
                                                                ;SO ERROR MUST BE REPORTED HERE.
                                                                ;FIRST SEE IF ARGUMENTS SHOULD
                                                                ;HAVE RESULTED IN OVERFLOW OR UNDER
                                                                ;FLOW BY LOOKING AT THE FLAG.
021520  001002                          BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
                                                                ;REPORT RESULT INCORRECT, EXPECTING
021522  104113          18$:    ERROR   +113                    ;OVERFLOW.
021524  000742                  BR      4$
                                19$:                            ;REPORT RESULT INCORRECT, EXPECTING
021526  104114          20$:    ERROR   +114                    ;UNDERFLOW.
021530  000740                  BR      4$

                                ;IF AN FP TRAP OCCURS COME HERE.
021532  011602          25$:    MOV     (SP),R2         ;GET ADDRESS OF TRAP.
021534  022702  021350          CMP     #2$,R2          ;WAS THE TRAP DURING THE MULF INSTRUCTION?
021540  001402                  BEQ     26$             ;BRANCH IF YES.
021542  000137  037450          JMP     FPSPUR  ;OTHERWISE GO REPORT A SPURIOUS
                                                        ;FP TRAP.
021546  022626          26$:    CMP     (SP)+,(SP)+     ;RESET THE STACK.
021550  010237  001236          MOV     R2,$TMP2        ;SAVE DATA FOR ERROR REPORT.
021554  170204                  STFPS   R4              ;GET FPS.
021556  170305                  STST    R5              ;GET FEC.
021560  012700  000200          MOV     #200,R0         ;SET FD MODE.
021564  170100                  LDFPS   R0
021566  012700  021640          MOV     #OVFNTT,R0      ;GET THE RESULT.
021572  174010                  STD     AC0,(R0)
021574  010537  001254          MOV     R5,$TMP11
021600  020561  000024          CMP     R5,24(R1)       ;WAS THE FEC ANTICIPATED?
021604  001004                  BNE     27$             ;BRANCH IF NOT ANTICIPATED.
021606  010102                  MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
021610  062702  000030          ADD     #30,R2          ;RETURN TO THE ERROR REPORT OF THE
                                                        ;CALLING ROUTINE.
021614  000112                  JMP     (R2)
021616  005761  000026  27$:    TST     26(R1)          ;THE ERROR WAS NOT ANTICIPATED SO
                                                        ;IT MUST BE REPORTED HERE. FIRST SEE IF EXPECTED
                                                        ;OVERFLOW OR UNDER FLOW.
021622  001003                  BNE     29$             ;BRANCH IF EXPECTING UNDERFLOW
```

TEST # 12 - SEE COMMENT ABOVE FOR TEST TITLE

```
4118                                                        ;REPORT TRAPPED ON OVERFLOW WITH FIV=0
4119 021624  104115                    28$:    ERROR   +115
4120 021626  000161  000036                   JMP     36(R1)
4121
4122 021632                            29$:                ;REPORT TRAPPED ON UNDER FLOW WITH FIU=0
4123 021632  104116                    30$:    ERROR   +116
4124 021634  000161  000036                   JMP     36(R1)
4125
4126 021640  000000  000000  000000   OVFNTT: .WORD   0,0,0,0
4127
4128 021650                            IIIDONE:
     021650  104412                            RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
                                                               ;SEE IF THE USER HAS EXPRESSED
                                                               ;THE DESIRE TO CHANGE THE SOFTWARE
                                                               ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                               ;THE USER TYPED CONTROL G?).
4129
4130
4131
4140
4141                                                        ;TEST TITLE:UNDER/OVERFLOW, USING MULD WITH TRAP DISABLED
```

```
                                .SBTTL  TEST # 13 - SEE COMMENT ABOVE FOR TEST TITLE
                                ;:*****************************************************************
                                ;*TEST 13       SEE COMMENT ABOVE FOR TEST TITLE
                                ;*
                                ;*THIS IS A TEST OF THE OVERFLOW AND UNDERFLOW CONDITIONS THAT CAN
                                ;*ARRISE USING THE MULD INSTRUCTION WITH TRAPS DISABLED. A SUBROUTINE IS
                                ;*USED TO SET UP THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND
                                ;*CHECK THE RESULTS.
                                ;*
                                ;:*****************************************************************
     021652  000004             TST13:  SCOPE
4143
4144
4145 021654                     ;UNDERFLOW, EXPONENT OF RESULT=-129
                                JJJ1:
     021654  104413                     LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
4146 021656  004737  022200             JSR     PC,OVUNDNT
4147 021662  020200  000000     1$:     .WORD   20200,0             ;AC
4148 021666  127272  000000             .WORD   127272,0
4149 021672  020000  000000  000000 2$: .WORD   20000,0,0,0         ;FSRC
4150 021702  000000  000000  000000 3$: .WORD   0,0,0,0             ;RES
4151 021712  000000  000000     4$:     .WORD   0,0                 ;ERROR RES.
4152 021716  127272  000000             .WORD   127272,0
4153 021722  000200             5$:     200                         ;FPS BEFORE EXECUTION.
4154 021724  000204                     204                         ;FPS AFTER EXECUTION.
4155 021726  000012             6$:     12                          ;FEC
4156 021730  177777                     -1                          ;FLAG
4157 021732  104131             7$:     ERROR   +131                ;ST 331 TO 155 INTO 115 (BUT FIU)
4158 021734  000401                     BR      8$
4159 021736  104132                     ERROR   +132                ;ST 115 (BUT FD)
4160 021740                     8$:
4161
4162                            ;UNDERFLOW, EXPONENT OF RESULT = -193
4163 021740                     JJJ2:
     021740  104413                     LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
4164 021742  004737  022200             JSR     PC,OVUNDNT
4165 021746  010200  000000     1$:     .WORD   10200,0             ;AC
4166 021752  123456  000000             .WORD   123456,0
4167 021756  010000  000000  000000 2$: .WORD   10000,0,0,0         ;FSRC
4168 021766  000000  000000  000000 3$: .WORD   0,0,0,0             ;RES
4169 021776  000000  000000  123456 4$: .WORD   0,0,123456,0       ;ERROR RES
4170 022006  005213             5$:     5213                        ;FPS BEFORE EXECUTION.
4171 022010  005204                     5204                        ;FPS AFTER EXECUTION.
4172 022012  000012             6$:     12                          ;FEC
4173 022014  177777                     -1                          ;FLAG
4174 022016  104133             7$:     ERROR   +133                ;SETTING FIUV OR FIV BAD.
4175 022020  000401                     BR      8$
4176 022022  104132                     ERROR   +132                ;ST 115 (BUT FD)
4177 022024                     8$:
4178
4179                            ;OVERFLOW, EXPONENT OF RESULT = 128
4180 022024                     JJJ3:
     022024  104413                     LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
4181 022026  004737  022200             JSR     PC,OVUNDNT
4182 022032  060200  000000     1$:     .WORD   60200,0             ;AC
4183 022036  065432  000000             .WORD   65432,0
4184 022042  060000  000000  000000 2$: .WORD   60000,0,0,0         ;FSRC
4185 022052  000000  000000  000000 3$: .WORD   0,0,0,0             ;RES
```

TEST # 13 - SEE COMMENT ABOVE FOR TEST TITLE

```
4186 022062  000000  000000  065432  4$:     .WORD   0,0,65432,0     ;ERROR RES.
4187 022072  000200                  5$:     200                     ;FPS BEFORE EXECUTION.
4188 022074  000206                          206                     ;FPS AFTER EXECUTION.
4189 022076  000010                  6$:     10                      ;FEC
4190 022100  000000                          0                       ;FLAG
4191 022102  104134                  7$:     ERROR   +134            ;ST 333 TO 136 INTO 116 (BUT FIV)
4192 022104  000401                          BR      8$
4193 022106  104135                          ERROR   +135            ;ST 116 (BUT FD)
4194 022110                          8$:
4195
4196
4197                                 ;OVERFLOW, EXPONENT OF RESULT = 130
4198 022110                          JJJ4:
     022110  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4199 022112  004737  022200                  JSR     PC,OVUNDNT
4200 022116  060200  000000          1$:     .WORD   60200,0         ;AC
4201 022122  125252  000000                  .WORD   125252,0
4202 022126  060200  000000  000000  2$:     .WORD   60200,0,0,0     ;FSRC
4203 022136  000000  000000  000000  3$:     .WORD   0,0,0,0         ;RES
4204 022146  000000  000000  125252  4$:     .WORD   0,0,125252,0    ;ERROR RES.
4205 022156  006211                  5$:     6211                    ;FPS BEFORE EXECUTION.
4206 022160  006206                          6206                    ;FPS AFTER EXECUTION.
4207 022162  000010                  6$:     10                      ;FEC
4208 022164  000000                          0                       ;FLAG
4209 022166  104136                  7$:     ERROR   +136            ;SETTING FIUV OR FIV BAD.
4210 022170  000401                          BR      8$
4211 022172  104135                          ERROR   +135            ;ST 116 (BUT FD)
4212 022174  000137  022610          8$:     JMP     JJJDONE ;GO TO NEXT TEST.
4213
4214                                 ;THIS SUBROUTINE, OVUNDNT, IS USED TO SET UP THE OPERANDS, EXECUTE
4215                                 ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
4216                                 ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
4217                                 ;TO IT IS MADE THUS:
4218                                 ;
4219                                 ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
4220                                 ;               FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
4221                                 ;               RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
4222                                 ;               ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
4223                                 ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
4224                                 ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
4225                                 ;               FEC:    .WORD   X               ;EXPECTED FEC
4226                                 ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
4227                                 ;               ERR1:   ERROR   +X              ;TRAP ERROR.
4228                                 ;               BR      CONT
4229                                 ;               ERR2:   ERROR   +X              ;DATA, RESULT ERROR
4230                                 ;               CONT:                           ;RETURN ADDRESS
4231                                 ;
4232                                 ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
4233                                 ;THE MULD INSTRUCTION IS EXECUTED. IF NO TRAP OCCURS THEN THE
4234                                 ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
4235                                 ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDNT RETURNS CONTROL
4236                                 ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDNT
4237                                 ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. IF THE RESULT OF THE
4238                                 ;MULD IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
4239                                 ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
4240                                 ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDNT
4241                                 ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
```

```
                                        ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDNT WILL
                                        ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
                                        ;IF A TRAP OCCURS (IT SHOULD NOT) THEN OVUNDNT WILL READ THE FEC.
                                        ;SHOULD THE FEC MATCH THE ANTICIPATED FEC OVUNDNT WILL
                                        ;STORE ALL DATA AND TRANSFER CONTROL TO THE ERROR CALL AT ERR1. IF THE
                                        ;FEC IS NOT THE SAME AS THE ANTICIPATED FEC OVUNDNT WILL REPORT
                                        ;THE ERROR AND RETURN TO CONT. NOTE THAT OVUNDNT USES THE FLAG
                                        ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                        ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

022200  012601                  OVUNDNT:      MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
022202  012700  000200                  MOV     #200,R0         ;SET FD MODE.
022206  170100                        LDFPS   R0

022210  010100                        MOV     R1,R0           ;LOAD AC0, OPERAND.
022212  172410                        LDD     (R0),AC0

022214  010102                        MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
022216  010237  001240                MOV     R2,$TMP3        ;ERROR.
022222  062702  000010                ADD     #10,R2
022226  010237  001242                MOV     R2,$TMP4
022232  062702  000010                ADD     #10,R2
022236  010237  001244                MOV     R2,$TMP5
022242  016137  000042  001252        MOV     42(R1),$TMP10
022250  012737  022600  001246        MOV     #OVDNTT,$TMP6

022256  016100  000040                MOV     40(R1),R0       ;LOAD THE FPS.
022262  170100                        LDFPS   R0
022264  012737  022306  001236        MOV     #1$,$TMP2
022272  012737  022472  000244        MOV     #25$,FPVECT     ;SET UP THE FP TRAP VECTOR IN CASE
                                                              ;OF ERROR.
022300  010100                        MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
022302  062700  000010                ADD     #10,R0

022306  171010                1$:     MULD    (R0),AC0        ;TEST INSTRUCTION.

022310  170204                2$:     STFPS   R4              ;GET FPS.
022312  170305                        STST    R5              ;GET FEC.
022314  012700  000200                MOV     #200,R0         ;SET FD MODE.
022320  170100                        LDFPS   R0
022322  012700  022600                MOV     #OVDNTT,R0      ;GET THE RESULT.
022326  174010                        STD     AC0,(R0)
022330  010437  001250                MOV     R4,$TMP7
022334  010537  001254                MOV     R5,$TMP11

022340  012700  022600                MOV     #OVDNTT,R0      ;CHECK THE RESULT.
022344  010102                        MOV     R1,R2
022346  062702  000020                ADD     #20,R2
022352  012703  000004                MOV     #4,R3
022356  022022                3$:     CMP     (R0)+,(R2)+
022360  001015                        BNE     15$             ;BRANCH IF INCORRECT.
022362  077303                        SOB     R3,3$

022364  026104  000042                CMP     42(R1),R4       ;WAS FPS CORRECT?
022370  001002                        BNE     10$             ;BRANCH IF FPS IS INCORRECT.

022372  000161  000056        4$:     JMP     56(R1)          ;RETURN, TEST COMPLETED.
```

```
4299
4300                                        ;REPORT INCORRECT FPS.
4301 022376  005761  000046          10$:   TST     46(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
4302 022402  001002                        BNE     12$             ;BRANCH IF UNDERFLOW.
4303
4304                                                                ;REPORT FPS BAD AFTER OVERFLOW.
4305 022404  104123                  11$:   ERROR   +123
4306 022406  000771                        BR      4$
4307
4308 022410                           12$:                          ;REPORT FPS BAD AFTER UNDERFLOW.
4309 022410  104124                  13$:   ERROR   +124
4310 022412  000767                        BR      4$
4311
4312                                        ;RESULT INCORRECT.
4313 022414  012700  022600          15$:   MOV     #OVDNTT,R0      ;SEE IF FAILURE IS ANTICIPATED
4314 022420  010102                        MOV     R1,R2           ;FAILURE.
4315 022422  062702  000030                ADD     #30,R2
4316 022426  012703  000004                MOV     #4,R3
4317 022432  022022                  16$:   CMP     (R0)+,(R2)+
4318 022434  001007                        BNE     17$             ;BRANCH IF NOT ANTICIPATED.
4319 022436  077303                        SOB     R3,16$
4320
4321 022440  010102                        MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
4322 022442  062702  000054                ADD     #54,R2          ;TO THE ERROR REPORT IN THE CALLING
4323 022446  010237  001236                MOV     R2,$TMP2        ;ROUTINE.
4324 022452  000112                        JMP     (R2)
4325
4326 022454  005761  000046          17$:   TST     46(R1)          ;RESULT WAS NOT ANTICIPATED
4327                                                                ;SO ERROR MUST BE REPORTED HERE.
4328                                                                ;FIRST SEE IF ARGUMENTS SHOULD
4329                                                                ;HAVE RESULTED IN OVERFLOW OR UNDER
4330                                                                ;FLOW BY LOOKING AT THE FLAG.
4331 022460  001002                        BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
4332
4333                                                                ;REPORT RESULT INCORRECT, EXPECTING
4334 022462  104125                  18$:   ERROR   +125            ;OVERFLOW.
4335 022464  000742                        BR      4$
4336
4337 022466                           19$:                          ;REPORT RESULT INCORRECT, EXPECTING
4338 022466  104126                  20$:   ERROR   +126            ;UNDERFLOW.
4339 022470  000740                        BR      4$
4340
4341                                        ;IF AN FP TRAP OCCURS COME HERE.
4342 022472  011602                  25$:   MOV     (SP),R2         ;GET ADDRESS OF TRAP.
4343 022474  022702  022310                CMP     #2$,R2          ;WAS THE TRAP DURING THE MULF INSTRUCTION?
4344 022500  001402                        BEQ     26$             ;BRANCH IF YES.
4345 022502  000137  037450                JMP     FPSPUR  ;OTHERWISE GO REPORT A SPURIOUS
4346                                                                ;FP TRAP.
4347 022506  022626                  26$:   CMP     (SP)+,(SP)+     ;RESET THE STACK.
4348 022510  010237  001236                MOV     R2,$TMP2        ;SAVE DATA FOR ERROR REPORT.
4349 022514  170204                        STFPS   R4              ;GET FPS.
4350 022516  170305                        STST    R5              ;GET FEC.
4351 022520  012700  000200                MOV     #200,R0         ;SET FD MODE.
4352 022524  170100                        LDFPS   R0
4353 022526  012700  022600                MOV     #OVDNTT,R0      ;GET THE RESULT.
4354 022532  174010                        STD     AC0,(R0)
4355 022534  010537  001254                MOV     R5,$TMP11
```

```
4356 022540  020561  000044                    CMP     R5,44(R1)       ;WAS THE FEC ANTICIPATED?
4357 022544  001004                            BNE     27$             ;BRANCH IF NOT ANTICIPATED.
4358
4359 022546  010102                            MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
4360 022550  062702  000050                    ADD     #50,R2          ;RETURN TO THE ERROR REPORT OF THE
4361                                                                    ;CALLING ROUTINE.
4362 022554  000112                            JMP     (R2)
4363
4364 022554  005761  000026          27$:      TST     26(R1)          ;THE ERROR WAS NOT ANTICIPATED SO
4365                                                                    ;IT MUST BE REPORTED HERE. FIRST SEE IF EXPECTED
4366                                                                    ;OVERFLOW OR UNDER FLOW.
4367 022562  001003                            BNE     29$             ;BRANCH IF EXPECTING UNDERFLOW
4368
4369                                                                    ;REPORT TRAPPED ON OVERFLOW WITH FIV=0
4370 022564  104127                  28$:      ERROR   +127
4371 022566  000161  000056                    JMP     56(R1)
4372
4373 022572                           29$:                              ;REPORT TRAPPED ON UNDER FLOW WITH FIU=0
4374 022572  104130                  30$:      ERROR   +130
4375 022574  000161  000056                    JMP     56(R1)
4376
4377 022600  000000  000000  000000  OVDNTT:   .WORD   0,0,0,0
4378
4379 022610                           JJJDONE:
     022610  104412                            RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                        ;SEE IF THE USER HAS EXPRESSED
                                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                        ;THE USER TYPED CONTROL G?).
4380
4381
4382
4394
4395                                    ;TEST TITLE:UNDER/OVERFLOW, USING MULF WITH TRAPS ENABLED
```

```
                                .SBTTL  TEST # 14 - SEE COMMENT ABOVE FOR TEST TITLE
                                ;:*****************************************************************
                                ;*TEST 14       SEE COMMENT ABOVE FOR TEST TITLE
                                ;*
                                ;*THIS IS A TEST OF THE UNDERFLOW AND OVERFLOW
                                ;*CONDITIONS THAT CAN OCCUR USING THE MULF INSTRUCTION.
                                ;*A SUBROUTINE IS CALLED TO SET UP THE OPERANDS,
                                ;* EXECUTE THE MULF INSTRUCTION AND CHECK
                                ;*THE RESULTS. HERE THE PARTICULAR INTERRUPT,
                                ;*EITHER OVERFLOW OR UNDERFLOW, IS ENABLED SO A TRAP SHOULD
                                ;*OCCUR.
                                ;*
                                ;:*****************************************************************
022612  000004                  TST14:  SCOPE

                                ;UNDERFLOW, EXPONENT OF RESULT = -129
022614                          KKK1:
022614  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
022616  004737  023040                  JSR     PC,OVUNFT
022622  020123  045676          1$:     .WORD   20123,45676     ;AC
022626  020200  000000          2$:     .WORD   20200,0         ;FSRC
022632  000123  045676          3$:     .WORD   123,45676       ;RES
022636  177777  177777          4$:     .WORD   -1,-1           ;ERROR RES.
022642  002000                  5$:     2000                    ;FPS BEFORE EXECUTION.
022644  102004                          102004                  ;FPS AFTER EXECUTION.
022646  000012                  6$:     12                      ;FEC
022650  177777                          -1                      ;FLAG
022652  104145                  7$:     ERROR   +145            ;ST 331 (BUT FIU) NO TRAP.
022654  000401                          BR      8$
022656  104144                          ERROR   +144
022660                          8$:

                                ;UNDERFLOW, EXPONENT OF THE RESULT = -193
022660                          KKK3:
022660  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
022662  004737  023040                  JSR     PC,OVUNFT
022666  010127  127272          1$:     .WORD   10127,127272    ;AC
022672  010200  000000          2$:     .WORD   10200,0         ;FSRC
022676  060127  127272          3$:     .WORD   60127,127272    ;RES
022702  177777  177777          4$:     .WORD   -1,-1           ;ERROR RES.
022706  007017                  5$:     7017                    ;FPS BEFORE EXECUTION.
022710  107000                          107000                  ;FPS AFTER EXECUTION.
022712  000012                  6$:     12                      ;FEC
022714  177777                          -1
022716  104146                  7$:     ERROR   +146            ;ST 137 (BUT FIU) NO TRAP.
022720  000401                          BR      8$
022722  104144                          ERROR   +144
022724                          8$:

                                ;OVERFLOW, EXPONENT OF THE RESULT = 128
022724                          KKK4:
022724  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
022726  004737  023040                  JSR     PC,OVUNFT
022732  060252  125252          1$:     .WORD   60252,125252    ;AC
022736  060000  000000          2$:     .WORD   60000,0         ;FSRC
022742  000052  125252          3$:     .WORD   000052,125252   ;RES
022746  177777  177777          4$:     .WORD   -1,-1           ;ERROR RES.
```

```
4437 022752 001000                  5$:     1000                    ;FPS BEFORE EXECUTION.
4438 022754 101006                          101006                  ;FPS AFTER EXECUTION.
4439 022756 000010                  6$:     10                      ;FEC
4440 022760 000000                          0                       ;FLAG
4441 022762 104147                  7$:     ERROR   +147            ;ST 333 (BUT FIV) NO TRAP
4442 022764 000401                          BR      8$
4443 022766 104143                          ERROR   +143
4444 022770                         8$:
4445
4446                                ;OVERFLOW, EXPONENT OF RESULT = 130
4447 022770                         KKK5:
     022770 104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4448 022772 004737 023040                   JSR     PC,OVUNFT
4449 022776 060345 067654          1$:      .WORD   60345,67654     ;AC
4450 023002 060200 000000          2$:      .WORD   60200,0         ;FSRC
4451 023006 000345 067654          3$:      .WORD   345,67654       ;RES
4452 023012 177777 177777          4$:      .WORD   -1,-1           ;ERROR RES.
4453 023016 007015                 5$:      7015                    ;FPS BEFORE EXECUTION.
4454 023020 107002                          107002                  ;FPS AFTER EXECUTION.
4455 023022 000010                 6$:      10                      ;FEC
4456 023024 000000                          0                       ;FLAG
4457 023026 104150                 7$:      ERROR   +150            ;ST 133 (BUT FIV) NO TRAP
4458 023030 000401                          BR      8$
4459 023032 104143                          ERROR   +143
4460 023034 000137 023452          8$:      JMP     KKKDONE
4461
4462                                ;THIS SUBROUTINE, OVUNFT, IS USED TO SET UP THE OPERANDS, EXECUTE
4463                                ;THE MULF INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
4464                                ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
4465                                ;TO IT IS MADE THUS:
4466                                ;
4467                                ;               ACARG:  .WORD   X,X             ;AC OPERAND
4468                                ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
4469                                ;               RES:    .WORD   X,X             ;EXPECTED RESULT
4470                                ;               ERRES:  .WORD   X,X             ;ERROR RESULT
4471                                ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
4472                                ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
4473                                ;               FEC:    .WORD   X               ;EXPECTED FEC
4474                                ;               FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
4475                                ;               ERR1:   ERROR   +X              ;TRAP ERROR.
4476                                ;               BR      CONT
4477                                ;               ERR2:   ERROR   +X              ;DATA, RESULT ERROR
4478                                ;               CONT:                           ;RETURN ADDRESS
4479                                ;
4480                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
4481                                ;THE MULF INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
4482                                ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
4483                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNFT RETURNS CONTROL
4484                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNFT
4485                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
4486                                ;IN THE SAME WAY. IF THE RESULT OF THE
4487                                ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
4488                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
4489                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNFT
4490                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
4491                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNFT WILL
4492                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
```

```
                                        ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
                                        ;NOTE THAT OVUNFNT USES THE FLAG
                                        ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                        ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

023040  012601                  OVUNFT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
023042  012700  000200                  MOV     #200,R0         ;SET FD MODE.
023046  170100                          LDFPS   R0

023050  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
023052  172410                          LDD     (R0),AC0

023054  010102                          MOV     R1,R2           ;SAVE THE DATA PATTERNS IN CASE OF
023056  010237  001240                  MOV     R2,$TMP3        ;ERROR.
023062  062702  000004                  ADD     #4,R2
023066  010237  001242                  MOV     R2,$TMP4
023072  062702  000004                  ADD     #4,R2
023076  010237  001244                  MOV     R2,$TMP5
023102  016137  000022  001252          MOV     22(R1),$TMP10
023110  012737  023442  001246          MOV     #OVFTT,$TMP6

023116  016100  000020                  MOV     20(R1),R0       ;LOAD THE FPS.
023122  170100                          LDFPS   R0
023124  012737  023146  001236          MOV     #1$,$TMP2
023132  012737  023156  000244          MOV     #50$,FPVECT     ;SET UP THE FP TRAP VECTOR IN CASE
                                                                ;OF ERROR.
023140  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
023142  062700  000004                  ADD     #4,R0

023146  171010                  1$:     MULF    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
023150  170000                  2$:     CFCC

023152  000137  023402                  JMP     25$             ;FAILURE, NO TRAP.

023156  011602                  50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
023160  020227  023150                  CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
023164  001402                          BEQ     51$             ;BRANCH IF YES.
023166  000137  037450                  JMP     FPSPUR  ;OTHERWISE REPORT SPURIOUS FP ERROR.

023172  022626                  51$:    CMP     (SP)+,(SP)+     ;RESET THE STACK
023174  170204                          STFPS   R4              ;GET FPS.
023176  170305                          STST    R5              ;GET FEC.
023200  012700  000200                  MOV     #200,R0         ;SET FD MODE.
023204  170100                          LDFPS   R0
023206  012700  023442                  MOV     #OVFTT,R0       ;GET THE RESULT.
023212  174010                          STD     AC0,(R0)
023214  010437  001250                  MOV     R4,$TMP7
023220  010537  001254                  MOV     R5,$TMP11

023224  012700  023442                  MOV     #OVFTT,R0       ;CHECK THE RESULT.
023230  010102                          MOV     R1,R2
023232  062702  000010                  ADD     #10,R2
023236  012703  000002                  MOV     #2,R3
023242  022022                  3$:     CMP     (R0)+,(R2)+
023244  001027                          BNE     15$             ;BRANCH IF INCORRECT.
023246  077303                          SOB     R3,3$
```

```
4550 023250  026104  000022                CMP     22(R1),R4       ;WAS FPS CORRECT?
4551 023254  001014                        BNE     10$             ;BRANCH IF FPS IS INCORRECT.
4552
4553 023256  026105  000024                CMP     24(R1),R5       ;IS FEC CORRECT?
4554 023262  001002                        BNE     5$              ;IF INCORRECT BRANCH.
4555 023264  000161  000036          4$:   JMP     36(R1)          ;RETURN, TEST COMPLETED.
4556
4557                               ;REPORT INCORRECT FEC.
4558 023270  005761  000026          5$:   TST     26(R1)          ;WAS THE RESULT OVERFLOW OR UNDERFLOW?
4559 023274  001002                        BNE     7$              ;BRANCH IF UNDERFLOW.
4560
4561                                                               ;REPORT BAD FEC ON EXPECTED OVERFLOW.
4562 023276  104137                6$:   ERROR   +137
4563 023300  000771                        BR      4$
4564
4565 023302                         7$:                           ;REPORT BAD FEC ON EXPECTED UNDERFLOW.
4566 023302  104140                8$:   ERROR   +140
4567 023304  000767                        BR      4$
4568
4569                               ;REPORT INCORRECT FPS.
4570 023306  005761  000026         10$:   TST     26(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
4571 023312  001002                        BNE     12$             ;BRANCH IF UNDERFLOW.
4572
4573                                                               ;REPORT FPS BAD AFTER OVERFLOW.
4574 023314  104141                11$:  ERROR   +141
4575 023316  000762                        BR      4$
4576
4577 023320                         12$:                          ;REPORT FPS BAD AFTER UNDERFLOW.
4578 023320  104142                13$:  ERROR   +142
4579 023322  000760                        BR      4$
4580
4581                               ;RESULT INCORRECT.
4582 023324  012700  023442         15$:   MOV     #OVFTT,R0       ;SEE IF FAILURE IS ANTICIPATED
4583 023330  010102                        MOV     R1,R2           ;FAILURE.
4584 023332  062702  000014                ADD     #14,R2
4585 023336  012703  000002                MOV     #2,R3
4586 023342  022022                16$:   CMP     (R0)+,(R2)+
4587 023344  001007                        BNE     17$             ;BRANCH IF NOT ANTICIPATED.
4588 023346  077303                        SOB     R3,16$
4589
4590 023350  010102                        MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
4591 023352  062702  000034                ADD     #34,R2          ;TO THE ERROR REPORT IN THE CALLING
4592 023356  010237  001236                MOV     R2,$TMP2        ;ROUTINE.
4593 023362  000112                        JMP     (R2)
4594
4595 023364  005761  000026         17$:   TST     26(R1)          ;RESULT WAS NOT ANTICIPATED
4596                                                               ;SO ERROR MUST BE REPORTED HERE.
4597                                                               ;FIRST SEE IF ARGUMENTS SHOULD
4598                                                               ;HAVE RESULTED IN OVERFLOW OR UNDER
4599                                                               ;FLOW BY LOOKING AT THE FLAG.
4600 023370  001002                        BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
4601
4602                                                               ;REPORT RESULT INCORRECT, EXPECTING
4603 023372  104143                18$:   ERROR   +143            ;OVERFLOW.
4604 023374  000733                        BR      4$
4605
4606 023376                         19$:                          ;REPORT RESULT INCORRECT, EXPECTING
```

TEST # 14 - SEE COMMENT ABOVE FOR TEST TITLE

```
4607 023376  104144                  20$:    ERROR   +144            ;UNDERFLOW.
4608 023400  000731                          BR      4$
4609
4610                                 ;IF NO FP TRAP OCCURS COME HERE.
4611 023402  170204                  25$:    STFPS   R4              ;GET FPS.
4612 023404  170305                          STST    R5              ;GET FEC.
4613 023406  012700  000200                  MOV     #200,R0         ;SET FD MODE.
4614 023412  170100                          LDFPS   R0
4615 023414  012700  023442                  MOV     #OVFTT,R0       ;GET THE RESULT.
4616 023420  174010                          STD     AC0,(R0)
4617 023422  010437  001250                  MOV     R4,$TMP7
4618 023426  010537  001254                  MOV     R5,$TMP11
4619 023432  010102                          MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
4620 023434  062702  000030                  ADD     #30,R2          ;RETURN TO THE ERROR REPORT OF THE
4621                                                                 ;CALLING ROUTINE.
4622 023440  000112                          JMP     (R2)
4623
4624 023442  000000  000000  000000  OVFTT:  .WORD   0,0,0,0
4625
4626 023452                          KKKDONE:
     023452  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                     ;SEE IF THE USER HAS EXPRESSED
                                                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                     ;THE USER TYPED CONTROL G?).
4627
4628
4629
4637
4638                                 ;TEST TITLE:UNDER/OVERFLOW, USING MULD WITH TRAPS ENABLED
```

```
                                .SBTTL  TEST # 15 - SEE COMMENT ABOVE FOR TEST TITLE
                                ;;*****************************************************************
                                ;*TEST 15       SEE COMMENT ABOVE FOR TEST TITLE
                                ;*
                                ;*THIS IS A TEST OF THE OVER FLOW AND UNDER FLOW CONDITIONS USING THE
                                ;*MULD INSTRUCTION WITH TRAPS ENABLED. A SUBROUTINE IS USED TO SET UP
                                ;*THE OPERANDS, EXECUTE THE MULD INSTRUCTION AND CHECK THE RESULTS.
                                ;*
                                ;;*****************************************************************
    023454  000004              TST15:  SCOPE

                                ;UNDERFLOW, EXPONENT OF RESULT = -129
023456                          LLL1:
    023456  104413                      LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
023460  004737  024002                  JSR     PC,OVUNDT
023464  020052  125252          1$:     .WORD   20052,125252        ;AC
023470  125252  125252                  .WORD   125252,125252
023474  020300  000000  000000  2$:     .WORD   20300,0,0,0         ;FSRC
023504  000177  177777  177777  3$:     .WORD   177,-1,-1,-1        ;RES
023514  000177  177777          4$:     .WORD   177,-1              ;ERROR RES.
023520  125252  125252                  .WORD   125252,125252
023524  002200                  5$:     2200                        ;FPS BEFORE EXECUTION.
023526  102204                          102204                      ;FPS AFTER EXECUTION.
023530  000012                  6$:     12                          ;FEC
023532  177777                          -1                          ;FLAG
023534  104157                  7$:     ERROR   +157                ;ST 331 (BUT FIU) NO TRAP.
023536  000401                          BR      8$
023540  104160                          ERROR   +160                ;ST 155 (BUT FD)
023542                          8$:

                                ;UNDERFLOW, EXPONENT OF THE RESULT = -193
023542                          LLL2:
    023542  104413                      LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
023544  004737  024002                  JSR     PC,OVUNDT
023550  010327  127272          1$:     .WORD   10327,127272        ;AC
023554  036363  045454                  .WORD   36363,45454
023560  010000  000000  000000  2$:     .WORD   10000,0,0,0         ;FSRC
023570  060127  127272          3$:     .WORD   60127,127272        ;RES
023574  036363  045454                  .WORD   36363,45454
023600  177777  177777  177777  4$:     .WORD   -1,-1,-1,-1         ;ERROR RES.
023610  007217                  5$:     7217                        ;FPS BEFORE EXECUTION.
023612  107200                          107200                      ;FPS AFTER EXECUTION.
023614  000012                  6$:     12                          ;FEC
023616  177777                          -1                          ;FLAG
023620  104161                  7$:     ERROR   +161                ;ST 137 (BUT FIU) NO TRAP.
023622  000401                          BR      8$
023624  104156                          ERROR   +156
023626                          8$:

                                ;OVERFLOW, EXPONENT OF THE RESULT = 128
023626                          LLL3:
    023626  104413                      LPERR                       ;SET UP THE LOOP ON ERROR ADDRESS.
023630  004737  024002                  JSR     PC,OVUNDT
023634  060252  125252          1$:     .WORD   60252,125252        ;AC
023640  125252  125252                  .WORD   125252,125252       ;FSRC
023644  160100  000000  000000  2$:     .WORD   160100,0,0,0        ;FSRC
023654  100177  177777  177777  3$:     .WORD   100177,-1,-1,-1     ;RES
```

TEST # 15 - SEE COMMENT ABOVE FOR TEST TITLE

```
 4684 023664  100177  177777          4$:     .WORD   100177,-1       ;ERROR RES.
 4685 023670  125252  125252                  .WORD   125252,125252
 4686 023674  001200                  5$:     1200                    ;FPS BEFORE EXECUTION.
 4687 023676  101216                          101216                  ;FPS AFTER EXECUTION.
 4688 023700  000010                  6$:     10                      ;FEC
 4689 023702  000000                          0                       ;FLAG
 4690 023704  104162                  7$:     ERROR   +162            ;ST 333 (BUT FIV) NO TRAP.
 4691 023706  000401                          BR      8$
 4692 023710  104163                          ERROR   +163            ;ST 700 (BUT FD).
 4693 023712                          8$:
 4694
 4695                                 ;OVERFLOW, EXPONENT OF THE RESULT = 130
 4696 023712                          LLL4:
      023712  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 4697 023714  004737  024002                  JSR     PC,OVUNDT
 4698 023720  060345  067654          1$:     .WORD   60345,67654     ;AC
 4699 023724  056765  045676                  .WORD   56765,45676
 4700 023730  060200  000000  000000  2$:     .WORD   60200,0,0,0     ;FSRC
 4701 023740  000345  067654          3$:     .WORD   345,67654       ;RES
 4702 023744  056765  045676                  .WORD   56765,45676
 4703 023750  177777  177777  177777  4$:     .WORD   -1,-1,-1,-1     ;ERROR RES.
 4704 023760  007215                  5$:     7215                    ;FPS BEFORE EXECUTION.
 4705 023762  107202                          107202                  ;FPS AFTER EXECUTION.
 4706 023764  000010                  6$:     10                      ;FEC
 4707 023766  000000                          0                       ;FLAG
 4708 023770  104164                  7$:     ERROR   +164            ;ST 133 (BUT FIV) NO TRAP
 4709 023772  000401                          BR      8$
 4710 023774  104155                          ERROR   +155
 4711 023776  000137  024414          8$:     JMP     LLLDONE
 4712
 4713                                 ;THIS SUBROUTINE, OVUNDT, IS USED TO SET UP THE OPERANDS, EXECUTE
 4714                                 ;THE MULD INSTRUCTION AND CHECK THE RESULTS OF AN INSTRUCTION WITH
 4715                                 ;OPERANDS WHICH SHOULD RESULT IN EITHER OVERFLOW OR UNDERFLOW. A CALL
 4716                                 ;TO IT IS MADE THUS:
 4717                                 ;
 4718                                 ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
```

```
                                ;              FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
                                ;              RES:    .WORD   X,X,X,X         ;EXPECTED RESULT
                                ;              ERRES:  .WORD   X,X,X,X         ;ERROR RESULT
                                ;              FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
                                ;              FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                ;              FEC:    .WORD   X               ;EXPECTED FEC
                                ;              FLAG:   .WORD   X               ;0/-1,OVER/UNDER FLOW FLAG
                                ;              ERR1:   ERROR   +X              ;TRAP ERROR.
                                ;              BR      CONT
                                ;              ERR2:   ERROR   +X              ;DATA, RESULT ERROR
                                ;              CONT:                           ;RETURN ADDRESS
                                ;
                                ;THE OPERANDS ARE SET UP (USING AC0 AS THE ACCUMULATOR). THEN
                                ;THE MULD INSTRUCTION IS EXECUTED. IF THE TRAP OCCURS THEN THE
                                ;RESULT IS CHECKED AGAINST RES. IF THE RESULT IS CORRECT THEN THE FPS IS
                                ;COMPARED WITH FPSA IF THIS TOO IS CORRECT OVUNDT RETURNS CONTROL
                                ;TO THE CALLING ROUTINE AT CONT. IF THE FPS IS BAD OVUNDT
                                ;REPORTS THIS FAILURE AND THEN RETURNS TO CONT. THE FEC IS TREATED
                                ;IN THE SAME WAY. IF THE RESULT OF THE
                                ;MULF IS INCORRECT, THE INCORRECT RESULT IS COMPARED WITH THE
                                ;ANTICIPATED FAILING DATA PATTERN, ERRES. IF THE FAILURE IN
                                ;THE RESULT WAS ANTICIPATED CORRECTLY TO BE ERRES THEN OVUNDT
                                ;WILL TRANSFER CONTROL TO THE ERROR CALL AT ERR2. OTHERWISE THE
                                ;RESULT WAS INCORRECT BUT WAS NOT ANTICIPATED AND OVUNDT WILL
                                ;REPORT THE FAILURE AFTER WHICH CONTROL WILL BE PASSED TO CONT.
                                ;IF NO TRAP OCCURS CONTROL IS PASSED TO ERR1.
                                ;NOTE THAT OVUNDNT USES THE FLAG
                                ;TO TELL WHETHER OR NOT THESE PARTICULAR OPERANDS WILL RESULT IN
                                ;UNDERFLOW (FLAG=-1) OR OVERFLOW (FLAG=0).

024002  012601                  OVUNDT: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
024004  012700  000200                  MOV     #200,R0         ;SET FD MODE.
024010  170100                          LDFPS   R0

024012  010100                          MOV     R1,R0           ;LOAD AC0, OPERAND.
024014  172410                          LDD     (R0),AC0

024016  010102                          MOV     R1,R2           ;SAVE     DATA PATTERNS IN CASE OF
024020  010237  001240                  MOV     R2,$TMP3        ;ERROR.
024024  062702  000010                  ADD     #10,R2
024030  010237  001242                  MOV     R2,$TMP4
024034  062702  000010                  ADD     #10,R2
024040  010237  001244                  MOV     R2,$TMP5
024044  016137  000042  001252          MOV     42(R1),$TMP10
024052  012737  024404  001246          MOV     #OVDTT,$TMP6

024060  016100  000040                  MOV     40(R1),R0       ;LOAD THE FPS.
024064  170100                          LDFPS   R0
024066  012737  024110  001236          MOV     #1$,$TMP2
024074  012737  024120  000244          MOV     #50$,FPVECT     ;SET UP THE FP TRAP VECTOR IN CASE
                                                                ;OF ERROR.
024102  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF FSRC.
024104  062700  000010                  ADD     #10,R0

024110  171010                  1$:     MULD    (R0),AC0        ;TEST INSTRUCTION. SHOULD CAUSE TRAP.
024112  170000                  2$:     CFCC
```

```
4777 024114  000137  024344                    JMP     25$             ;FAILURE, NO TRAP.
4778
4779 024120  011602                    50$:    MOV     (SP),R2         ;TRAP TO HERE AND SEE IF THE PC OF THE
4780 024122  020227  024112                    CMP     R2,#2$          ;TRAP WAS THAT OF THE MULF INSTRUCTION.
4781 024126  001402                            BEQ     51$             ;BRANCH IF YES.
4782 024130  000137  037450                    JMP     FPSPUR  ;OTHERWISE REPORT SPURIOUS FP ERROR.
4783
4784 024134  022626                    51$:    CMP     (SP)+,(SP)+     ;RESET THE STACK
4785 024136  170204                            STFPS   R4              ;GET FPS.
4786 024140  170305                            STST    R5              ;GET FEC.
4787 024142  012700  000200                    MOV     #200,R0         ;SET FD MODE.
4788 024146  170100                            LDFPS   R0
4789 024150  012700  024404                    MOV     #OVDTT,R0       ;GET THE RESULT.
4790 024154  174010                            STD     AC0,(R0)
4791 024156  010437  001250                    MOV     R4,$TMP7
4792 024162  010537  001254                    MOV     R5,$TMP11
4793
4794 024166  012700  024404                    MOV     #OVDTT,R0       ;CHECK THE RESULT.
4795 024172  010102                            MOV     R1,R2
4796 024174  062702  000020                    ADD     #20,R2
4797 024200  012703  000004                    MOV     #4,R3
4798 024204  022022                    3$:     CMP     (R0)+,(R2)+
4799 024206  001027                            BNE     15$             ;BRANCH IF INCORRECT.
4800 024210  077303                            SOB     R3,3$
4801
4802 024212  026104  000042                    CMP     42(R1),R4       ;WAS FPS CORRECT?
4803 024216  001014                            BNE     10$             ;BRANCH IF FPS IS INCORRECT.
4804
4805 024220  026105  000044                    CMP     44(R1),R5       ;IS FEC CORRECT?
4806 024224  001002                            BNE     5$              ;IF INCORRECT BRANCH.
4807 024226  00016'  000056            4$:     JMP     56(R1)          ;RETURN. TEST COMPLETED.
4808
4809                                    ;REPORT INCORRECT FEC.
4810 024232  005761  000046            5$:     TST     46(R1)          ;WAS THE RESULT OVERFLOW OR UNDERFLOW?
4811 024236  001002                            BNE     7$              ;BRANCH IF UNDERFLOW.
4812
4813                                                                    ;REPORT BAD FEC ON EXPECTED OVERFLOW.
4814 024240  104151                    6$:     ERROR   +151
4815 024242  000771                            BR      4$
4816
4817 024244                            7$:                             ;REPORT BAD FEC ON EXPECTED UNDERFLOW.
4818 024244  104152                    8$:     ERROR   +152
4819 024246  000767                            BR      4$
4820
4821                                    ;REPORT INCORRECT FPS.
4822 024250  005761  000046            10$:    TST     46(R1)          ;WAS THE RESULT OVER OR UNDER FLOW?
4823 024254  001002                            BNE     12$             ;BRANCH IF UNDERFLOW.
4824
4825                                                                    ;REPORT FPS BAD AFTER OVERFLOW.
4826 024256  104153                    11$:    ERROR   +153
4827 024260  000762                            BR      4$
4828
4829 024262                            12$:                            ;REPORT FPS BAD AFTER UNDERFLOW.
4830 024262  104154                    13$:    ERROR   +154
4831 024264  000760                            BR      4$
4832
4833                                    ;RESULT INCORRECT.
```

```
4834 024266  012700  024404          15$:    MOV     #OVDTT,R0       ;SEE IF FAILURE IS ANTICIPATED
4835 024272  010102                          MOV     R1,R2           ;FAILURE.
4836 024274  062702  000030                  ADD     #30,R2
4837 024300  012703  000004                  MOV     #4,R3
4838 024304  022022                  16$:    CMP     (R0)+,(R2)+
4839 024306  001007                          BNE     17$             ;BRANCH IF NOT ANTICIPATED.
4840 024310  077303                          SOB     R3,16$
4841
4842 024312  010102                          MOV     R1,R2           ;ERROR WAS ANTICIPATED SO RETURN
4843 024314  062702  000054                  ADD     #54,R2          ;TO THE ERROR REPORT IN THE CALLING
4844 024320  010237  001236                  MOV     R2,$TMP2        ;ROUTINE.
4845 024324  000112                          JMP     (R2)
4846
4847 024326  005761  000046          17$:    TST     46(R1)          ;RESULT WAS NOT ANTICIPATED
4848                                                                  ;SO ERROR MUST BE REPORTED HERE.
4849                                                                  ;FIRST SEE IF ARGUMENTS SHOULD
4850                                                                  ;HAVE RESULTED IN OVERFLOW OR UNDER
4851                                                                  ;FLOW BY LOOKING AT THE FLAG.
4852 024332  001002                          BNE     19$             ;BRANCH IF UNDERFLOW EXPECTED.
4853
4854                                                                  ;REPORT RESULT INCORRECT, EXPECTING
4855 024334  104155                  18$:    ERROR   +155            ;OVERFLOW.
4856 024336  000733                          BR      4$
4857
4858 024340                          19$:                            ;REPORT RESULT INCORRECT, EXPECTING
4859 024340  104156                  20$:    ERROR   +156            ;UNDERFLOW.
4860 024342  000731                          BR      4$
4861
4862                                  ;IF NO FP TRAP OCCURS COME HERE.
4863 024344  170204                  25$:    STFPS   R4              ;GET FPS.
4864 024346  170305                          STST    R5              ;GET FEC.
4865 024350  012700  000200                  MOV     #200,R0         ;SET FD MODE.
4866 024354  170100                          LDFPS   R0
4867 024356  012700  024404                  MOV     #OVDTT,R0       ;GET THE RESULT.
4868 024362  174010                          STD     AC0,(R0)
4869 024364  010437  001250                  MOV     R4,$TMP7
4870 024370  010537  001254                  MOV     R5,$TMP11
4871 024374  010102                          MOV     R1,R2           ;ERROR WAS ANTICIPATED SO
4872 024376  062702  000050                  ADD     #50,R2          ;RETURN TO THE ERROR REPORT OF THE
4873                                                                  ;CALLING ROUTINE.
4874 024402  000112                          JMP     (R2)
4875
4876 024404  000000  000000  000000  OVDTT:  .WORD   0,0,0,0
4877
4878 024414                          LLLDONE:
     024414  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                     ;SEE IF THE USER HAS EXPRESSED
                                                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                     ;THE USER TYPED CONTROL G?).
4879
4880
4881
4882
4890
```

```
4891                                    .SBTTL  TEST # 16 - MODF TEST
                                        ;;*****************************************************************
                                        ;*TEST 16       MODF TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE MODF INSTRUCTION, WHICH MAKES USE OF
                                        ;*A SUBROUTINE TO SET UP THE OPERANDS, EXECUTE THE MODF INSTRUCTION
                                        ;*AND CHECK THE RESULTS.
                                        ;*
                                        ;;*****************************************************************
     024416  000004                     TST16:  SCOPE
4892
4893                                    ;MODF WITH (FSRC=AC=0)
4894 024420                             GGG1:
     024420  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4895 024422  004737  025504                     JSR     PC,MODFSUB
4896 024426  000000  000000            1$:      .WORD   0,0             ;AC
4897 024432  000000  000000            2$:      .WORD   0,0             ;FSRC
4898 024436  000000  000000            3$:      .WORD   0,0             ;FRACTIONAL RES.
4899 024442  000000  000000            4$:      .WORD   0,0             ;INTEGER RES.
4900 024446  177777  177777            5$:      .WORD   -1,-1           ;ERROR FRACTIONAL RES.
4901 024452  177777  177777            6$:      .WORD   -1,-1           ;ERROR INGETER RES.
4902 024456  000013                     7$:      13                      ;FPS BEFORE EXECUTION.
4903 024460  000004                              4                       ;FPS AFTER EXECUTION.
4904 024462  104056                     8$:      ERROR   +56             ;STORE SINGLE ZERO BAD.
4905 024464  000401                              BR      9$
4906 024466  104057                              ERROR   +57             ;AC V 1 <= ZERO FAILED.
4907 024470                             9$:
4908
4909                                    ;MODF TEST, WITH (FSRC=0)
4910 024470                             GGG2:
     024470  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4911 024472  004737  025504                     JSR     PC,MODFSUB
4912 024476  123456  076543            1$:      .WORD   123456,76543    ;AC
4913 024502  000000  000000            2$:      .WORD   0,0             ;FSRC
4914 024506  000000  000000            3$:      .WORD   0,0             ;FRACTIONAL RES.
4915 024512  000000  000000            4$:      .WORD   0,0             ;INTEGER RESULT.
4916 024516  123456  076543            5$:      .WORD   123456,76543    ;ERROR FRACTIONAL RES.
4917 024522  177777  177777            6$:      .WORD   -1,-1           ;ERROR INTEGER RES.
4918 024526  000000                     7$:      0                       ;FPS BEFORE EXECUTION.
4919 024530  000004                              4                       ;FPS AFTER EXECUTION.
4920 024532  104056                     8$:      ERROR   +56             ;STORE ZERO FAILURE.
4921 024534  000401                              BR      9$
4922 024536  104057                              ERROR   +57
4923 024540                             9$:
4924
4925                                    ;MODF TEST WITH (AC=0)
4926 024540                             GGG3:
     024540  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4927 024542  004737  025504                     JSR     PC,MODFSUB
4928 024546  000000  000000            1$:      .WORD   0,0             ;AC
4929 024552  076543  021234            2$:      .WORD   76543,21234     ;FSRC
4930 024556  000000  000000            3$:      .WORD   0,0             ;FRACTIONAL RES.
4931 024562  000000  000000            4$:      .WORD   0,0             ;INTEGER RES.
4932 024566  000000  000000            5$:      .WORD   0,0             ;ERROR FRACTIONAL RES.
4933 024572  177777  177777            6$:      .WORD   -1,-1           ;ERROR INTEGER RES.
4934 024576  000003                     7$:      3                       ;FPS BEFORE EXECUTION.
4935 024600  000004                              4                       ;FPS AFTER EXECUTION.
```

```
4936 024602  104053                8$:     ERROR   +53             ;RES.BAD
4937 024604  000401                        BR      9$
4938 024606  104057                        ERROR   +57
4939 024610                        9$:
4940
4941                               ;MODF TEST WITH EXPONENT OF THE RESULT = 25
4942 024610                        GGG4:
     024610  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4943 024612  004737  025504                JSR     PC,MODFSUB
4944 024616  046252  125252        1$:     .WORD   46252,125252    ;AC
4945 024622  040300  000000        2$:     .WORD   40300,0         ;FSRC
4946 024626  000000  000000        3$:     .WORD   0,0             ;FRACTIONAL RES.
4947 024632  046377  177777        4$:     .WORD   46377,-1        ;INTEGER RES.
4948 024636  046252  125252        5$:     .WORD   46252,125252    ;ERROR FRACTIONAL RES.
4949 024642  040300  000000        6$:     .WORD   40300,0         ;ERROR INTEGER RES.
4950 024646  000013                7$:     13                      ;FPS BEFORE EXECUTION.
4951 024650  000004                        4                       ;FPS AFTER EXECUTION.
4952 024652  104053                8$:     ERROR   +53             ;ST 134
4953 024654  000401                        BR      9$
4954 024656  104060                        ERROR   +60
4955 024660                        9$:
4956
4957                               ;MODF TEST WITH EXPONENT OF THE RESULT = 127
4958 024660                        GGG5:
     024660  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4959 024662  004737  025504                JSR     PC,MODFSUB
4960 024666  077652  125252        1$:     .WORD   77652,125252    ;AC
4961 024672  040300  000000        2$:     .WORD   40300,0         ;FSRC
4962 024676  000000  000000        3$:     .WORD   0,0             ;FRACTIONAL RES.
4963 024702  077777  177777        4$:     .WORD   77777,-1        ;INTEGER RES.
4964 024706  077652  125252        5$:     .WORD   77652,125252    ;ERROR FRACTIONAL RES.
4965 024712  040300  000000        6$:     .WORD   40300,0         ;ERROR INTEGER RES.
4966 024716  000000                7$:     0                       ;FPS BEFORE EXECUTION.
4967 024720  000004                        4                       ;FPS AFTER EXECUTION.
4968 024722  104053                8$:     ERROR   +53
4969 024724  000401                        BR      9$
4970 024726  104060                        ERROR   +60
4971 024730                        9$:
4972
4973                               ,MODF TEST WITH EXPONENT OF RESULT = 25
4974 024730                        GGG6:
     024730  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
4975 024732  004737  025504                JSR     PC,MODFSUB
4976 024736  046200  000001        1$:     .WORD   46200,1         ;AC
4977 024742  040340  000000        2$:     .WORD   40340,0         ;FSRC
4978 024746  000000  000000        3$:     .WORD   0,0             ;FRACTIONAL RES.
4979 024752  046340  000001        4$:     .WORD   46340,1         ;INTEGER RES.
4980 024756  040000  000000        5$:     .WORD   40000,0         ;ERROR FRACTIONAL RES.
4981 024762  177777  177777        6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
4982 024766  000013                7$:     13                      ;FPS BEFORE EXECUTION.
4983 024770  000004                        4                       ;FPS AFTER EXECUTION.
4984 024772  104061                8$:     ERROR   +61             ;BAD CONSTANT (NOT 24),
4985                                                               ;OR ST 525 TO 050 INTO 150.
4986 024774  000401                        BR      9$
4987 024776  104054                        ERROR   +54
4988 025000                        9$:
4989
```

```
                                        ;MODF   TEST WITH EXPONENT OF THE RESULT = 24
                                        GGG7:
                                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                                JSR     PC,MODFSUB
                                        1$:     .WORD   46000,1         ;AC
                                        2$:     .WORD   40340,0         ;FSRC
                                        3$:     .WORD   40100,0         ;FRACTIONAL RES.
                                        4$:     .WORD   46140,1         ;INTEGER RESULT.
                                        5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
                                        6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
                                        7$:     0                       ;FPS BEFORE EXECUTION.
                                                0                       ;FPS AFTER EXECUTION.
                                        8$:     ERROR   +62             ;BAD CONSTANT USED (NOT 24)
                                                                        ;OR ST 525 TO 150 INTO 050
                                                BR      9$
                                                ERROR   +54
                                        9$:

                                        ;MODF TEST WITH EXPONENT OF THE RESULT = 10
                                        GGG8:
                                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                                JSR     PC,MODFSUB
                                        1$:     .WORD   42577,-1        ;AC
                                        2$:     .WORD   40200,0         ;FSRC
                                        3$:     .WORD   40177,176000    ;FRACTIONAL RES.
                                        4$:     .WORD   42577,140000    ;INTEGER RES.
                                        5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
                                        6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
                                        7$:     0                       ;FPS BEFORE EXECUTION.
                                                0                       ;FPS AFTER EXECUTION.
                                        8$:     ERROR   +53
                                                BR      9$
                                                ERROR   +54
                                        9$:

                                        ;MODF TEST WITH THE EXPONENT OF THE RESULT = 10
                                        GGG9:
                                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                                JSR     PC,MODFSUB
                                        1$:     .WORD   42577,140001    ;AC
                                        2$:     .WORD   40200,0         ;FSRC
                                        3$:     .WORD   34600,0         ;FRACTIONAL RES.
                                        4$:     .WORD   42577,140000    ;INTEGER RES.
                                        5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
                                        6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
                                        7$:     0                       ;FPS BEFORE EXECUTION.
                                                0                       ;FPS AFTER EXECUTION.
                                        8$:     ERROR   +63             ;ST 532 TO 122 INTO NORMALIZE.
                                                BR      9$
                                                ERROR   +54
                                        9$:

                                        ;MODF TEST WITH EXPONENT OF THE RESULT = 9
                                        GGG10:
                                                LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
                                                JSR     PC,MODFSUB
                                        1$:     .WORD   42377,100000    ;AC
```

4990				
4991	025000			
	025000	104413		
4992	025002	004737	025504	
4993	025006	046000	000001	
4994	025012	040340	000000	
4995	025016	040100	000000	
4996	025022	046140	000001	
4997	025026	000000	000000	
4998	025032	177777	177777	
4999	025036	000000		
5000	025040	000000		
5001	025042	104062		
5002				
5003	025044	000401		
5004	025046	104054		
5005	025050			
5006				
5007				
5008	025050			
	025050	104413		
5009	025052	004737	025504	
5010	025056	042577	177777	
5011	025062	040200	000000	
5012	025066	040177	176000	
5013	025072	042577	140000	
5014	025076	177777	177777	
5015	025102	177777	177777	
5016	025106	000000		
5017	025110	000000		
5018	025112	104053		
5019	025114	000401		
5020	025116	104054		
5021	025120			
5022				
5023				
5024	025120			
	025120	104413		
5025	025122	004737	025504	
5026	025126	042577	140001	
5027	025132	040200	000000	
5028	025136	034600	000000	
5029	025142	042577	140000	
5030	025146	000000	000000	
5031	025152	177777	177777	
5032	025156	000000		
5033	025160	000000		
5034	025162	104063		
5035	025164	000401		
5036	025166	104054		
5037	025170			
5038				
5039				
5040	025170			
	025170	104413		
5041	025172	004737	025504	
5042	025176	042377	100000	

```
 5043 025202  040200  000000          2$:     .WORD   40200,0         ;FSRC
 5044 025206  000000  000000          3$:     .WORD   0,0             ;FRACTIONAL RES.
 5045 025212  042377  100000          4$:     .WORD   42377,100000    ;INTEGER RES.
 5046 025216  177777  177777          5$:     .WORD   -1,-1           ;ERROR FRACTIONAL RES.
 5047 025222  177777  177777          6$:     .WORD   -1,-1           ;ERROR INTEGER RES.
 5048 025226  000013                  7$:     13                      ;FPS BEFORE EXECUTION.
 5049 025230  000004                          4                       ;FPS AFTER EXECUTION.
 5050 025232  104053                  8$:     ERROR   +53
 5051 025234  000401                          BR      9$
 5052 025236  104054                          ERROR   +54
 5053 025240                          9$:
 5054
 5055                                 ;MODF TEST WITH EXPONENT OF THE RESULT = 0
 5056 025240                          GGG11:
      025240  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5057 025242  004737  025504                  JSR     PC,MODFSUB
 5058 025246  040177  177777          1$:     .WORD   40177,-1        ;AC
 5059 025252  040200  000000          2$:     .WORD   40200,0         ;FSRC
 5060 025256  040177  177777          3$:     .WORD   40177,-1        ;FRACTIONAL RES.
 5061 025262  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
 5062 025266  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
 5063 025272  040177  177777          6$:     .WORD   40177,-1        ;ERROR INTEGER RES.
 5064 025276  000017                  7$:     17                      ;FPS BEFORE EXECUTION.
 5065 025300  000000                          0                       ;FPS AFTER EXECUTION.
 5066 025302  104064                  8$:     ERROR   +64             ;ST 041 TO 046 INTO 246.
 5067 025304  000401                          BR      9$
 5068 025306  104064                          ERROR   +64
 5069 025310                          9$:
 5070
 5071                                 ;MODF TEST WITH EXPONENT OF THE RESULT = -15
 5072 025310                          GGG12:
      025310  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5073 025312  004737  025504                  JSR     PC,MODFSUB
 5074 025316  034377  177777          1$:     .WORD   34377,-1        ;AC
 5075 025322  040200  000000          2$:     .WORD   40200,0         ;FSRC
 5076 025326  034377  177777          3$:     .WORD   34377,-1        ;FRACTIONAL RES.
 5077 025332  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
 5078 025336  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
 5079 025342  034377  177777          6$:     .WORD   34377,-1        ;ERROR INTEGER RES.
 5080 025346  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
 5081 025350  000000                          0                       ;FPS AFTER EXECUTION.
 5082 025352  104064                  8$:     ERROR   +64
 5083 025354  000401                          BR      9$
 5084 025356  104064                          ERROR   +64
 5085 025360                          9$:
 5086
 5087                                 ;MODF TEST WITH EXPONENT OF RESULT = -64, IN ROUND MODE
 5088 025360                          GGG13:
      025360  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5089 025362  004737  025504                  JSR     PC,MODFSUB
 5090 025366  020000  000001          1$:     .WORD   20000,1         ;AC
 5091 025372  040300  000000          2$:     .WORD   40300,0         ;FSRC
 5092 025376  020100  000002          3$:     .WORD   20100,2         ;FRACTIONAL RES.
 5093 025402  000000  000000          4$:     .WORD   0,0             ;INTEGER RES.
 5094 025406  020100  000001          5$:     .WORD   20100,1         ;ERROR FRACTIONAL RES.
 5095 025412  000000  000000          6$:     .WORD   0,0             ;ERROR INTEGER RES.
 5096 025416  000000                  7$:     0                       ;FPS BEFORE EXECUTION.
```

```
5097 025420  000000                        0                       ;FPS AFTER EXECUTION.
5098 025422  104065              8$:       ERROR   +65             ;ROUND TRUNK, ST 126 INTO ROUND.
5099 025424  000401                        BR      9$
5100 025426  104054                        ERROR   +54
5101 025430                      9$:
5102
5103                             ;MODF TEST WITH EXPONENT OF RESULT = 11
5104 025430                      GGG14:
     025430  104413                        LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5105 025432  004737  025504              JSR     PC,MODFSUB
5106 025436  142777  170000      1$:     .WORD   142777,170000   ;AC
5107 025442  040200  000000      2$:     .WORD   40200,0         ;FSRC
5108 025446  140000  000000      3$:     .WORD   140000,0        ;FRACTIONAL RES.
5109 025452  142777  160000      4$:     .WORD   142777,160000   ;INTEGER RES.
5110 025456  040000  000000      5$:     .WORD   40000,0         ;ERROR FRACTIONAL RES.
5111 025462  042777  160000      6$:     .WORD   42777,160000    ;ERROR INTEGER RES.
5112 025466  000007              7$:     7                       ;FPS BEFORE EXECUTION.
5113 025470  000010                      10                      ;FPS AFTER EXECUTION.
5114 025472  104066              8$:     ERROR   +66             ;SIGN OF FRACTION.
5115 025474  000401                      BR      9$
5116 025476  104067                      ERROR   +67             ;SIGN OF INTEGER.
5117 025500  000137  026072      9$:     JMP     GGGDONE         ;GO TO NEXT TEST.
5118
5119
5120                             ;THIS SUBROUTINE, MODFSUB, IS CALLED TO SETUP THE
5121                             ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
5122                             ;IT IS CALLED THUS:
5123                             ;
5124                             ;               ACARG:  .WORD   X,X             ;AC OPERAND
5125                             ;               FSRCARG:.WORD   X,X             ;FSRC OPERAND
5126                             ;               FRES:   .WORD   X,X             ;FRACTIONAL RESULT
5127                             ;               INTRES: .WORD   X,X             ;INTEGER RESULT
5128                             ;               ERFRES: .WORD   X,X             ;ERROR FRACTION RESULT
5129                             ;               ERINTRES:.WORD  X,X             ;ERROR INTEGER RESULT
5130                             ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
5131                             ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
5132                             ;               ERR1:   ERROR   +X              ;FRACTION ERROR
5133                             ;                       BR      CONT
5134                             ;               ERR2:   ERROR   +X              ;INTEGER ERROR
5135                             ;               CONT:                           ;RETURN ADDRESS
5136                             ;
5137                             ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
5138                             ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
5139                             ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
5140                             ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
5141                             ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
5142                             ;THEN MODFSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
5143                             ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
5144                             ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
5145                             ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
5146                             ;FAILURE MATCHES THE TRUE RESULT THEN  MODFSUB PASSES CONTROL TO THE
5147                             ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
5148                             ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
5149                             ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
5150                             ;IF A MATCH IS MADE HOWEVER, MODFSUB WILL RETURN CONTROL TO THE ERROR
5151                             ;CALL AT ERR2.
5152
```

```
5153 025504  012601                    MODFSUB:  MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
5154 025506  012700  000200                      MOV     #200,R0         ;SET FD MODE.
5155 025512  170100                              LDFPS   R0
5156 025514  010100                              MOV     R1,R0           ;SET UP AC0
5157 025516  172410                              LDD     (R0),AC0
5158 025520  012700  026062                      MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
5159 025524  172510                              LDD     (R0),AC1
5160 025526  016100  000030                      MOV     30(R1),R0       ;SET UP THE FPS.
5161 025532  170100                              LDFPS   R0
5162 025534  012737  025550  001236              MOV     #1$,$TMP2
5163 025542  010100                              MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
5164 025544  062700  000004                      ADD     #4,R0
5165
5166 025550  171410                    1$:       MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUC ION.
5167
5168 025552  170204                              STFPS   R4              ;GET THE FPS.
5169 025554  012700  000200                      MOV     #200,R0         ;SET FD MODE.
5170 025560  170100                              LDFPS   R0
5171 025562  012700  026042                      MOV     #MODFT0,R0      ;GET THE FRACTIONAL RESULT.
5172 025566  174010                              STD     AC0,(R0)
5173 025570  012700  026052                      MOV     #MODFT1,R0      ;GET THE INTEGER RESULT.
5174 025574  174110                              STD     AC1,(R0)
5175
5176 025576  010102                              MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
5177 025600  010237  001240                      MOV     R2,$TMP3
5178 025604  062702  000004                      ADD     #4,R2
5179 025610  010237  001242                      MOV     R2,$TMP4
5180 025614  062702  000004                      ADD     #4,R2
5181 025620  010237  001244                      MOV     R2,$TMP5
5182 025624  062702  000004                      ADD     #4,R2
5183 025630  010237  001246                      MOV     R2,$TMP6
5184 025634  012737  026042  001250              MOV     #MODFT0,$TMP7
5185 025642  012737  026052  001252              MOV     #MODFT1,$TMP10
5186 025650  010437  001254                      MOV     R4,$TMP11
5187 025654  016137  000032  001256              MOV     32(R1),$TMP12
5188
5189 025662  012702  026042                      MOV     #MODFT0,R2      ;CHECK THE FRACTIONAL RESULT.
5190 025666  026112  000010                      CMP     10(R1),(R2)
5191 025672  001022                              BNE     10$             ;BRANCH IF INCORRECT.
5192 025674  026162  000012  000002              CMP     12(R1),2(R2)
5193 025702  001016                              BNE     10$
5194
5195 025704  012702  026052                      MOV     #MODFT1,R2      ;CHECK THE INTEGER RESULT.
5196 025710  026112  000014                      CMP     14(R1),(R2)
5197 025714  001026                              BNE     15$             ;BRANCH IF INCORRECT.
5198 025716  026162  000016  000002              CMP     16(R1),2(R2)
5199 025724  001022                              BNE     15$
5200
5201 025726  026104  000032                      CMP     32(R1),R4       ;CHECK THE FPS.
5202 025732  001034                              BNE     20$             ;BRANCH IF INCORRECT.
5203
5204 025734  000161  000042            9$:       JMP     42(R1)          ;RETURN.
5205
5206                                   ;FRACTIONAL ERROR.
5207 025740  026112  000020            10$:      CMP     20(R1),(R2)     ;WAS THE ERROR ANTICIPATED?
5208 025744  001010                              BNE     11$             ;BRANCH IF NOT ANTICIPATED.
5209 025746  026162  000022  000002              CMP     22(R1),2(R2)
```

```
5210 025754  001004                        BNE     11$
5211 025756  010102                        MOV     R1,R2           ;THE ERROR WAS ANTICIPATED SO
5212 025760  062702  000034                ADD     #34,R2          ;RETURN TO THE ERROR REPORT AT THE
5213                                                                ;CALLING ROUTINE.
5214 025764  000112                        JMP     (R2)
5215
5216 025766                          11$:                           ;THE ERROR WAS NOT ANTICIPATED SO
5217 025770  104053                  12$:  ERROR   +53             ;REPORT THE INCORRECT FRACTION HERE.
5218 025772  000761                        BR      9$
5219
5220                                 ;INTEGER ERROR.
5221 025772  026112  000024          15$:  CMP     24(R1),(R2)     ;WAS THIS ERROR ANTICIPATED?
5222 025776  001010                        BNE     16$             ;BRANCH IF NOT.
5223 026000  026162  000026  000002        CMP     26(R1),2(R2)
5224 026006  001004                        BNE     16$
5225 026010  010102                        MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
5226 026012  062702  000040                ADD     #40,R2          ;TO THE ERROR REPORT IN THE CALLING
5227                                                                ;ROUTINE.
5228 026016  000112                        JMP     (R2)
5229
5230 026020                          16$:                           ;THE ERROR WAS NOT ANTICIPATED SO REPORT
5231 026020  104054                  17$:  ERROR   +54             ;THE INTEGER FAILURE HERE.
5232 026022  000744                        BR      9$
5233
5234                                 ;FPS INCORRECT.
5235 026024  010437  001254          20$:  MOV     R4,$TMP11       ;REPORT INCORRECT FPS.
5236 026030  016137  000032  001256        MOV     32(R1),$TMP12
5237 026036  104055                  21$:  ERROR   +55
5238 026040  000735                        BR      9$
5239
5240 026042  000000  000000  000000  MODFT0: .WORD   0,0,0,0
5241
5242 026052  000000  000000  000000  MODFT1: .WORD   0,0,0,0
5243
5244 026062  177777  177777  177777  MODP1:  .WORD   -1,-1,-1,-1
5245
5246 026072                          GGGDONE:
     026072  104412                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                    ;SEE IF THE USER HAS EXPRESSED
                                                                    ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                    ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                    ;THE USER TYPED CONTROL G?).
5247
5248
5249
5257
```

```
5258                                    .SBTTL  TEST # 17 - MODD TEST
                                        ;;*****************************************************************
                                        ;*TEST 17       MODD TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE MODD INSTRUCTION. IT MAKES USE OF A SUBROUTINE
                                        ;*TO SET UP THE ARGUMENTS, EXECUTE THE INSTRUCTION AND CHECK THE
                                        ;*RESULTS.
                                        ;*
                                        ;;*****************************************************************
     026074  000004                     TST17:  SCOPE
5259
5260                                    ;MODD WITH (FSRC=AC=0)
5261 026076                             HHH1:
     026076  104413                             LPEFR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5262 026100  004737  027602                     JSR     PC,MODDSUB
5263 026104  000000  000000  000000     1$:     .WORD   0,0,0,0         ;AC
5264 026114  000000  000000  000000     2$:     .WORD   0,0,0,0         ;FSRC
5265 026124  000000  000000  000000     3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5266 026134  000000  000000  000000     4$:     .WORD   0,0,0,0         ;INTEGER RES.
5267 026144  000000  000000  000000     5$:     .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
5268 026154  000000  000000  177777     6$:     .WORD   0,0,-1,-1       ;ERROR INTEGER RES.
5269 026164  000200                     7$:     200                     ;FPS BEFORE EXECUTION.
5270 026166  000204                             204                     ;FPS AFTER EXECUTION.
5271 026170  104070                     8$:     ERROR   +70
5272 026172  000401                             BR      9$
5273 026174  104074                             ERROR   +74             ;ST 231 TO 142 INTO 143
5274 026176                             9$:
5275
5276                                    ;MODD TEST WITH FSRC=0
5277 026176                             HHH2:
     026176  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5278 026200  004737  027602                     JSR     PC,MODDSUB
5279 026204  012345  067012             1$:     .WORD   012345,67012    ;AC
5280 026210  034567  012345                     .WORD   34567,012345
5281 026214  000000  000000  000000     2$:     .WORD   0,0,0,0         ;FSRC
5282 026224  000000  000000  000000     3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5283 026234  000000  000000  000000     4$:     .WORD   0,0,0,0         ;INTEGER RES.
5284 026244  012345  067012             5$:     .WORD   012345,67012    ;ERROR FRACTIONAL RES.
5285 026250  034567  012345                     .WORD   34567,012345
5286 026254  177777  177777  177777     6$:     .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
5287 026264  000213                     7$:     213                     ;FPS BEFORE EXECUTION.
5288 026266  000204                             204                     ;FPS AFTER EXECUTION.
5289 026270  104075                     8$:     ERROR   +75             ;STORE DOUBLE ZERO
5290 026272  000401                             BR      9$
5291 026274  104076                             ERROR   +76             ;AC V 1 <= ZERO ST 143
5292 026276                             9$:
5293
5294                                    ;MODD TEST WITH (AC=0)
5295 026276                             HHH3:
     026276  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5296 026300  004737  027602                     JSR     PC,MODDSUB
5297 026304  000000  000000  000000     1$:     .WORD   0,0,0,0         ;AC
5298 026314  072727  127272             2$:     .WORD   72727,127272    ;FSRC
5299 026320  072727  127272                     .WORD   72727,127272
5300 026324  000000  000000  000000     3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5301 026334  000000  000000  000000     4$:     .WORD   0,0,0,0         ;INTEGER RES.
5302 026344  177777  177777  177777     5$:     .WORD   -1,-1,-1,-1     ;ERROR FRACTIONAL RES.
```

TEST # 17 - MODD TEST

```
5303 026354  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
5304 026364  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
5305 026366  000204                          204                     ;FPS AFTER EXECUTION.
5306 026370  104070                  8$:     ERROR   +70
5307 026372  000401                          BR      9$
5308 026374  104071                          ERROR   +71
5309 026376                          9$:
5310
5311                                 ;MODD TEST WITH EXPONENT OF THE RESULT = 57
5312 026376                          HHH4:
     026376  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5313 026400  004737  027602                  JSR     PC,MODDSUB
5314 026404  056252  125252          1$:     .WORD   56252,125252    ;AC
5315 026410  125252  125250                  .WORD   125252,125250
5316 026414  040300  000000  000000  2$:     .WORD   40300,0,0,0     ;FSRC
5317 026424  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5318 026434  056377  177777  177777  4$:     .WORD   56377,-1,-1,-4  ;INTEGER RES.
5319 026444  000000  000000          5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
5320 026450  125252  125252                  .WORD   125252,125252
5321 026454  056377  177777  177777  6$:     .WORD   56377,-1,-1,-1  ;ERROR INTEGER RES.
5322 026464  000213                  7$:     213                     ;FPS BEFORE EXECUTION.
5323 026466  000204                          204                     ;FPS AFTER EXECUTION.
5324 026470  104077                  8$:     ERROR   +77             ;ST 526 TO 134 INTO 135
5325 026472  000401                          BR      9$
5326 026474  104077                          ERROR   +77
5327 026476                          9$:
5328
5329                                 ;MODD TEST WITH EXPONENT OF THE RESULT = 79
5330 026476                          HHH5:
     026476  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5331 026500  004737  027602                  JSR     PC,MODDSUB
5332 026504  140240  000000  000000  1$:     .WORD   140240,0,0,0    ;AC
5333 026514  063714  146314          2$:     .WORD   63714,146314    ;FSRC
5334 026520  133572  167737                  .WORD   133572,167737
5335 026524  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5336 026534  163777  177777          4$:     .WORD   163777,-1       ;INTEGER RES.
5337 026540  162531  125726                  .WORD   162531,125726
5338 026544  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1     ;ERROR FRACTIONAL RES.
5339 026554  063777  177777          6$:     .WORD   63777,-1        ;ERROR INTEGER RES.
5340 026560  162531  125726                  .WORD   162531,125726
5341 026564  000210                  7$:     210                     ;FPS BEFORE EXECUTION.
5342 026566  000204                          204                     ;FPS AFTER EXECUTION.
5343 026570  104070                  8$:     ERROR   +70
5344 026572  000401                          BR      9$
5345 026574  104100                          ERROR   +100            ;ST 526 BAD SIGN
5346 026576                          9$:
5347
5348                                 ;MODD TEST WITH EXPONENT OF THE RESULT = 57
5349 026576                          HHH6:
     026576  104413                          LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5350 026600  004737  027602                  JSR     PC,MODDSUB
5351 026604  056200  000000  000000  1$:     .WORD   56200,0,0,1     ;AC
5352 026614  040340  000000  000000  2$:     .WORD   40340,0,0,0     ;FSRC
5353 026624  000000  000000  000000  3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5354 026634  056340  000000  000000  4$:     .WORD   56340,0,0,1     ;INTEGER RES.
5355 026644  040000  000000  000000  5$:     .WORD   40000,0,0,0     ;ERROR FRACTIONAL RES.
5356 026654  056340  000000  000000  6$:     .WORD   56340,0,0,1     ;ERROR INTEGER RES.
```

```
5357 026664  000213                    7$:     213                     ;FPS BEFORE EXECUTION.
5358 026666  000204                            204                     ;FPS AFTER EXECUTION.
5359 026670  104101                    8$:     ERROR   +101            ;CONSTANT BAD (NOT 56)
5360                                                                   ;OR ST 525 TO 050 INTO 150
5361 026672  000401                            BR      9$
5362 026674  104101                            ERROR   +101
5363 026676                            9$:
5364
5365                                   ;MODD TEST WITH EXPONENT OF THE RESULT = 56
5366 026676                            HHH7:
     026676  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5367 026700  004737  027602                    JSR     PC,MODDSUB
5368 026704  056000  000000  000000  1$:      .WORD   56000,0,0,1     ;AC
5369 026714  040340  000000  000000  2$:      .WORD   40340,0,0,0     ;FSRC
5370 026724  040100  000000  000000  3$:      .WORD   40100,0,0,0     ;FRACTIONAL RES.
5371 026734  056140  000000  000000  4$:      .WORD   56140,0,0,1     ;INTEGER RES.
5372 026744  000000  000000  000000  5$:      .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
5373 026754  056140  000000  000000  6$:      .WORD   56140,0,0,1     ;ERROR INTEGER RES.
5374 026764  000213                    7$:     213                     ;FPS BEFORE EXECUTION.
5375 026766  000200                            200                     ;FPS AFTER EXECUTION.
5376 026770  104102                    8$:     ERROR   +102            ;BAD CONSTANT (NOT 56) OR
5377                                                                   ;ST 525 TO 150 INTO 050
5378 026772  000401                            BR      9$
5379 026774  104102                            ERROR   +102
5380 026776                            9$:
5381
5382                                   ;MODD TEST WITH EXPONENT OF THE RESULT = 36
5383 026776                            HHH8:
     026776  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5384 027000  004737  027602                    JSR     PC,MODDSUB
5385 027004  051177  177777  177777  1$:      .WORD   51177,-1,-1,-1  ;AC
5386 027014  040200  000000  000000  2$:      .WORD   40200,0,0,0     ;FSRC
5387 027024  040177  177760  000000  3$:      .WORD   40177,-20,0,0   ;FRACTIONAL RES.
5388 027034  051177  177777  177760  4$:      .WORD   51177,-1,-20,0  ;INTEGER RES.
5389 027044  177777  177777  177777  5$:      .WORD   -1,-1,-1,-1     ;ERROR FRACTIONAL RES.
5390 027054  177777  177777  177777  6$:      .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
5391 027064  000217                    7$:     217                     ;FPS BEFORE EXECUTION.
5392 027066  000200                            200                     ;FPS AFTER EXECUTION.
5393 027070  104070                    8$:     ERROR   +70
5394 027072  000401                            BR      9$
5395 027074  104071                            ERROR   +71
5396 027076                            9$:
5397
5398                                   ;MODD TEST WITH EXPONENT OF THE RESULT = 30
5399 027076                            HHH9:
     027076  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5400 027100  004737  027602                    JSR     PC,MODDSUB
5401 027104  040200  000000  000000  1$:      .WORD   40200,0,0,0     ;AC
5402 027114  047577  177777            2$:     .WORD   47577,-1        ;FSRC
5403 027120  176000  000001                    .WORD   176000,1
5404 027124  031600  000000  000000  3$:      .WORD   31600,0,0,0     ;FRACTIONAL RES.
5405 027134  047577  177777            4$:     .WORD   47577,-1        ;INTEGER RES.
5406 027140  176000  000000                    .WORD   176000,0
5407 027144  000000  000000  000000  5$:      .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
5408 027154  047577  177777  177777  6$:      .WORD   47577,-1,-1,-1  ;ERROR INTEGER RES.
5409 027164  000200                    7$:     200                     ;FPS BEFORE EXECUTION.
5410 027166  000200                            200                     ;FPS AFTER EXECUTION.
```

```
5411 027170  104103                  8$:     ERROR   +103           ;(NORMALIZE) ST 532 TO 122
5412                                                                  ;INTO NORM.
5413 027172  000401                          BR      9$
5414 027174  104104                          ERROR   +104           ;AC V 1 <= X14
5415                                                                  ;OR ST 733 TO 156 INTO 157.
5416 027176                          9$:
5417
5418                                 ;MODD TEST WITH EXPONENT OF THE RESULT = 31
5419 027176                          HHH10:
     027176  104413                          LPERR                  ;SET UP THE LOOP ON ERROR ADDRESS.
5420 027200  004737  027602                  JSR     PC,MODDSUB
5421 027204  047777  177777          1$:     .WORD   47777,-1       ;AC
5422 027210  177000  000000                  .WORD   177000,0
5423 027214  040200  000000  000000  2$:     .WORD   40200,0,0,0    ;FSRC
5424 027224  000000  000000  000000  3$:     .WORD   0,0,0,0        ;FRACTIONAL RES.
5425 027234  047777  177777          4$:     .WORD   47777,-1       ;INTEGER RES.
5426 027240  177000  000000                  .WORD   177000,0
5427 027244  000000  000000  177000  5$:     .WORD   0,0,177000,0   ;ERROR FRACTIONAL RES.
5428 027254  177777  177777  177777  6$:     .WORD   -1,-1,-1,-1    ;ERROR INTEGER RES.
5429 027264  000213                  7$:     213                    ;FPS BEFORE EXECUTION.
5430 027266  000204                          204                    ;FPS AFTER EXECUTION.
5431 027270  104105                  8$:     ERROR   +105           ;(BUT FD) STORE X10
5432 027272  000401                          BR      9$
5433 027274  104071                          ERROR   +71
5434 027276                          9$:
5435
5436                                 ;MODD TEST WITH EXPONENT OF THE RESULT = 0
5437 027276                          HHH11:
     027276  104413                          LPERR                  ;SET UP THE LOOP ON ERROR ADDRESS.
5438 027300  004737  027602                  JSR     PC,MODDSUB
5439 027304  040200  000000  000000  1$:     .WORD   40200,0,0,0    ;AC
5440 027314  040177  072727          2$:     .WORD   40177,72727    ;FSRC
5441 027320  127272  072727                  .WORD   127272,72727
5442 027324  040177  072727          3$:     .WORD   40177,72727    ;FRACTIONAL RES.
5443 027330  127272  072727                  .WORD   127272,72727
5444 027334  000000  000000  000000  4$:     .WORD   0,0,0,0        ;INTEGER RES.
5445 027344  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1    ;ERROR FRACTIONAL RES.
5446 027354  000000  000000  177777  6$:     .WORD   0,0,-1,-1      ;ERROR INTEGER RES.
5447 027364  000200                  7$:     200                    ;FPS BEFORE EXECUTION.
5448 027366  000200                          200                    ;FPS AFTER EXECUTION.
5449 027370  104070                  8$:     ERROR   +70
5450 027372  000401                          BR      9$
5451 027374  104106                          ERROR   +106           ;ST 246 TO 126 INTO 127 (BUT FD)
5452 027376                          9$:
5453
5454                                 ;MODD TEST WITH EXPONENT OF THE RESULT = -115
5455 027376                          HHH12:
     027376  104413                          LPERR                  ;SET UP THE LOOP ON ERROR ADDRESS.
5456 027400  004737  027602                  JSR     PC,MODDSUB
5457 027404  003377  177777          1$:     .WORD   3377,-1        ;AC
5458 027410  177777  052525                  .WORD   -1,52525
5459 027414  040200  000000  000000  2$:     .WORD   40200,0,0,0    ;FSRC
5460 027424  003377  177777          3$:     .WORD   3377,-1        ;FRACTIONAL RES.
5461 027430  177777  052525                  .WORD   -1,52525
5462 027434  000000  000000  000000  4$:     .WORD   0,0,0,0        ;INTEGER RES.
5463 027444  177777  177777  177777  5$:     .WORD   -1,-1,-1,-1    ;ERROR FRACTIONAL RES.
5464 027454  000000  000000  177777  6$:     .WORD   0,0,-1,-1      ;ERROR INTEGER RES.
```

```
5465 027464  000200                    7$:     200                     ;FPS BEFORE EXECUTION.
5466 027466  000200                            200                     ;FPS AFTER EXECUTION.
5467 027470  104070                    8$:     ERROR   +70
5468 027472  000401                            BR      9$
5469 027474  104107                            ERROR   +107            ;ST 446 TO 126 INTO 127 (BUT FD)
5470 027476                            9$:
5471
5472                                   ;MODD TEST WITH EXPONENT OF THE RESULT = -63, IN ROUND MODE.
5473 027476                            HHH13:
     027476  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5474 027500  004737  027602                    JSR     PC,MODDSUB
5475 027504  040300  000000  000000  1$:      .WORD   40300,0,0,0     ;AC
5476 027514  020200  000000  000000  2$:      .WORD   20200,0,0,1     ;FSRC
5477 027524  020300  000000  000000  3$:      .WORD   20300,0,0,2     ;FRACTIONAL RES.
5478 027534  000000  000000  000000  4$:      .WORD   0,0,0,0         ;INTEGER RES.
5479 027544  000000  000000  177777  5$:      .WORD   0,0,-1,-1       ;ERROR FRACTIONAL RES.
5480 027554  177777  177777  177777  6$:      .WORD   -1,-1,-1,-1     ;ERROR INTEGER RES.
5481 027564  000200                    7$:     200                     ;FPS BEFORE EXECUTION.
5482 027566  000200                            200                     ;FPS AFTER EXECUTION.
5483 027570  104110                    8$:     ERROR   +110            ;ST 127 INTO RND/TR
5484 027572  000401                            BR      9$
5485 027574  104071                            ERROR   +71
5486 027576  000137  030200            9$:     JMP     HHHDONE ;GO TO THE NEXT TEST.
5487
5488                                   ;THIS SUBROUTINE, MODDSUB, IS CALLED TO SETUP THE
5489                                   ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
5490                                   ;IT IS CALLED THUS:
5491                                   ;
5492                                   ;               ACARG:  .WORD   X,X,X,X         ;AC OPERAND
5493                                   ;               FSRCARG:.WORD   X,X,X,X         ;FSRC OPERAND
5494                                   ;               FRES:   .WORD   X,X,X,X         ;FRACTIONAL RESULT
5495                                   ;               INTRES: .WORD   X,X,X,X         ;INTEGER RESULT
5496                                   ;               ERFRES: .WORD   X,X,X,X         ;ERROR FRACTION RESULT
5497                                   ;               ERINTRES:.WORD  X,X,X,X         ;ERROR INTEGER RESULT
5498                                   ;               FPSB:   .WORD   X               ;FPS BEFORE EXECUTION
5499                                   ;               FPSA:   .WORD   X               ;FPS AFTER EXECUTION
5500                                   ;               ERR1:   ERROR   +X              ;FRACTION ERROR
5501                                   ;                       BR      CONT
5502                                   ;               ERR2:   ERROR   +X              ;INTEGER ERROR
5503                                   ;               CONT:                           ;RETURN ADDRESS
5504                                   ;
5505                                   ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
5506                                   ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
5507                                   ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
5508                                   ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
5509                                   ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
5510                                   ;THEN MODDSUB WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
5511                                   ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
5512                                   ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
5513                                   ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
5514                                   ;FAILURE MATCHES THE TRUE RESULT THEN  MODDSUB PASSES CONTROL TO THE
5515                                   ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
5516                                   ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
5517                                   ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
5518                                   ;IF A MATCH IS MADE HOWEVER, MODDSUB WILL RETURN CONTROL TO THE ERROR
5519                                   ;CALL AT ERR2.
5520
```

```
5521 027602  012601                  MODDSUB:  MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
5522 027604  012700  000200                    MOV     #200,R0         ;SET FD MODE.
5523 027610  170100                            LDFPS   R0
5524 027612  010100                            MOV     R1,R0           ;SET UP AC0
5525 027614  172410                            LDD     (R0),AC0
5526 027616  012700  026062                    MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
5527 027622  172510                            LDD     (R0),AC1
5528 027624  016100  000060                    MOV     60(R1),R0       ;SET UP THE FPS.
5529 027630  170100                            LDFPS   R0
5530 027632  012737  027646  001236            MOV     #1$,$TMP2
5531 027640  010100                            MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
5532 027642  062700  000010                    ADD     #10,R0
5533
5534 027646  171410                  1$:       MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
5535
5536 027650  170204                            STFPS   R4              ;GET THE FPS.
5537 027652  012700  000200                    MOV     #200,R0         ;SET FD MODE.
5538 027656  170100                            LDFPS   R0
5539 027660  012700  030160                    MOV     #MODDT0,R0      ;GET THE FRACTIONAL RESULT.
5540 027664  174010                            STD     AC0,(R0)
5541 027666  012700  030170                    MOV     #MODDT1,R0      ;GET THE INTEGER RESULT.
5542 027672  174110                            STD     AC1,(R0)
5543
5544 027674  010102                            MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
5545 027676  010237  001240                    MOV     R2,$TMP3
5546 027702  062702  000010                    ADD     #10,R2
5547 027706  010237  001242                    MOV     R2,$TMP4
5548 027712  062702  000010                    ADD     #10,R2
5549 027716  010237  001244                    MOV     R2,$TMP5
5550 027722  062702  000010                    ADD     #10,R2
5551 027726  010237  001246                    MOV     R2,$TMP6
5552 027732  012737  030160  001250            MOV     #MODDT0,$TMP7
5553 027740  012737  030170  001252            MOV     #MODDT1,$TMP10
5554 027746  016137  000062  001256            MOV     62(R1),$TMP12
5555 027754  010437  001254                    MOV     R4,$TMP11
5556
5557 027760  012702  030160                    MOV     #MODDT0,R2      ;CHECK THE FRACTIONAL RESULT.
5558 027764  010103                            MOV     R1,R3
5559 027766  062703  000020                    ADD     #20,R3
5560 027772  012705  000004                    MOV     #4,R5
5561 027776  022223                  2$:       CMP     (R2)+,(R3)+
5562 030000  001020                            BNE     10$             ;BRANCH IF INCORRECT.
5563 030002  077503                            SOB     R5,2$
5564
5565 030004  012702  030170                    MOV     #MODDT1,R2      ;CHECK THE INTEGER RESULT.
5566 030010  010103                            MOV     R1,R3
5567 030012  062703  000030                    ADD     #30,R3
5568 030016  012705  000004                    MOV     #4,R5
5569 030022  022223                  3$:       CMP     (R2)+,(R3)+
5570 030024  001026                            BNE     15$             ;BRANCH IF INCORRECT.
5571 030026  077503                            SOB     R5,3$
5572
5573
5574 030030  026104  000062                    CMP     62(R1),R4       ;CHECK THE FPS.
5575 030034  001042                            BNE     20$             ;BRANCH IF INCORRECT.
5576
5577 030036  000161  000072            9$·     JMP     72(R1)          ;RETURN.
```

```
                                        ;FRACTIONAL ERROR.
030042  012702  030160          10$:    MOV     #MODDT0,R2      ;WAS THE FRACTIONAL ERROR ANTICIPATED?
030046  010103                          MOV     R1,R3
030050  062703  000040                  ADD     #40,R3
030054  012705  000004                  MOV     #4,R5
030060  022223                  50$:    CMP     (R2)+,(R3)+
030062  001005                          BNE     11$             ;BRANCH IF NOT ANTICIPATED.
030064  077503                          SOB     R5,50$
030066  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIPATED SO
030070  062702  000064                  ADD     #64,R2          ;RETURN TO THE ERROR REPORT AT THE
                                                                ;CALLING ROUTINE.
030074  000112                          JMP     (R2)

030076                          11$:                            ;THE ERROR WAS NOT ANTICIPATED SO
030076  104070                  12$:    ERROR   +70             ;REPORT THE INCORRECT FRACTION HERE.
030100  000756                          BR      9$

                                        ;INTEGER ERROR.
030102  012702  030170          15$:    MOV     #MODDT1,R2      ;WAS THE INTEGER ERROR ANTICIPATED?
030106  010103                          MOV     R1,R3
030110  062703  000050                  ADD     #50,R3
030114  012705  000004                  MOV     #4,R5
030120  022223                  60$:    CMP     (R2)+,(R3)+
030122  001005                          BNE     17$             ;BRANCH IF NOT ANTICIPATED.
030124  077503                          SOB     R5,60$
030126  010102                          MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
030130  062702  000070                  ADD     #70,R2          ;TO THE ERROR REPORT IN THE CALLING
                                                                ;ROUTINE.
030134  000112                          JMP     (R2)

030136                          16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
030136  104071                  17$:    ERROR   +71             ;THE INTEGER FAILURE HERE.
030140  000736                          BR      9$

                                        ;FPS INCORRECT.
030142  010437  001254          20$:    MOV     R4,$TMP11       ;REPORT INCORRECT FPS.
030146  016137  000062  001256          MOV     62(R1),$TMP12
030154  104072                  21$:    ERROR   +72
030156  000727                          BR      9$

030160  000000  000000  000000  MODDT0: .WORD   0,0,0,0

030170  000000  000000  000000  MODDT1: .WORD   0,0,0,0

030200                          HHHDONE:
030200  104412                          RSETUP                  ;GO INITIALIZF THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).


                                        ;TEST TITLE:UNDER/OVERFLOW, USING MODF WITH TRAPS DISABLED
```

```
5636                                    .SBTTL  TEST # 20 - SEE COMMENT ABOVE FOR TEST TITLE
                                        ;**********************************************************************
                                        ;*TEST 20       SEE COMMENT ABOVE FOR TEST TITLE
                                        ;*
                                        ;*THIS IS A TEST OF THE MODF OVERFLOW AND UNDERFLOW CONDITIONS. IT MAKES
                                        ;*USE OF A SUBROUTINE TO SETUP THE OPERANDS, EXECUTE THE MODF INSTRUCTION
                                        ;*AND CHECK THE RESULTS. TRAPS ARE DISABLED DURING THIS TEST.
                                        ;*
                                        ;**********************************************************************
     030202  000004                     TST20:  SCOPE
5637
5638                                    ;UNDERFLOW TEST, WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
5639 030204                             MMM1:
     030204  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5640 030206  004737  030532                     JSR     PC,MODFOV
5641 030212  020123  045676            1$:      .WORD   20123,45676     ;AC
5642 030216  020200  000000            2$:      .WORD   20200,0         ;FSRC
5643 030222  000123  045676            3$:      .WORD   123,45676       ;FRACTIONAL RES.
5644 030226  000000  000000            4$:      .WORD   0,0             ;INTEGER RES.
5645 030232  177777  177777            5$:      .WORD   -1,-1           ;ERROR FRACTIONAL RES.
5646 030236  177777  177777            6$:      .WORD   -1,-1           ;ERROR INTEGER RES.
5647 030242  042000                     7$:      42000                   ;FPS BEFORE EXECUTION.
5648 030244  142004                              142004                  ;FPS AFTER EXECUTION.
5649 030246  000012                              12                      ;FEC
5650 030250  104170                     8$:      ERROR   +170            ;FEC INCORRECT, UNDERFLOW.
5651 030252  000401                              BR      9$
5652 030254  104171                              ERROR   +171            ;AC V 1 (2,3) <= ZERO, ST 126.
5653 030256                             9$:
5654
5655                                    ;UNDERFLOW EXP OF RESULT = -193, FIU = 0, FID = 1
5656 030256                             MMM2:
     030256  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5657 030260  004737  030532                     JSR     PC,MODFOV
5658 030264  010200  000000            1$:      .WORD   10200,0         ;AC
5659 030270  010000  000000            2$:      .WORD   10000,0         ;FSRC
5660 030274  000000  000000            3$:      .WORD   0,0             ;FRACTIONAL RES.
5661 030300  000000  000000            4$:      .WORD   0,0             ;INTEGER RES.
5662 030304  177777  177777            5$:      .WORD   -1,-1           ;ERROR FRACTIONAL RES.
5663 030310  177777  177777            6$:      .WORD   -1,-1           ;ERROR INTEGER RES.
5664 030314  005013                     7$:      5013                    ;FPS BEFORE EXECUTION.
5665 030316  005004                              5004                    ;FPS AFTER EXECUTION.
5666 030320  000012                              12                      ;FEC
5667 030322  000240                     8$:      NOP
5668 030324  000401                              BR      9$
5669 030326  104171                              ERROR   +171
5670 030330                             9$:
5671
5672                                    ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
5673 030330                             MMM3:
     030330  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5674 030332  004737  030532                     JSR     PC,MODFOV
5675 030336  060052  125252            1$:      .WORD   60052,125252    ;AC
5676 030342  060200  000000            2$:      .WORD   60200,0         ;FSRC
5677 030346  000000  000000            3$:      .WORD   0,0             ;FRACTIONAL RES.
5678 030352  000052  125252            4$:      .WORD   52,125252       ;INTEGER RES.
5679 030356  000000  000000            5$:      .WORD   0,0             ;ERROR FRACTIONAL RES.
5680 030362  000000  000000            6$:      .WORD   0,0             ;ERROR INTEGER RES.
```

```
 5681 030366  041000                    7$:     41000                   ;FPS BEFORE EXECUTION.
 5682 030370  141006                            141006                  ;FPS AFTER EXECUTION.
 5683 030372  000010                            10                      ;FEC
 5684 030374  104172                    8$:     ERROR   +172            ;BAD FEC ON OVERFLOW.
 5685 030376  000401                            BR      9$
 5686 030400  104173                            ERROR   +173            ;ST 520 TO STORE ZERO TWICE
 5687                                                                   ;INTO 162
 5688 030402                            9$:
 5689
 5690                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
 5691 030402                            MMM4:
      030402  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5692 030404  004737  030532                    JSR     PC,MODFOV
 5693 030410  060345  067654            1$:     .WORD   60345,67654     ;AC
 5694 030414  060200  000000            2$:     .WORD   60200,0         ;FSRC
 5695 030420  000000  000000            3$:     .WORD   0,0             ;FRACTIONAL RES.
 5696 030424  000000  000000            4$:     .WORD   0,0             ;INTEGER RES.
 5697 030430  000000  000000            5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
 5698 030434  000345  067654            6$:     .WORD   345,67654       ;ERROR INTEGER RES.
 5699 030440  006011                    7$:     6011                    ;FPS BEFORE EXECUTION.
 5700 030442  006006                            6006                    ;FPS AFTER EXECUTION.
 5701 030444  000010                            10                      ;FEC
 5702 030446  000240                    8$:     NOP
 5703 030450  000401                            BR      9$
 5704 030452  104174                            ERROR   +174            ;ST 520 TO 162 INTO STORE ZERO TWICE.
 5705 030454                            9$:
 5706
 5707                                   ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, RESULT NEGATIVE
 5708                                   ;AND FIV = 1, FID = 1
 5709 030454                            MMM5:
      030454  104413                            LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
 5710 030456  004737  030532                    JSR     PC,MODFOV
 5711 030462  160252  125252            1$:     .WORD   160252,125252   ;AC
 5712 030466  060000  000000            2$:     .WORD   60000,0         ;FSRC
 5713 030472  000000  000000            3$:     .WORD   0,0             ;FRACTIONAL RES.
 5714 030476  100052  125252            4$:     .WORD   100052,125252   ;INTEGER RES.
 5715 030502  000000  000000            5$:     .WORD   0,0             ;ERROR FRACTIONAL RES.
 5716 030506  000052  125252            6$:     .WORD   52,125252       ;ERROR INTEGER RES.
 5717 030512  041000                    7$:     41000                   ;FPS BEFORE EXECUTION.
 5718 030514  141006                            141006                  ;FPS AFTER EXECUTION.
 5719 030516  000010                            10                      ;FEC
 5720 030520  104172                    8$:     ERROR   +172
 5721 030522  000401                            BR      9$
 5722 030524  104175                            ERROR   +175            ;ST 517, BAD SIGN.
 5723 030526  000137  031126            9$:     JMP     MMMDONE ;GO TO THE NEXT TEST.
 5724
 5725                                   ;THIS SUBROUTINE, MODFOV, IS CALLED TO SETUP THE
 5726                                   ;OPERANDS, EXECUTE THE MODF INSTRUCTION AND CHECK THE RESULTS.
 5727                                   ;IT IS CALLED THUS:
 5728                                   ;
 5729                                   ;               ACARG:   .WORD   X,X            ;AC OPERAND
 5730                                   ;               FSRCARG:.WORD    X,X            ;FSRC OPERAND
 5731                                   ;               FRES:    .WORD   X,X            ;FRACTIONAL RESULT
 5732                                   ;               INTRES:  .WORD   X,X            ;INTEGER RESULT
 5733                                   ;               ERFRES:  .WORD   X,X            ;ERROR FRACTION RESULT
 5734                                   ;               ERINTRES:.WORD   X,X            ;ERROR INTEGER RESULT
 5735                                   ;               FPSB:    .WORD   X              ;FPS BEFORE EXECUTION
```

```
                                        ;              FPSA:   .WORD   X               ;FPS AFTER EXECUTION
                                        ;              FEC:    .WORD   X               ;FEC
                                        ;              ERR1:   ERROR   +X              ;FEC ERROR
                                        ;                      BR      CONT
                                        ;              ERR2:   ERROR   +X              ;INTEGER ERROR
                                        ;              CONT:                           ;RETURN ADDRESS
                                        ;
                                        ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODF
                                        ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
                                        ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
                                        ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
                                        ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
                                        ;THEN MODFOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
                                        ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
                                        ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
                                        ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
                                        ;FAILURE MATCHES THE TRUE RESULT THEN  MODFOV PASSES CONTROL TO THE
                                        ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
                                        ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
                                        ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
                                        ;IF A MATCH IS MADE HOWEVER, MODFOV WILL RETURN CONTROL TO THE ERROR
                                        ;CALL AT ERR2.
                                        
030532  012601                  MODFOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
030534  012700  000200                  MOV     #200,R0         ;SET FD MODE.
030540  170100                          LDFPS   R0
030542  010100                          MOV     R1,R0           ;SET UP AC0
030544  172410                          LDD     (R0),AC0
030546  012700  026062                  MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
030552  172510                          LDD     (R0),AC1
030554  016100  000030                  MOV     30(R1),R0       ;SET UP THE FPS.
030560  170100                          LDFPS   R0
030562  012737  030576  001236          MOV     #1$,$TMP2
030570  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
030572  062700  000004                  ADD     #4,R0
                                        
030576  171410                  1$:     MODF    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.
                                        
030600  170204                          STFPS   R4              ;GET THE FPS.
030602  170305                          STST    R5              ;GET FEC.
030604  012700  000200                  MOV     #200,R0         ;SET FD MODE.
030610  170100                          LDFPS   R0
030612  012700  031106                  MOV     #MODFD0,R0      ;GET THE FRACTIONAL RESULT.
030616  174010                          STD     AC0,(R0)
030620  012700  031116                  MOV     #MODFD1,R0      ;GET THE INTEGER RESULT.
030624  174110                          STD     AC1,(R0)
                                        
030626  010102                          MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
030630  010237  001240                  MOV     R2,$TMP3
030634  062702  000004                  ADD     #4,R2
030640  010237  001242                  MOV     R2,$TMP4
030644  062702  000004                  ADD     #4,R2
030650  010237  001244                  MOV     R2,$TMP5
030654  062702  000004                  ADD     #4,R2
030660  010237  001246                  MOV     R2,$TMP6
030664  012737  031106  001250          MOV     #MODFD0,$TMP7
030672  012737  031116  001252          MOV     #MODFD1,$TMP10
```

```
 5793 030700  010437  001254                    MOV     R4,$TMP11
 5794 030704  016137  000032  001256            MOV     32(R1),$TMP12
 5795 030712  010537  001260                    MOV     R5,$TMP13
 5796 030716  016137  000034  001262            MOV     34(R1),$TMP14
 5797
 5798 030724  012702  031106                    MOV     #MODFD0,R2      ;CHECK THE FRACTIONAL RESULT.
 5799 030730  026112  000010                    CMP     10(R1),(R2)
 5800 030734  001025                            BNE     10$             ;BRANCH IF INCORRECT.
 5801 030736  026162  000012  000002            CMP     12(R1),2(R2)
 5802 030744  001021                            BNE     10$
 5803
 5804 030746  012702  031116                    MOV     #MODFD1,R2      ;CHECK THE INTEGER RESULT.
 5805 030752  026112  000014                    CMP     14(R1),(R2)
 5806 030756  001016                            BNE     15$             ;BRANCH IF INCORRECT.
 5807 030760  026162  000016  000002            CMP     16(R1),2(R2)
 5808 030766  001012                            BNE     15$
 5809
 5810 030770  026104  000032                    CMP     32(R1),R4       ;CHECK THE FPS.
 5811 030774  001024                            BNE     20$             ;BRANCH IF INCORRECT.
 5812
 5813 030776  026105  000034                    CMP     34(R1),R5       ;CHECK THE FEC.
 5814 031002  001030                            BNE     25$             ;BRANCH IF INCORRECT.
 5815
 5816 031004  000161  000044          9$:       JMP     44(R1)          ;RETURN.
 5817
 5818                              ;FRACTIONAL ERROR.
 5819 031010                       10$:                                ;THE ERROR WAS NOT ANTICIPATED SO
 5820 031010  104165                12$:       ERROR   +165            ;REPORT THE INCORRECT FRACTION HERE.
 5821 031012  000774                           BR      9$
 5822
 5823                              ;INTEGER ERROR.
 5824 031014  026112  000024          15$:      CMP     24(R1),(R2)     ;WAS THIS ERROR ANTICIPATED?
 5825 031020  001010                           BNE     16$             ;BRANCH IF NOT.
 5826 031022  026162  000026  000002           CMP     26(R1),2(R2)
 5827 031030  001004                           BNE     16$
 5828 031032  010102                           MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
 5829 031034  062702  000042                   ADD     #42,R2          ;TO THE ERROR REPORT IN THE CALLING
 5830                                                                   ;ROUTINE.
 5831 031040  000112                           JMP     (R2)
 5832
 5833 031042                       16$:                                ;THE ERROR WAS NOT ANTICIPATED SO REPORT
 5834 031042  104166                17$:       ERROR   +166            ;THE INTEGER FAILURE HERE.
 5835 031044  000757                           BR      9$
 5836
 5837                              ;FPS INCORRECT.
 5838 031046  010437  001254          20$:      MOV     R4,$TMP11       ;REPORT INCORRECT FPS.
 5839 031052  016137  000032  001256           MOV     32(R1),$TMP1?
 5840 031060  104167                21$:       ERROR   +167
 5841 031062  000750                           BR      9$
 5842
 5843                              ;REPORT FEC ERROR.
 5844 031064  010537  001260          25$:      MOV     R5,$TMP13
 5845 031070  016137  000034  001262           MOV     34(R1),$TMP14
 5846 031076  010102                           MOV     R1,R2
 5847 031100  062702  000036                   ADD     #36,R2
 5848 031104  000112                           JMP     (R2)
 5849
```

```
 5850 031106  000000  000000  000000  MODFD0: .WORD   0,0,0,0
 5851
 5852 031116  000000  000000  000000  MODFD1: .WORD   0,0,0,0
 5853
 5854 031126                          MMMDONE:
      031126  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                              ;SEE IF THE USER HAS EXPRESSED
                                              ;THE DESIRE TO CHANGE THE SOFTWARE
                                              ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                              ;THE USER TYPED CONTROL G?).
 5855
 5856
 5857
 5865
 5866                                 ;TEST TITLE:UNDER/OVERFLOW, USING MODD WITH TRAPS DISABLED
```

TEST # 21 - SEE COMMENT ABOVE FOR TEST TITLE

```
5867                                    .SBTTL  TEST # 21 - SEE COMMENT ABOVE FOR TEST TITLE
                                        ;;*****************************************************************
                                        ;*TEST 21       SEE COMMENT ABOVE FOR TEST TITLE
                                        ;*
                                        ;*THIS IS A TEST OF THE MODD INSTRUCTION'S OVER FLOW AND UNDER FLOW
                                        ;*CONDITIONS. A SUBROUTINE IS USED TO SET UP THE OPERANDS, EXECUTE THE
                                        ;*MODD INSTUCTION AND CHECK THE RESULTS.
                                        ;*
                                        ;;*****************************************************************
     031130  000004                     TST21:  SCOPE
5868
5869                                    ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -129, FIU = 1, FID = 1
5870 031132                             NNN1:
     031132  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5871 031134  004737  031546                     JSR     PC,MODDOV
5872 031140  020252  125252             1$:     .WORD   20252,125252    ;AC
5873 031144  125252  125252                     .WORD   125252,125252
5874 031150  020100  000000  000000     2$:     .WORD   20100,0,0,0     ;FSRC
5875 031160  000177  177777  177777     3$:     .WORD   177,-1,-1,-1    ;FRACTIONAL RES.
5876 031170  000000  000000  000000     4$:     .WORD   0,0,0,0         ;INTEGER RES.
5877 031200  020252  125252             5$:     .WORD   20252,125252    ;ERROR FRACTIONAL RES.
5878 031204  125252  125252                     .WORD   125252,125252
5879 031210  000000  000000  177777     6$:     .WORD   0,0,-1,-1       ;ERROR INTEGER RES.
5880 031220  042200                     7$:     42200                   ;FPS BEFORE EXECUTION.
5881 031222  142204                             142204                  ;FPS AFTER EXECUTION.
5882 031224  000012                             12                      ;FEC
5883 031226  104201                     8$:     ERROR   +201            ;FEC INCORRECT ON UNDERFLOW.
5884 031230  000401                             BR      9$
5885 031232  104202                             ERROR   +202            ;ST 155 (BUT FD)
5886 031234                             9$:
5887
5888                                    ;UNDERFLOW TEST WITH EXPONENT OF THE RESULT = -193, FIU = 0, FID = 1
5889 031234                             NNN2:
     031234  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5890 031236  004737  031546                     JSR     PC,MODDOV
5891 031242  010000  000000             1$:     .WORD   10000,0         ;AC
5892 031246  12~     000000                     .WORD   123456,0
5893 031252  010200  000000  000000     2$:     .WORD   10200,0,0,0     ;FSRC
5894 031262  000000  000000  000000     3$:     .WORD   0,0,0,0         ;FRACTIONAL RES.
5895 031272  000000  000000  000000     4$:     .WORD   0,0,0,0         ;INTEGER RES.
5896 031302  000000  000000  000000     5$:     .WORD   0,0,0,0         ;ERROR FRACTIONAL RES.
5897 031312  000000  000000             6$:     .WORD   0,0             ;ERROR INTEGER RES.
5898 031316  123456  000000                     .WORD   123456,0
5899 031322  005213                     7$:     5213                    ;FPS BEFORE EXECUTION.
5900 031324  005204                             5204                    ;FPS AFTER EXECUTION.
5901 031326  000012                             12
5902 031330  000240                     8$:     NOP
5903 031332  000401                             BR      9$
5904 031334  104203                             ERROR   +203            ;ST 047 (BUT FD).
5905 031336                             9$:
5906
5907                                    ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 128, FIV = 1, FID = 1
5908 031336                             NNN3:
     031336  104413                             LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
5909 031340  004737  031546                     JSR     PC,MODDOV
5910 031344  060252  125252             1$:     .WORD   60252,125252    ;AC
5911 031350  125252  125252                     .WORD   125252,125252
```

```
5912 031354  060100  000000  000000  2$:     .WORD   60100,0,0,0      ;FSRC
5913 031364  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
5914 031374  000177  177777  177777  4$:     .WORD   177,-1,-1,-1     ;INTEGER RES.
5915 031404  000000  000000  000000  5$:     .WORD   0,0,0,0          ;ERROR FRACTIONAL RES.
5916 031414  000177  177777          6$:     .WORD   177,-1           ;ERROR INTEGER RES.
5917 031420  125252  125252                  .WORD   125252,125252
5918 031424  041200                  7$:     41200                    ;FPS BEFORE EXECUTION.
5919 031426  141206                          141206                   ;FPS AFTER EXECUTION.
5920 031430  000010                          10                       ;FEC
5921 031432  104204                  8$:     ERROR   +204             ;FEC BAD ON OVERFLOW.
5922 031434  000401                          BR      9$
5923 031436  104205                          ERROR   +205             ;ST 520 TO 162 INTO 163 (BUT FD).
5924 031440                          9$:
5925
5926                                 ;OVERFLOW TEST WITH EXPONENT OF THE RESULT = 130, FIV = 0, FID = 1
5927 031440                          NNN4:
     031440  104413                          LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
5928 031442  004737  031546                  JSR     PC,MODDOV
5929 031446  060200  000000          1$:     .WORD   60200,0          ;AC
5930 031452  125252  000000                  .WORD   125252,0
5931 031456  060200  000000  000000  2$:     .WORD   60200,0,0,0      ;FSRC
5932 031466  000000  000000  000000  3$:     .WORD   0,0,0,0          ;FRACTIONAL RES.
5933 031476  000000  000000  000000  4$:     .WORD   0,0,0,0          ;INTEGER RES.
5934 031506  000000  000000  000000  5$:     .WORD   0,0,0,0          ;ERROR FRACTIONAL RES.
5935 031516  000400  000000          6$:     .WORD   400,0            ;ERROR INTEGER RES.
5936 031522  125252  000000                  .WORD   125252,0
5937 031526  006211                  7$:     6211                     ;FPS BEFORE EXECUTION.
5938 031530  006206                          6206                     ;FPS AFTER EXECUTION.
5939 031532  000010                          10                       ;FEC
5940 031534  000240                  8$:     NOP
5941 031536  000401                          BR      9$
5942 031540  104206                          ERROR   +206             ;ST 520 TO 162 INTO STORE ZERO TWICE.
5943 031542  000137  032154          9$:     JMP     NNNDONE ;GO TO NEXT TEST.
5944
5945                                 ;THIS SUBROUTINE, MODDOV, IS CALLED TO SETUP THE
5946                                 ;OPERANDS, EXECUTE THE MODD INSTRUCTION AND CHECK THE RESULTS.
5947                                 ;IT IS CALLED THUS:
5948                                 ;
5949                                 ;               ACARG:   .WORD   X,X,X,X          ;AC OPERAND
5950                                 ;               FSRCARG:.WORD    X,X,X,X          ;FSRC OPERAND
5951                                 ;               FRES:    .WORD   X,X,X,X          ;FRACTIONAL RESULT
5952                                 ;               INTRES:  .WORD   X,X,X,X          ;INTEGER RESULT
5953                                 ;               ERFRES:  .WORD   X,X,X,X          ;ERROR FRACTION RESULT
5954                                 ;               ERINTRES:.WORD   X,X,X,X          ;ERROR INTEGER RESULT
5955                                 ;               FPSB:    .WORD   X                ;FPS BEFORE EXECUTION
5956                                 ;               FPSA:    .WORD   X                ;FPS AFTER EXECUTION
5957                                 ;               ERR1:    ERROR   +X               ;FRACTION ERROR
5958                                 ;                        BR      CONT
5959                                 ;               ERR2:    ERROR   +X               ;INTEGER ERROR
5960                                 ;               CONT:                             ;RETURN ADDRESS
5961                                 ;
5962                                 ;THE OPERANDS ARE SET UP (USING AC0 FOR THE AC ARGUMENT). THE MODD
5963                                 ;INSTRUCTION IS EXECUTED. THEN THE RESULTS ARE RETRIEVED.
5964                                 ;THE FRACTION PART OF THE RESULT IS COMPARED WITH FRES. IF THIS IS CORRECT
5965                                 ;THEN THE INTEGER PART IS COMPARED WITH INTRES. IF BOTH OF THESE ARE CORRECT
5966                                 ;THEN THE FPS IS COMPARED WITH FPSA. AFTER EXECUTION IF NO ERRORS OCCURRED
5967                                 ;THEN MODDOV WILL RETURN TO CONT. IF THE FPS WAS INCORRECT
```

```
                                        ;IT IS REPORTED HERE. IF THE FRACTION IS INCORRECT IT IS COMPARED WITH
                                        ;THE ANTICIPATED BAD FRACTION, ERFRES. IF THIS DOESN'T MATCH
                                        ;THE TRUE RESULT THEN THE ERROR IS REPORTED HERE. IF THE ANTICIPATED
                                        ;FAILURE MATCHES THE TRUE RESULT THEN  MODDOV PASSES CONTROL TO THE
                                        ;ERROR CALL AT ERR1. LIKEWISE IF THE INTEGER PART OF THE RESULT IS
                                        ;NOT CORRECT THEN IT IS COMPARED WITH THE ANTICIPATED INTEGER
                                        ;FAILURE. IF THIS DOEN'T MATCH THEN THE ERROR IS REPORTED HERE.
                                        ;IF A MATCH IS MADE HOWEVER, MODDOV WILL RETURN CONTROL TO THE ERROR
                                        ;CALL AT ERR2.

031546  012601                  MODDOV: MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS
031550  012700  000200                  MOV     #200,R0         ;SET FD MODE.
031554  170100                          LDFPS   R0
031556  010100                          MOV     R1,R0           ;SET UP AC0
031560  172410                          LDD     (R0),AC0
031562  012700  026062                  MOV     #MODP1,R0       ;PUT A BACKROUND PATTERN INTO AC1.
031566  172510                          LDD     (R0),AC1
031570  016100  000060                  MOV     60(R1),R0       ;SET UP THE FPS.
031574  170100                          LDFPS   R0
031576  012737  031612  001236          MOV     #1$,$TMP2
031604  010100                          MOV     R1,R0           ;COMPUTE THE ADDRESS OF THE FSRC.
031606  062700  000010                  ADD     #10,R0

031612  171410                  1$:     MODD    (R0),AC0        ;EXECUTE THE TEST INSTRUCTION.

031614  170305                          STST    R5              ;GET THE FPS.
031616  170204                          STFPS   R4              ;GET THE FPS.
031620  012700  000200                  MOV     #200,R0         ;SET FD MODE.
031624  170100                          LDFPS   R0
031626  012700  032134                  MOV     #MODDD0,R0      ;GET THE FRACTIONAL RESULT.
031632  174010                          STD     AC0,(R0)
031634  012700  032144                  MOV     #MODDD1,R0      ;GET THE INTEGER RESULT.
031640  174110                          STD     AC1,(R0)

031642  010102                          MOV     R1,R2           ;SAVE THE DATA IN CASE OF ERROR.
031644  010237  001240                  MOV     R2,$TMP3
031650  062702  000010                  ADD     #10,R2
031654  010237  001242                  MOV     R2,$TMP4
031660  062702  000010                  ADD     #10,R2
031664  010237  001244                  MOV     R2,$TMP5
031670  062702  000010                  ADD     #10,R2
031674  010237  001246                  MOV     R2,$TMP6
031700  012737  032134  001250          MOV     #MODDD0,$TMP7
031706  012737  032144  001252          MOV     #MODDD1,$TMP10
031714  010437  001254                  MOV     R4,$TMP11
031720  016137  000062  001256          MOV     62(R1),$TMP12
031726  010537  001260                  MOV     R5,$TMP13
031732  016137  000064  001262          MOV     64(R1),$TMP14

031740  012702  032134                  MOV     #MODDD0,R2      ;CHECK THE FRACTIONAL RESULT.
031744  010103                          MOV     R1,R3
031746  062703  000020                  ADD     #20,R3
031752  012700  000004                  MOV     #4,R0
031756  022223                  2$:     CMP     (R2)+,(R3)+
031760  001023                          BNE     10$             ;BRANCH IF INCORRECT.
031762  077003                          SOB     R0,2$
```

TEST # 21 - SEE COMMENT ABOVE FOR TEST TITLE

```
 6025 031764  012702  032144                MOV     #MODDD1,R2      ;CHECK THE INTEGER RESULT.
 6026 031770  010103                        MOV     R1,R3
 6027 031772  062703  000030                ADD     #30,R3
 6028 031776  012700  000004                MOV     #4,R0
 6029 032002  022223                3$:     CMP     (R2)+,(R3)+
 6030 032004  001013                        BNE     15$             ;BRANCH IF INCORRECT.
 6031 032006  077003                        SOB     R0,3$
```

```
                                                ;CHECK THE FPS.
032010  026104  000062          CMP     62(R1),R4
032014  001027                  BNE     20$             ;BRANCH IF INCORRECT.

032016  026105  000064          CMP     64(R1),R5       ;CHECK THE FEC.
032022  001033                  BNE     25$

032024  000161  000074  9$:     JMP     74(R1)          ;RETURN.

                        ;FRACTIONAL ERROR.
032030                  10$:                            ;THE ERROR WAS NOT ANTICIPATED SO
032030  104176          12$:    ERROR   +176            ;REPORT THE INCORRECT FRACTION HERE.
032032  000774                  BR      9$

                        ;INTEGER ERROR.
032034  012702  032144  15$:    MOV     #MODDD1,R2      ;WAS THE INTEGER ERROR ANTICIPATED?
032040  010103                  MOV     R1,R3
032042  062703  000050          ADD     #50,R3
032046  012705  000004          MOV     #4,R5
032052  022223          60$:    CMP     (R2)+,(R3)+
032054  001005                  BNE     17$             ;BRANCH IF NOT ANTICIPATED.
032056  077503                  SOB     R5,60$
032060  010102                  MOV     R1,R2           ;THE ERROR WAS ANTICIAPTED SO RETURN
032062  062702  000072          ADD     #72,R2          ;TO THE ERROR REPORT IN THE CALLING
                                                        ;ROUTINE.
032066  000112                  JMP     (R2)

032070                  16$:                            ;THE ERROR WAS NOT ANTICIPATED SO REPORT
032070  104267          17$:    ERROR   +267            ;THE INTEGER FAILURE HERE.
032072  000754                  BR      9$

                        ;FPS INCORRECT.
032074  010437  001254  20$:    MOV     R4,$TMP11       ;REPORT INCORRECT FPS.
032100  016137  000062  001256          MOV     62(R1),$TMP12
032106  104200          21$:    ERROR   +200
032110  000745                  BR      9$

                        ;REPORT FEC ERROR.
032112  010537  001260  25$:    MOV     R5,$TMP13
032116  016137  000064  001262          MOV     64(R1),$TMP14
032124  010102                  MOV     R1,R2
032126  062702  000066          ADD     #66,R2
032132  000112                  JMP     (R2)

032134  000000  000000  000000  MODDD0: .WORD   0,0,0,0

032144  000000  000000  000000  MODDD1: .WORD   0,0,0,0

032154                  NNNDONE:
032154  104412                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                        ;SEE IF THE USER HAS EXPRESSED
                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).
```

TEST # 22 - INTERRUPT CORRECT FLOWS TEST

```
6126                                    .SBTTL  TEST # 22 - INTERRUPT CORRECT FLOWS TEST
                                        ;*****************************************************************
                                        ;*TEST 22       INTERRUPT CORRECT FLOWS TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE 'CORRECT' FLOWS. THIS PART OF THE MICRO CODE
                                        ;*HAS AS ITS PURPOSE INSURING THAT INTERRUPT REQUESTS MADE DURING
                                        ;*CERTAIN LENGTHY FPP INSTRUCTIONS GET HONORED. THIS IS DONE
                                        ;*IN A WAY SUCH THAT IF AN INTERRUPT REQUEST OCCURS DURING ONE
                                        ;*OF THESE INSTRUCTIONS THE STATE OF THAT INSTRUCTION'S
                                        ;*EXECUTION WILL BE THE SAME AS IF THAT INSTRUCTION HAD NEVER
                                        ;*BEEN FETCHED AND ITS EXECUTION NEVER STARTED. THUS THE MICRO CODE
                                        ;*WILL RESTORE ALL REGISTERS, BACK UP THE PC AND LEAVE THE
                                        ;*FPS AND AC0 THROUGH AC5 UNMODIFIED.
                                        ;*THE INSTRUCTIONS FOR WHICH THIS IS NECESSARY ARE:
                                        ;*       ADD (OR SUB)
                                        ;*       DIV
                                        ;*       MUL
                                        ;*       MOD
                                        ;*(BOTH DOUBLE AND FLOATING)
                                        ;*ALL ADDRESSING MODES WILL BE TRIED WITH THE ADDD INSTRUCTION. THEN
                                        ;*EACH OF THE OTHER INSTRUCTIONS WILL BE TRIED USING MODE 1
                                        ;*NOTE THAT THIS TEST NEEDS A SPECIAL INTERRUPT MODULE,
                                        ;*WHICH WILL PROBABLY ONLY BE PRESENT IN DEC'S MANUFACTURING ENVIRONMENT,
                                        ;*TO RUN. THIS SPECIAL EQUIPMENT IS DESIGNED TO RAISE AN
                                        ;*INTERRUPT REQUEST IN THE PROCESSOR IF A BIT IS SET IN ITS STATUS
                                        ;*REGISTER AND ONLY WHEN AN FPP INSTRUCTION IS ENCOUNTERED.
                                        ;*THEREFORE THIS TEST WILL BE RUN CONDITIONALLY (DEPENDENT UPON WHETHER
                                        ;*OR NOT THE STATUS REGISTER OF THE TEST EQUIPMENT TIMES OUT WHEN REFERENCED).
                                        ;*THIS TEST CAN ALSO BE DESELECTED BY TURNING SWITCH 7 OF THE
                                        ;*SWITCH REGISTER (PHYSICAL OR VIRTUAL) ON.
                                        ;*THE TEST ASSUMES THAT THE TEST EQUIPMENT'S STATUS REGISTER IS AT
                                        ;*LOCATION 777774 (NOTE THAT ALL REFERENCES TO THIS LOCATION ARE
                                        ;*MADE INDIRECT THROUGH THIS PROGRAMS LOCATION CORINT, SO THAT
                                        ;*IF THE USER HAS MODIFIED THE TEST EQUIPMENT'S STATUS REGISTER TO
                                        ;*RESPOND TO A DIFFERENT ADDRESS LOCATION CORINT MUST BE
                                        ;*MADE TO CONTAIN THAT STATUS REGISTER'S NEW ADDRESS).
                                        ;*THIS PROGRAM ASSUMES THAT THE TRAP VECTOR FOR THE TEST EQUIPMENT IS 110.
                                        ;*AGAIN NOTE THAT ALL REFERENCES TO THIS TRAP VECTOR ARE INDIRECT, THROUGH
                                        ;*THIS PROGRAM'S LOCATION CORTRP (IF THE TEST EQUIPMENT IS
                                        ;*MADE TO TRAP TO A DIFFERENT VECTOR LOCATION CORTRP MUST CONTAIN THE
                                        ;*ADDRESS OF THIS VECTOR).
                                        ;*
                                        ;*****************************************************************
     032156  000004                     TST22:  SCOPE
6127
6128 032160  132737  000200  001337            BITB    #200,$ENVM      ;SEE IF APT IS SELECTING TEST.
6129 032166  001406                     BEQ     COR1            ;BRANCH TO AUTOSIZE IF NOT.
6130 032170  032777  000200  146742            BIT     #200,@SWR       ;SEE IF THE USER HAS SELECTED THIS
6131                                             ;TEST USING THE SWITCH REGISTER.
6132 032176  001022                     BNE     COR3            ;IF SO, PERFORM TEST.
6133 032200  000137  033336             JMP     CORDONE ;ELSE DO NOT RUN TEST.
6134
6135 032204  012737  032230  000004  COR1:   MOV     #COR2,ERRVECT   ;SEE IF THE TEST EQUIPMENT'S STATUS
6136 032212  012777  000000  001112            MOV     #0,@CORINT      ;REGISTER TIMES OUT.
6137 032220  012737  037502  000004            MOV     #CPSPUR,ERRVECT
6138 032226  000406                     BR      COR3            ;DIDN'T TIME OUT SO START TEST.
6139
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6140 032230  022626                        COR2:   CMP     (SP)+,(SP)+     ;IF THE REFERENCE TIMES OUT DO
6141 032232  012737  037502  000004               MOV     #CPSPUR,ERRVECT
6142 032240  000137  033336                       JMP     CORDONE ;NOT RUN TEST.
6143
6144                                       ;TEST ADDD MODE 0
6145 032244                                COR3:
6146 032244  005227  177777                       INC     #-1
6147 032250  001002                               BNE     COR33
6148 032252  104401                               TYPE
6149 032254  040455                               .WORD   CORMES
6150 032256                                COR33:
6151 032256  104413                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6152 032260  004737  033036                       JSR     PC,CORSUB
6153 032264  040200  000100  000200  1$:     .WORD   40200,100,200,300       ;AC0
6154 032274  123456                        2$:     .WORD   123456          ;R0
6155 032276  000200                        3$:     200                     ;FPS
6156 032300  172000                        4$:     ADDD    AC0,AC0         ;TEST INSTRUCTION.
6157 032302  000240                               NOP
6158 032304  005037  033320                       CLR     CORFLG  ;RESET INTERRUPT FLAG
6159 032310  104252                               ERROR   +252            ;NO INTERRUPT! TEST EQUIPMENT FAILED.
6160 032312  000401                               BR      11$
6161 032314  104253                        5$:     ERROR   +253            ;INCORRECT STATE AT INTERRUPT.
6162 032316                                11$:
6163                                       ;TEST ADD MODE 1
6164 032316                                COR4:
     032316  104413                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6165 032320  004737  033036                       JSR     PC,CORSUB
6166 032324  040201  000555  077007  1$:     .WORD   40201,555,77007,111111  ;AC0
6167 032334  032324                        2$:     .WORD   1$              ;R0
6168 032336  000217                        3$:     217                     ;FPS
6169 032340  172010                        4$:     ADDD    (R0),AC0        ;TEST INSTRUCTION
6170 032342  000240                               NOP
6171 032344  005037  033320                       CLR     CORFLG  ;RESET INTERRUPT FLAG
6172 032350  104252                               ERROR   +252            ;REPORT FAILURE. NO INTERRUPT.
6173 032352  000401                               BR      11$
6174 032354  104254                               ERROR   +254
6175 032356                                11$:
6176
6177                                       ;TEST ADDD MODE 2
6178 032356                                COR5:
     032356  104413                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6179 032360  004737  033036                       JSR     PC,CORSUB
6180 032364  040202  111333  052525  1$:     .WORD   40202,111333,52525,70707        ;AC0
6181 032374  032364                        2$:     .WORD   1$              ;R0
6182 032376  000205                        3$:     205                     ;FPS
6183 032400  172020                        4$:     ADDD    (R0)+,AC0       ;TEST INSTRUCTION
6184 032402  000240                               NOP
6185 032404  005037  033320                       CLR     CORFLG  ;RESET THE INTERRUPT FLAG
6186 032410  104252                               ERROR   +252            ;REPORT FAILURE. NO INTERRUPT.
6187 032412  000401                               BR      11$
6188 032414  104255                               ERROR   +255            ;CORRECT FLOWS FAILED.
6189 032416                                11$:
6190
6191                                       ;TEST ADDD MODE 3
6192 032416                                COR6:
     032416  104413                               LPERR                   ;SET UP THE LOOP ON ERROR ADDRESS.
6193 032420  004737  033036                       JSR     PC,CORSUB
```

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6194 032424  040203  071735  072746  1$:     .WORD   40203,71735,72746,1     ;AC0
6195 032434  032460                  2$:     .WORD   10$                   ;R0
6196 032436  000206                  3$:     206                           ;FPS
6197 032440  172030                  4$:     ADDD    @(R0)+,AC0            ;TEST INSTRUCTION
6198 032442  000240                          NOP
6199 032444  005037  033320                  CLR     CORFLG                ;RESET THE INTERRUPT FLAG
6200 032450  104252                          ERROR   +252                  ;REPORT FAILURE, NO INTERRUPT.
6201 032452  000403                          BR      11$
6202 032454  104256                  5$:     ERROR   +256                  ;CORRECT FLOWS FAILED.
6203 032456  000401                          BR      11$
6204 032460  032424                  10$:    .WORD   1$                    ;USED FOR THE ADDRESSING OF THE OPERAND
6205                                                                        ;IN THIS MODE.
6206 032462                          11$:
6207                                 ;TEST ADDD MODE 4
6208 032462                          COR7:
     032462  104413                          LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
6209 032464  004737  033036                  JSR     PC,CORSUB
6210 032470  040204  123456  070123  1$:     .WORD   40204,123456,70123,45671      ;AC0
6211 032500  032500                  2$:     .WORD   1$+10                 ;R0
6212 032502  000212                  3$:     212                           ;FPS
6213 032504  172040                  4$:     ADDD    -(R0),AC0             ;TEST INSTRUCTION
6214 032506  000240                          NOP
6215 032510  005037  033320                  CLR     CORFLG  ;RESET THE INTERRUPT FLAG
6216 032514  104252                          ERROR   +252                  ;REPORT FAILURE. NO INTERRUPT.
6217 032516  000401                          BR      11$
6218 032520  104257                          ERROR   +257                  ;CORRECT FLOWS FAILED
6219 032522                          11$:
6220
6221                                 ;TEST ADDD MODE 5
6222 032522                          COR8:
     032522  104413                          LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
6223 032524  004737  033036                  JSR     PC,CORSUB
6224 032530  040205  076543  021076  1$:     .WORD   40205,76543,21076,54321 ;AC0
6225 032540  032566                  2$:     .WORD   10$+2                 ;R0
6226 032542  000213                  3$:     213                           ;FPS
6227 032544  172050                  4$:     ADDD    @-(R0),AC0            ;TEST INSTRUCTION
6228 032546  000240                          NOP
6229 032550  005037  033320                  CLR     CORFLG  ;RESET THE INTERRUPT FLAG
6230 032554  104252                          ERROR   +252                  ;REPORT ERROR. NO INTERRUPT.
6231 032556  000403                          BR      11$
6232 032560  104260                  5$:     ERROR   +260                  ;CORRECT FLOWS FAILED.
6233 032562  000401                          BR      11$
6234 032564  032530                  10$:    .WORD   1$
6235 032566                          11$:
6236
6237                                 ;TEST ADDD MODE 6
6238 032566                          COR9:
     032566  104413                          LPERR                         ;SET UP THE LOOP ON ERROR ADDRESS.
6239 032570  004737  033036                  JSR     PC,CORSUB
6240 032574  040206  034353  063730  1$:     .WORD   40206,34353,63730,31323 ;AC0
6241 032604  032573                  2$:     .WORD   1$-1                  ;R0
6242 032606  000214                  3$:     214                           ;FPS
6243 032610  172060  000001          4$:     ADDD    1(R0),AC0             ;TEST INSTRUCTION
6244 032614  005037  033320                  CLR     CORFLG
6245 032620  104252                          ERROR   +252                  ;REPORT FAILURE NO TRAP.
6246 032622  000401                          BR      11$
6247 032624  104261                  5$:     ERROR   +261
```

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6248 032626                                    11$:
6249
6250                                           ;TEST ADDD MODE 7
6251 032626                                    COR10:
     032626  104413                                   LPERR                    ;SET UP THE LOOP ON ERROR ADDPESS.
6252 032630  004737  033036                          JSR     PC,CORSUB
6253 032634  040210  070107  062426  1$:      .WORD   40210,70107,62426,55555 ;AC0
6254 032644  032667                 2$:      .WORD   10$-1                   ;R0
6255 032646  000204                 3$:      204                             ;FPS
6256 032650  172070  000001        4$:      ADDD    @1(R0),AC0              ;TEST INSTRUCTION
6257 032654  005037  033320                 CLR     CORFLG
6258 032660  104252                        ERROR   +252                    ;REPORT FAILURE NO TRAP
6259 032662  000403                        11$
6260 032664  104262                 5$:      E, 'OR  +262                    ;CORRECT FLOWS FAILED.
6261 032666  000401                        BR      11$
6262 032670  032634                 10$:     .WORD   1$
6263 032672                          11$:
6264
6265                                           ;TEST DIVD MODE 1
6266 032672                                    COR11:
     032672  104413                                   LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
6267 032674  004737  033036                          JSR     PC,CORSUB
6268 032700  040211  033445  056677  1$:      .WORD   40211,33445,56677,001122        ;AC0
6269 032710  032700                 2$:      .WORD   1$                      ;R0
6270 032712  000205                 3$:      205                             ;FPS
6271 032714  174410                 4$:      DIVD    (R0),AC0                ;TEST INSTRUCTION
6272 032716  000240                        NOP
6273 032720  005037  033320                 CLR     CORFLG
6274 032724  104252                        ERROR   +252                    ;REPORT FAILURE, NO TRAP.
6275 032726  000401                        BR      11$
6276 032730  104263                 5$:      ERROR   +263                    ;CORRECT FLOWS FAILED.
6277 032732                          11$:
6278
6279                                           ;TEST MULD MODE 1
6280 032732                                    COR12:
     032732  104413                                   LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
6281 032734  004737  033036                          JSR     PC,CORSUB
6282 032740  040212  165411  046252  1$:      .WORD   40212,165411,46252,63650        ;AC0
6283 032750  032740                 2$:      .WORD   1$                      ;R0
6284 032752  000210                 3$:      .WORD   210                     ;FPS
6285 032754  171010                 4$:      MULD    (R0),AC0                ;TEST INSTRUCTION
6286 032756  000240                        NOP
6287 032760  005037  033320                 CLR     CORFLG
6288 032764  104252                        ERROR   +252                    ;REPORT FAILURE, NO TRAP.
6289 032766  000401                        BR      11$
6290 032770  104264                 5$:      ERROR   +264                    ;CORRECT FLOWS FAILED.
6291 032772                          11$:
6292
6293                                           ;TEST MODD MODE 1
6294 032772                                    COR13:
     032772  104413                                   LPERR                    ;SET UP THE LOOP ON ERROR ADDRESS.
6295 032774  004737  033036                          JSR     PC,CORSUB
6296 033000  040213  045654  054542  1$:      .WORD   40213,45654,54542,171623        ;AC0
6297 033010  033000                 2$:      .WORD   1$                      ;R0
6298 033012  000412                 3$:      .WORD   412                     ;FPS
6299 033014  171410                 4$:      MODD    (R0),AC0                ;TEST INSTRUCTION.
6300 033016  000240                        NOP
```

```
                                        CLR     CORFLG
                                        ERROR   +252            ;REPORT FAILURE NO TRAP.
                                        BR      11$
                                5$:     ERROR   +265            ;CORRECT FLOWS FAILED.
                                11$:    JMP     CORDONE ;FINISHED TEST!

                                ;THIS SUBROUTINE, CORSUB, IS CALLED TO SET UP THE OPERANDS
                                ;AND CHECK THE RESULTS IN THIS TEST. IT IS CALLED THUS:
                                ;
                                ;               JSR     PC,CORSUB
                                ;       1$:     .WORD   X,X,X,X         ;AC0 OPERAND
                                ;       2$:     .WORD   X               ;R0
                                ;       3$:     .WORD   X               ;FPS
                                ;       4$:     INST                    ;TEST INSTRUCTION TO BE
                                ;                                       ;EXECUTED.
                                ;               ADR                     ;AN ADDRESS OFFSET FOR
                                ;                                       ;CERTAIN MODES OR NOP.
                                ;               ERROR   +252            ;NO TRAP ERROR.
                                ;               BR      11$
                                ;       5$:     ERROR   +N              ;CORRECT FLOWS FAILURE.
                                ;               BR      11$             ;OPTIONAL FOR CERTAIN MODES.
                                ;       10$:    .WORD   ADDRESS         ;OPTIONAL FOR CERTAIN MODES.
                                ;       11$:
                                ;
                                ;CORSUB WILL PICK UP A POINTER TO THE ARGUMENTS, IN R1. AC0, R0 AND
                                ;THE FPS WILL BE SET TO THE DESIGNATED VALUES. THEN THE TEST MODULE
                                ;WILL BE SET UP TO INTERRUPT AND THE INSTRUCTION AT 4$ EXECUTED. IF
                                ;NO TRAP OCCURS THEN THE TEST MODULE IS FAULTY. WHEN THE TRAP OCCURS
                                ;THE PC ON THE STACK SHOULD BE 4$, AND AC0, R0 AND THE FPS SHOULD NOT
                                ;HAVE BEEN MODIFIED. IF EVERYTHING IS CORRECT CORSUB WILL RETURN TO
                                ;5$ PLUS TWO. IF AN ERROR IS DETECTED THEN CORSUB WILL RETURN TO THE
                                ;ERROR REPORT AT 5$.
                                ;NOTE THAT A FLAG, CORFLG, IS SET TO -1 WHEN AN INTERRUPT IS PENDING.
                                ;CORFLG IS ZERO OTHERWISE.

033036  005037  033320      CORSUB: CLR     CORFLG  ;SET FLAG TO INDICATE NO INTERRUPT
                                                    ;PENDING.
033042  012601                      MOV     (SP)+,R1        ;GET A POINTER TO THE ARGUMENTS.
033044  010102                      MOV     R1,R2           ;SET AC0.
033046  012700  000200              MOV     #200,R0
033052  170100                      LDFPS   R0
033054  172412                      LDD     (R2),AC0
033056  016100  000012              MOV     12(R1),R0       ;SET UP THE FPS.
033062  170100                      LDFPS   R0
033064  016100  000010              MOV     10(R1),R0       ;SET UP R0.
033070  010102                      MOV     R1,R2
033072  062702  000014              ADD     #14,R2
033076  010237  001236              MOV     R2,$TMP2        ;SAVE ADDRESS OF INSTRUCTION IN CASE
                                                    ;OF ERROR.
033102  005037  177776              CLR     PSW             ;CLEAR THE PRIORITY TO ALLOW INTERRUPTS.
033106  012777  033134  000220      MOV     #CORTV,@CORTRP  ;SET UP THE INTERRUPT VECTOR.
033114  012737  177777  033320      MOV     #-1,CORFLG      ;SET THE FLAG TO INDICATE
                                                    ;AN INTERRUPT IS PENDING.
033122  012777  177777  000202      MOV     #-1,@CORINT     ;ENABLE THE TEST EQUIPMENT'S
                                                    ;TRAP FUNCTION AND GO
033130  000161  000014              JMP     14(R1)          ;EXECUTE THE INSTRUCTION.
```

TEST # 22 - INTERRUPT CORRECT FLOWS TEST

```
                                        ;TRAP TO HERE WHEN THE INTERPUPT OCCURS.
033134  005137  033320          CORTV:  COM     CORFLG  ;FIRST SEE IF AN INTERRUPT WAS PENDING.
033140  001060                          BNE     CORTV1          ;IF NOT GO REPORT AN ERROR.
033142  012777  000000  000162          MOV     #0,@CORINT      ;MAKE SURE THE TEST EQUIPMENT
                                                                ;IS NOT INTERRUPT ENABLED.

033150  170204                          STFPS   R4              ;GET THE FPS.
033152  012702  000200                  MOV     #200,R2         ;GET AC0
033156  170102                          LDFPS   R2
033160  012702  033322                  MOV     #CORTMP,R2
033164  174012                          STD     AC0,(R2)
033166  012737  033322  001240          MOV     #CORTMP,$TMP3
033174  010037  001244                  MOV     R0,$TMP5
033200  010437  001250                  MOV     R4,$TMP7
033204  011637  001254                  MOV     (SP),$TMP11
033210  010102                          MOV     R1,R2
033212  010237  001242                  MOV     R2,$TMP4
033216  062702  000010                  ADD     #10,R2
033222  012237  001246                  MOV     (R2)+,$TMP6
033226  012237  001252                  MOV     (R2)+,$TMP10
033232  010237  001256                  MOV     R2,$TMP12
033236  021602                          CMP     (SP),R2         ;SEE IF THE TRAP OCCURRED
                                                                ;AT THE CORRECT ADDRESS.
033240  001016                          BNE     CORTV0
033242  022626                          CMP     (SP)+,(SP)+     ;RESET THE STACK.
033244  020061  000010                  CMP     R0,10(R1)       ;SEE IF R0 IS CORRECT.
033250  001012                          BNE     CORTV0          ;BR IF NOT CORRECT.
033252  010102                          MOV     R1,R2           ;SEE IF AC0 WAS CORRECT
033254  012703  033322                  MOV     #CORTMP,R3
033260  012705  000004                  MOV     #4,R5
033264  022223                  1$:     CMP     (R2)+,(R3)+
033266  001003                          BNE     CORTV0          ;BRANCH IF INCORRECT.
033270  077503                          SOB     R5,1$
033272  000161  000032                  JMP     32(R1)          ;IF EVERYTHING IS CORRECT THEN RETURN.

033276  000161  000030          CORTV0: JMP     30(R1)          ;CORRECT FLOWS FAILED SO GO REPORT ERROR.

033302  011637  001236          CORTV1: MOV     (SP),$TMP2      ;AN INTERRUPT OCCURRED WHEN THE FLAG
                                                                ;CORFLG, DID NOT INDICATE THAT ONE WAS
                                                                ;PENDING SO REPORT SPURIOUS TRAP.
033306  005037  033320                  CLR     CORFLG
033312  022626                          CMP     (SP)+,(SP)+
033314  104266                          ERROR   +266
033316  000407                          BR      CORDONE

033320  000000          CORFLG: .WORD   0
033322  000000  000000  000000  CORTMP: .WORD   0,0,0,0

033332  177774          CORINT: .WORD   177774          ;THIS IS THE ADDRESS, 177774, OF THE
                                                        ;TEST EQUIPMENT'S STATUS REGISTER.
                                                        ;THE CONTENTS OF CORINT CAN BE MODIFIED
                                                        ;IF THIS STATUS REGISTER'S ADDRESS IS
                                                        ;CHANGED.
033334  000110          CORTRP: .WORD   110             ;THIS IS THE ADDRESS OF THE TEST EQUIPMENTS
                                                        ;TRAP VECTOR. LIKE THE STATUS REGISTER'S ADDRESS
                                                        ;DESCRIBED IMMEDIATELY ABOVE
                                                        ;THIS VECTOR CAN BE CHANGED, BUT THE
```

```
                                                        ;CONTENTS OF CORTRP MUST INDICATE THE
                                                        ;CHANGE.

033336                          CORDONE:
033336  104412                          RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
                                                        ;SEE IF THE USER HAS EXPRESSED
                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                        ;THE USER TYPED CONTROL G?).

033340                          TST23:

                                .SBTTL  END OF PASS ROUTINE

                                ;;*******************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
                                ;*IF SW12=1 INHIBIT TRACE TRAP
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO LOOP
033340                          $EOP:
033340  000004                          SCOPE
033342  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
033346  005037  001302                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
033352  005237  001324                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
033356  100004                          BPL     1000$           ;BRANCH IF STILL PLUS                   ;DPM002
033360  005037  001324                  CLR     $PASS           ;CLEAR THE PASS COUNTER                 ;DPM002
033364  005237  034106                  INC     $PASS2          ;INCREMENT OVERFLOW PASS COUNTER        ;DPM002
033370  005327                1000$:    DEC     (PC)+           ;;LOOP?
033372  000001                $EOPCT:   .WORD   1
033374  003402                          BLE     999$            ;NO                                     ;DPM002
033376  000137  034034                  JMP     $DOAGN          ;;YES
033402  012737                999$:     MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
033404  000001                $ENDCT:   .WORD   1
033406  033372                          $EOPCT
033410  005737  001112                  TST     $ERTTL          ;SEE IF ANY ERRORS THIS PASS            ;DPM002
033414  001007                          BNE     5000$           ;BRANCH IF SO TO PRINT THE EOP          ;DPM002
033416  005737  034104                  TST     EPENDS          ;SEE IF EOP MSGS ARE DISABLED           ;DPM002
033422  001120                          BNE     $GET42          ;BRANCH IF SO                           ;DPM002
033424  032737  001777  001324          BIT     #1777,$PASS     ;PRINT EOP EVERY 2000TH PASS            ;DPM002
033432  001114                          BNE     $GET42          ;BRANCH IF NOT MULTIPLE OF 1000         ;DPM002
033434                          5000$:
033434  104401  033442                  TYPE    ,65$            ;;TYPE ASCIZ STRING
033440  000407                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:    .ASCIZ  <12><15>/END PASS # /
033460                          64$:
033460  005737  034106                  TST     $PASS2          ;SEE IF OVERFLOW HAS NON-ZERO VALUE     ;DPM002
033464  001440                          BEQ     4900$           ;BRANCH IF ZERO                         ;DPM002
033466  013746  034106                  MOV     $PASS2,-(SP)    ;;SAVE $PASS2 FOR TYPEOUT
                                                                ;;TYPE OVERFLOW PASS NUMBER IN OCTAL    ;DPM002
033472  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
033474     006                          .BYTE   6               ;;TYPE 6 DIGITS
033475     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
```

```
END OF PASS ROUTINE

033476  005737  001324                    TST     $PASS           ;SEE IF PASS COUNT IS ZERO              ;DPM002
033502  001007                            BNE     3000$           ;BRANCH IF NOT                          ;DPM002
033504  104401  033512                    TYPE    ,67$            ;;TYPE ASCIZ STRING
033510  000403                            BR      66$             ;;GET OVER THE ASCIZ
                                  ;;67$:    .ASCIZ  !00000!
033520                            66$:
033520  000426                            BR      4910$           ;GO TEST $ERTTL                         ;DPM002
033522  012737  070000  001244    3000$:    MOV     #70000,$TMP5    ;CHECK 5TH OCTAL DIGIT FIRST            ;DPM002
033530  033737  001244  001324    4000$:    BIT     $TMP5,$PASS     ;CHECK TO SEE IF OCTAL DIGIT IS ZERO    ;DPM002
033536  001013                            BNE     4900$           ;BRANCH OUT IF ZERO                     ;DPM002
033540  104401  033546                    TYPE    ,69$            ;;TYPE ASCIZ STRING
033544  000401                            BR      68$             ;;GET OVER THE ASCIZ
                                  ;;69$:    .ASCIZ  !0!
033550                            68$:
033550  006237  001244                    ASR     $TMP5           ;SHIFT THE THREE BITS RIGHT 3 PLACES    ;DPM002
033554  006237  001244                    ASR     $TMP5           ;                                       ;DPM002
033560  006237  001244                    ASR     $TMP5           ;                                       ;DPM002
033564  000761                            BR      4000$           ;BRANCH BACK TO CHECK $PASS              ;DPM002
033566                            4900$:
033566  013746  001324                    MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                                                                  ;;TYPE PASS NUMBER IN OCTAL
033572  104403                            TYPOS                   ;;GO TYPE--OCTAL ASCII
033574     006                            .BYTE   6               ;;TYPE 6 DIGITS
033575     000                            .BYTE   0               ;;SUPPRESS LEADING ZEROS
033576  005737  001112            4910$:  TST     $ERTTL          ;SEE IF ANY ERRORS THIS PASS            ;DPM002
033602  001426                            BEQ     5001$           ;BRANCH AROUND REPORT IF NONE           ;DPM002
033604  104401  033612                    TYPE    ,71$            ;;TYPE ASCIZ STRING
033610  000415                            BR      70$             ;;GET OVER THE ASCIZ
                                  ;;71$:    .ASCIZ  /  TOTAL ERRORS THIS PASS /
033644                            70$:
033644  013746  001112                    MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
                                                                  ;;TOTAL NUMBER OF ERRORS IN OCTAL
033650  104403                            TYPOS                   ;;GO TYPE--OCTAL ASCII
033652     006                            .BYTE   6               ;;TYPE 6 DIGITS
033653     000                            .BYTE   0               ;;SUPPRESS LEADING ZEROS
033654  005037  001112                    CLR     $ERTTL          ;;CLEAR ERROR TOTAL
033660  104401  001313            5001$:  TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
033664  105777  145254            $GET42: TSTB    @$TKS           ;IS A CHARACTER WAITING?                ;DPM002
033670  100042                            BPL     $GT42C          ;BRANCH IF NOT                          ;DPM002
033672  013737  001146  001244            MOV     $TKB,$TMP5      ;WASTE THE CHARACTER, CLEARING READY    ;DPM002
033700  005737  034104                    TST     EPENDS          ;SEE WHICH STATE ENABLE/DISABLE IS IN   ;DPM002
033704  001017                            BNE     $DISAB          ;BRANCH IF EOP'S DISABLED               ;DPM002
033706  005237  034104                    INC     EPENDS          ;SET FLAG DISABLING PRINTOUTS           ;DPM002
033712  104401  033720                    TYPE    ,65$            ;;TYPE ASCIZ STRING
033716  000411                            BR      64$             ;;GET OVER THE ASCIZ
                                  ;;65$:    .ASCIZ  <CRLF>!EOP'S DISABLED!<CRLF>
033742                            64$:
033742  000415                            BR      $GT42C          ;BRANCH OVER ENABLE ROUTINE             ;DPM002
033744  005037  034104            $DISAB: CLR     EPENDS          ;CLEAR FLAG ENABLING PRINTOUTS          ;DPM002
033750  104401  033756                    TYPE    ,65$            ;;TYPE ASCIZ STRING
033754  000410                            BR      64$             ;;GET OVER THE ASCIZ
                                  ;;65$:    .ASCIZ  <CRLF>!EOP'S ENABLED!<CRLF>
033776                            64$:
033776  013700  000042            $GT42C: MOV     @#42,R0         ;;GET MONITOR ADDRESS
034002  001414                            BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
034004  005046                            CLR     -(SP)           ;;INSURE THE "T" BIT IS CLEAR
034006  012746  034014                    MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
```

```
END OF PASS ROUTINE

034012  000426                          BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                                                ;;WITH A CLEARED 'T' BIT
034014                          $CLR.T:
034014  013700  000042                  MOV     @#42,R0         ;;INSURE R0 CONTAINS THE MONITORS
034020  001405                          BEQ     $DOAGN          ;;RETURN ADDRESS
034022  000005                          RESET                   ;;CLEAR THE WORLD
034024  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
034026  000240                          NOP                     ;;SAVE ROOM
034030  000240                          NOP                     ;;FOR
034032  000240                          NOP                     ;;ACT11
034034                          $DOAGN:
034034  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
034036  042716  000020                  BIC     #20,(SP)        ;;CLEAR THE 'T' BIT
034042  032777  010000  145070          BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
034050  001005                          BNE     1$              ;;BR IF NO
034052  005137  034076                  COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
034056  100402                          BMI     1$              ;;BR IF NO
034060  052716  000020                  BIS     #20,(SP)        ;;SET TRACE TRAP
034064  012746  034072          1$:     MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
034070  000002                  $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
                                                                ;;AN 'RTT' IF 'RTT' IS A LEGAL
                                                                ;;INSTRUCTION
034072                          $LOOP:
034072  000137                          JMP     @(PC)+          ;;RETURN
034074  005214                  $RTNAD: .WORD   LOOP
034076  000000                  $TBIT:  .WORD   0               ;;'T' BIT STATE INDICATOR
034100     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
                                        .EVEN
034104  000000                  EPENDS: .WORD   0               ;LOCATION FOR EOP PRINT FLAG        ;DPM002
034106  000000                  $PASS2: .WORD   0               ;LOCATION FOR PASS COUNT OVERFLOW   ;DPM002
6427
6428                            .SBTTL  SCOPE HANDLER ROUTINE

                                ;;**************************************************************
                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW14=1         LOOP ON TEST
                                ;*SW11=1         INHIBIT ITERATIONS
                                ;*SW09=1         LOOP ON ERROR
                                ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                ;*CALL
                                ;*      SCOPE           ;;SCOPE=IOT

034110                          $SCOPE:
034110  104406                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
034112  032777  040000  145020  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
034120  001131                          BNE     $OVER           ;;YES IF SW14=1
                                ;#####START OF CODE FOR THE XOR TESTER#####
034122  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
034124  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
034130  012737  034150  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
034136  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
034142  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
034146  000500                          BR      $SVLAD          ;;GO TO THE NEXT TEST
```

```
034150  022626                      5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
034152  012637  000004                      MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
034156  000440                      7$      BR      7$              ;;LOOP ON THE PRESENT TEST
034160                              6$:;#####END OF CODE FOR THE XOR TESTER#####
034160  032777  000400  144752              BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
034166  001404                              BEQ     2$              ;;BR IF NO
034170  127737  144744  001102              CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
034176  001502                              BEQ     $OVER           ;;BR IF YES
034200  013737  177766  034422  2$:         MOV     177766,CPSAVE   ;MOVE CPU ERR REG VALUE TO LOC FOR TST  ;DPM001
034206  032737  000001  034422              BIT     #BIT00,CPSAVE   ;SEE IF THE POWER MONITOR BIT IS ON     ;DPM001
034214  001406                              BEQ     2000$           ;BRANCH TO CONTINUE ROUTINE IF CLEAR    ;DPM001
034216  042737  000001  177766              BIC     #BIT00,177766   ;CLEAR THE BIT FOUND TO BE SET          ;DPM001
034224  104177                              EMT     +177            ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
034226  105037  001103                      CLRB    $ERFLG          ;CLEAR THE ERROR FLAG FOR NEXT TEST     ;DPM001
034232  105737  001103          2000$:      TSTB    $ERFLG          ;WAS THERE AN ERROR?
034236  001421                              BEQ     3$              ;;BR IF NO
034240  123737  001115  001103              CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
034246  101015                              BHI     3$              ;;BR IF NO
034250  032777  001000  144662              BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
034256  001404                              BEQ     4$              ;;BR IF NO
034260  013737  001110  001106  7$:         MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
034266  000446                              BR      $OVER
034270  105037  001103          4$:         CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
034274  005037  001302                      CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
034300  000415                              BR      1$              ;;ESCAPE TO THE NEXT TEST
034302  032777  004000  144630  3$:         BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
034310  001011                              BNE     1$              ;;BR IF YES
034312  005737  001324                      TST     $PASS           ;;IF FIRST PASS OF PROGRAM
034316  001406                              BEQ     1$              ;;      INHIBIT ITERATIONS
034320  005237  001104                      INC     $ICNT           ;;INCREMENT ITERATION COUNT
034324  023737  001302  001104              CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
034332  002024                              BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
034334  012737  000001  001104  1$:         MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
034342  013737  034420  001302              MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
034350  105237  001102          $SVLAD:     INCB    $TSTNM          ;;COUNT TEST NUMBERS
034354  113737  001102  001322              MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
034362  011637  001106                      MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
034366  011637  001110                      MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
034372  005037  001304                      CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
034376  112737  000001  001115              MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
034404  013777  001102  144530  $OVER:      MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
034412  013716  001106                      MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
034416  000002                              RTI                     ;;FIXES PS
034420  000001                  $MXCNT:     1                       ;;MAX. NUMBER OF ITERATIONS
034422  000000                  CPSAVE:     .WORD   0               ;LOCATION TO SAVE CPU ERR REG CONTENTS  ;DPM001
6429
6430                                        .SBTTL  ERROR HANDLER ROUTINE

                                            ;;**************************************************************
                                            ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                            ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                            ;*AND GO TO ERTYPE ON ERROR
                                            ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                            ;*SW15=1         HALT ON ERROR
                                            ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                            ;*SW10=1         BELL ON ERROR
                                            ;*SW09=1         LOOP ON ERROR
```

ERROR HANDLER ROUTINE

```
                                        ;*CALL
                                        ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

034424  000000                  IBSAVE: .WORD   0               ;LOC'N TO HOLD $ERRPC DURING DUAL ERR   ;DPM001
034426                          $ERROR:
034426  104406                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
034430  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
034434  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
034436  013777  001102  144476          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
034444  032777  002000  144466          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
034452  001402                          BEQ     1$              ;;NO - SKIP
034454  104401  001306                  TYPE    ,$BELL          ;;RING BELL
034460  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
034464  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
034470  162737  000002  001116          SUB     #2,$ERRPC
034476  117737  144414  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
034504  122737  000177  001114          CMPB    #177,$ITEMB     ;SEE IF THIS IS THE POWER FAIL CALL      ;DPM001
034512  001421                          BEQ     1000$           ;BRANCH AROUND ROUTINE IF IT IS         ;DPM001
034514  013737  177766  034422          MOV     177766,CPSAVE   ;MOVE CPU ERR REG TO CPSAVE FOR TEST    ;DPM001
034522  032737  000001  034422          BIT     #BIT00,CPSAVE   ;SEE IF POWER MONITOR BIT IS SET        ;DPM001
034530  001412                          BEQ     1000$           ;BRANCH IF OK                           ;DPM001
034532  042737  000001  177766          BIC     #BIT00,177766   ;CLEAR THE BIT FOUND SET                ;DPM001
034540  013737  001116  034424          MOV     $ERRPC,IBSAVE   ;SAVE $ERRPC                            ;DPM001
034546  104177                          ERROR   +177            ;CALL SPECIAL POWER MON BIT ERROR        ;DPM001
034550  013737  034424  001116          MOV     IBSAVE,$ERRPC   ;RESTORE $ERRPC
034556                          1000$:
034556  032777  020000  144354          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
034564  001004                          BNE     20$             ;;SKIP TYPEOUTS
034566  004737  037040                  JSR     PC,$ERTYPE      ;;GO TO USER ERROR ROUTINE
034572  104401  001313                  TYPE    ,$CRLF
034576                          20$:
034576  122737  000001  001336          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
034604  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
034606  113737  001114  034620          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
034614  004737  035672                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
034620     000                  21$:    .BYTE   0
034621     000                          .BYTE   0
034622  000777                  22$:    BR      22$             ;;APT ERROR LOOP
034624  005737  034424          2$:     TST     IBSAVE          ;SEE IF POWER FAIL ERROR CALL            ;DPM001
034630  001005                          BNE     3$              ;BRANCH IF NOT - HALT NOT ALLOWED        ;DPM001
034632  005777  144302                  TST     @SWR            ;;HALT ON ERROR
034636  100002                          BPL     3$              ;;SKIP IF CONTINUE
034640  000000                          HALT                    ;;HALT ON ERROR!
034642  104406                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
034644  032777  001000  144266  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
034652  001405                          BEQ     4$              ;;BR IF NO
034654  005737  034424                  TST     IBSAVE          ;SEE IF THIS IS THE PWR MNTR BIT ERROR   ;DPM001
034660  001002                          BNE     4$              ;BRANCH IF SO - NO FUDGING ALLOWED       ;DPM001
034662  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
034666  005737  001304          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
034672  001405                          BEQ     5$              ;;BR IF NONE
034674  005737  034424                  TST     IBSAVE          ;SEE IF THIS IS THE PWR MNTR BIT ERROR   ;DPM001
034700  001002                          BNE     5$              ;BRANCH IF SO - NO FUDGING ALLOWED       ;DPM001
034702  013716  001304                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
034706                          5$:
034706  022737  034024  000042          CMP     #$ENDAD,42      ;;ACT-11 AUTO-ACCEPT?
034714  001001                          BNE     6$              ;;BRANCH IF NO
```

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        034716  000000                          HALT                    ;;YES
        034720                          6$:
        034720  032777  001000  144212          BIT     #BIT09,@SWR
        034726  001013                          BNE     ERM10
        034730  011637  001162                  MOV     (SP),$REG0              ;SEE IF ERROR #377
        034734  062737  177776  001162          ADD     #-2,$REG0
        034742  122777  000377  144212          CMPB    #377,@$REG0
        034750  001002                          BNE     ERM10
        034752  062716  000002                  ADD     #2,(SP)
        034756  000002                  ERM10:  RTI
   6431
   6432                                 .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
                                        ;;******************************************************************
                                        ;*SAVE R0-R5
                                        ;*CALL:
                                        ;*      SAVREG
                                        ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
                                        ;*
                                        ;*TOP---(+16)
                                        ;* +2---(+18)
                                        ;* +4---R5
                                        ;* +6---R4
                                        ;* +8---R3
                                        ;*+10---R2
                                        ;*+12---R1
                                        ;*+14---R0
        034760                          $SAVREG:
        034760  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
        034762  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
        034764  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
        034766  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
        034770  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
        034772  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
        034774  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
        035000  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
        035004  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
        035010  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
        035014  000002                          RTI
                                        ;*RESTORE R0-R5
                                        ;*CALL:
                                        ;*      RESREG
        035016                          $RESREG:
        035016  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
        035022  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
        035026  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
        035032  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
        035036  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
        035040  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
        035042  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
        035044  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
        035046  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
        035050  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
        035052  000002                          RTI
   6433
   6434                                 .SBTTL  TYPE ROUTINE
                                        ;;******************************************************************
                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
```

```
TYPE ROUTINE

                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                ;*
                                ;*CALL:
                                ;*1) USING A TRAP INSTRUCTION
                                ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                ;*OR
                                ;*      TYPE
                                ;*      MESADR
                                ;*
035054  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
035060  100002                          BPL     1$              ;;BR IF YES
035062  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
035064  000430                          BR      3$              ;;LEAVE
035066  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
035070  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
035074  122737  000001  001336          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
035102  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
035104  13273~  000100  001337          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
035112  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
035114  010037  035124                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
035120  004737  035662                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
035124  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
035126  132737  000040  001337  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
035134  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
035136  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
035140  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
035142  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
035144  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
035146  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
035152  000002                          RTI                     ;;RETURN
035154  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
035160  001430                          BEQ     8$
035162  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
035166  001006                          BNE     5$
035170  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
035172  104401                          TYPE                    ;;TYPE A CR AND LF
035174  001313                          $CRLF
035176  105037  035414                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
035202  000755                          BR      2$              ;;GET NEXT CHARACTER
035204  004737  035266          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
035210  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
035214  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
035216  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
035222  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
035226  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
035230  004737  035266                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
035234  105337  035414                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
035240  000770                          BR      7$              ;;LOOP
                                ;HORIZONTAL TAB PROCESSOR
035242  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
035246  004737  035266          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
035252  132737  000007  035414          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
035260  001372                          BNE     9$              ;;TAB STOP
```

```
035262  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
035264  000724                          BR      2$              ;;GET NEXT CHARACTER
035266                          $TYPEC:
035266  105777  143652                  TSTB    @$TKS           ;;CHAR IN KYBD BUFFER?                  ;MJD001
035272  100022                          BPL     10$             ;;BR IF NOT                             ;MJD001
035274  017746  143646                  MOV     @$TKB,-(SP)     ;;GET CHAR                              ;MJD001
035300  042716  177600                  BIC     #177600,(SP)    ;;STRIP EXTRANEOUS BITS                 ;MJD001
035304  122716  000023                  CMPB    #$XOFF,(SP)     ;;WAS CHAR XOFF                         ;MJD001
035310  001012                          BNE     102$            ;;BR IF NOT                            ;MJD001
035312                          101$:                                                                   ;MJD001
035312  105777  143626                  TSTB    @$TKS           ;;WAIT FOR CHAR                         ;MJD001
035316  100375                          BPL     101$                                                    ;MJD001
035320  117716  143622                  MOVB    @$TKB,(SP)      ;;GET CHAR                              ;MJD001
035324  042716  177600                  BIC     #177600,(SP)    ;;STRIP IT                              ;MJD001
035330  122716  000021                  CMPB    #$XON,(SP)      ;;WAS IT XON?                           ;MJD001
035334  001366                          BNE     101$            ;;BR IF NOT                            ;MJD001
035336                          102$:                                                                   ;MJD001
035336  005726                          TST     (SP)+           ;;FIX STACK                             ;MJD001
035340                          10$:                                                                    ;MJD001
035340  105777  143604                  TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
035344  100375                          BPL     10$                                                     ;MJD001
035346  126627  000002  000021          CMPB    2(SP),#$XON     ;;IS CHARACTER A RANDOM XON?            ;RAN001
035354  001420                          BEQ     $TYPEX          ;;BRANCH IF YES                         ;RAN001
035356  116677  000002  143566          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
035364  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
035372  001003                          BNE     1$              ;;BRANCH IF NO
035374  105037  035414                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
035400  000406                          BR      $TYPEX          ;;EXIT
035402  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
035410  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
035412  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
035414  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
035416  000207                  $TYPEX: RTS     PC
6435
6436                                    .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                ;;**********************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                ;*      .BYTE   M               ;;M=1 OR 0
                                ;*                                      ;;1=TYPE LEADING ZEROS
                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                ;*
                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                ;*$TYPOS OR $TYPOC
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPON                   ;;CALL FOR TYPEOUT
                                ;*
                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
```

```
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

035420  017646  000000                $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
035424  116637  000001  035651              MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
035432  112637  035653                      MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
035436  062716  000002                      ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
035442  000406                            BR      $TYPON
035444  112737  000001  035651  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
035452  112737  000006  035653            MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
035460  112737  000005  035650  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
035466  010346                          MOV     R3,-(SP)        ;;SAVE R3
035470  010446                          MOV     R4,-(SP)        ;;SAVE R4
035472  010546                          MOV     R5,-(SP)        ;;SAVE R5
035474  113704  035653                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
035500  005404                          NEG     R4
035502  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
035506  110437  035652                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
035512  113704  035651                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
035516  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
035522  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
035524  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
035526  000404                          BR      3$              ;;GO DO MSB
035530  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
035532  006105                          ROL     R5
035534  006105                          ROL     R5
035536  010503                          MOV     R5,R3
035540  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
035542  105337  035652                  DECB    $OMODE          ;;TYPE THIS DIGIT?
035546  100021                          BPL     7$              ;;BR IF NO
035550  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
035554  001002                          BNE     4$              ;;TEST FOR 0
035556  005704                          TST     R4              ;;SUPPRESS THIS 0?
035560  001403                          BEQ     5$              ;;BR IF YES
035562  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
035564  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
035570  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
035574  122703  000040                  CMPB    #' ,R3          ;IS THIS A SPACE CHARACTER?     ;DPM002
035600  001404                          BEQ     7$              ;BRANCH IF SO - DON'T TYPE      ;DPM002
035602  110337  035646                  MOVB    R3,8$           ;;SAVE FOR TYPING
035606  104401  035646                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
035612  105337  035650          7$:     DECB    $OCNT           ;;COUNT BY 1
035616  003344                          BGT     2$              ;;BR IF MORE TO DO
035620  002402                          BLT     6$              ;;BR IF DONE
035622  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
035624  000741                          BR      2$              ;;GO DO THE LAST DIGIT
035626  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
035630  012604                          MOV     (SP)+,R4        ;;RESTORE R4
035632  012603                          MOV     (SP)+,R3        ;;RESTORE R3
035634  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
035642  012616                          MOV     (SP)+,(SP)
035644  000002                          RTI                     ;;RETURN
035646     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
035647     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
035650     000                  $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
035651     000                  $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
035652  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
6437
```

```
6438                                    .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;*****************************************************************
035654  112737  000001  036120  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
035662  112737  000001  036116  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
035670  000403                         BR      $ATYC
035672  112737  000001  036120  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
035700                         $ATYC:
035700  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
035702  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
035704  105737  036116                 TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
035710  001450                         BEQ     5$              ;;IF NOT:  BR
035712  122737  000001  001336         CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
035720  001031                         BNE     3$              ;;IF NOT:  BR
035722  132737  000100  001337         BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
035730  001425                         BEQ     3$              ;;IF NOT:  BR
035732  017600  000004                 MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
035736  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
035744  005737  001316         1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
035750  001375                         BNE     1$              ;;IF NOT:  WAIT
035752  010037  001332                 MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
035756  105720                 2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
035760  001376                         BNE     2$
035762  163700  001332                 SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
035766  006200                         ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
035770  010037  001334                 MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
035774  012737  000004  001316         MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
036002  000413                         BR      5$
036004  017637  000004  036030  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
036012  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
036020  013746  177776                 MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
036024  004737  035054                 JSR     PC,$TYPE        ;;CALL TYPE MACRO
036030  000000                 4$:     .WORD   0
036032                         5$:
036032  105737  036120         10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
036036  001416                         BEQ     12$             ;;IF NOT:  BR
036040  005737  001336                 TST     $ENV            ;;RUNNING UNDER APT?
036044  001413                         BEQ     12$             ;;IF NOT:  BR
036046  005737  001316         11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
036052  001375                         BNE     11$             ;;IF NOT:  WAIT
036054  017637  000004  001320         MOV     @4(SP),$FATAL   ;;GET ERROR #
036062  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
036070  005237  001316                 INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
036074  105037  036120         12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
036100  105037  036117                 CLRB    $LFLG           ;;CLEAR LOG FLAG
036104  105037  036116                 CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
036110  012601                         MOV     (SP)+,R1        ;;POP STACK INTO R1
036112  012600                         MOV     (SP)+,R0        ;;POP STACK INTO R0
036114  000207                         RTS     PC              ;;RETURN
036116     000         $MFLG:  .BYTE   0               ;;MESSG. FLAG
036117     000         $LFLG:  .BYTE   0               ;;LOG FLAG
036120     000         $FFLG:  .BYTE   0               ;;FATAL FLAG
                               .EVEN
            000200  APTSIZE=200
            000001  APTENV=001
            000100  APTSPOOL=100
            000040  APTCSUP=040
6439
```

```
6440                                    .SBTTL  TTY INPUT ROUTINE
                                        ;;*****************************************************************
                                        .ENABL  LSE
                                        ;;*****************************************************************
                                        ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                                        ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
                                        ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                                        ;*WHEN OPERATING IN TTY FLAG MODE.
036122  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
036130  001074                         BNE     15$             ;;BRANCH IF NO
036132  105777  143006                 TSTB    @$TKS           ;;CHAR THERE?
036136  100071                         BPL     15$             ;;IF NO, DON'T WAIT AROUND
036140  117746  143002                 MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
036144  042716  177600                 BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
036150  022726  000007                 CMP     #7,(SP)+        ;;IS IT A CONTROL G?
036154  001062                         BNE     15$             ;;NO, RETURN TO USER
036156  123727  001134  000001         CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
036164  001456                         BEQ     15$             ;;BRANCH IF YES
036166  104401  036541                 TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
036172  104401  036546         $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
036176  013746  000176                 MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
036202  104402                         TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
036204  104401  036557                 TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
036210  005046                 19$:    CLR     -(SP)           ;;CLEAR COUNTER
036212  005046                         CLR     -(SP)           ;;THE NEW SWR
036214  105777  142724          7$:    TSTB    @$TKS           ;;CHAR THERE?
036220  100375                         BPL     7$              ;;IF NOT TRY AGAIN
036222  117746  142720                 MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
036226  042716  177600                 BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
036232  021627  000025          9$:    CMP     (SP),#25        ;;IS IT A CONTROL-U?
036236  001005                         BNE     10$             ;;BRANCH IF NOT
036240  104401  036534                 TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
036244  062706  000006          20$:   ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
036250  000757                         BR      19$             ;;LET'S TRY IT AGAIN
036252  021627  000015          10$:   CMP     (SP),#15        ;;IS IT A <CR>?
036256  001022                         BNE     16$             ;;BRANCH IF NO
036260  005766  000004                 TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
036264  001403                         BEQ     11$             ;;BRANCH IF YES
036266  016677  000002  142644         MOV     2(SP),@SWR      ;;SAVE NEW SWR
036274  062706  000006          11$:   ADD     #6,SP           ;;CLEAR UP STACK
036300  104401  001313          14$:   TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
036304  123727  001135  000001         CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
036312  001003                         BNE     15$             ;;BRANCH IF NOT
036314  012777  000100  142622         MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
036322  000002                 15$:    RTI                     ;;RETURN
036324  004737  035266          16$:   JSR     PC,$TYPEC       ;;ECHO CHAR
036330  021627  000060                 CMP     (SP),#60        ;;CHAR < 0?
036334  002420                         BLT     18$             ;;BRANCH IF YES
036336  021627  000067                 CMP     (SP),#67        ;;CHAR > 7?
036342  003015                         BGT     18$             ;;BRANCH IF YES
036344  042726  000060                 BIC     #60,(SP)+       ;;STRIP-OFF ASCII
036350  005766  000002                 TST     2(SP)           ;;IS THIS THE FIRST CHAR
036354  001403                         BEQ     17$             ;;BRANCH IF YES
036356  006316                         ASL     (SP)            ;;NO, SHIFT PRESENT
036360  006316                         ASL     (SP)            ;;    CHAR OVER TO MAKE
036362  006316                         ASL     (SP)            ;;    ROOM FOR NEW ONE.
036364  005266  000002          17$:   INC     2(SP)           ;;KEEP COUNT OF CHAR
```

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036370  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
036374  000707                          BR      7$              ;;GET THE NEXT ONE
036376  104401  001312          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
036402  000720                          BR      20$             ;;SIMULATE CONTROL-U
                                .DSABL  LSB
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                ;
036404  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
036406  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
036414  105777  142524          1$:    TSTB    @$TKS           ;;WAIT FOR
036420  100375                          BPL     1$              ;;A CHARACTER
036422  117766  142520  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
036430  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
036436  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
036444  001013                          BNE     3$              ;;BRANCH IF NO
036446  105777  142472          2$:    TSTB    @$TKS           ;;WAIT FOR A CHARACTER
036452  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
036454  117746  142466                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
036460  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
036464  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
036470  001366                          BNE     2$              ;;IF NOT DISCARD IT
036472  000750                          BR      1$              ;;YES, RESUME
036474  026627  000004  000021  3$:     CMP     4(SP),#$XON     ;;IS IT A RANDOM XON?           ;RAN001
036502  001744                          BEQ     1$              ;;BRANCH IF YES                 ;RAN001
036504  026627  000004  000140          CMP     4(SP),#140      ;;IS IT UPPER CASE?
036512  002407                          BLT     4$              ;;BRANCH IF YES
036514  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
036522  003003                          BGT     4$              ;;BRANCH IF YES
036524  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
036532  000002                  4$:     RTI                     ;;GO BACK TO USER
036534     136     125     015  $CNTLU: .ASCIZ   /^U/<15><12>   ;;CONTROL 'U'
036541     136     107     015  $CNTLG: .ASCIZ   /^G/<15><12>   ;;CONTROL 'G'
036546     015     012     123  $MSWR:  .ASCIZ   <15><12>/SWR = /
036557     040     040     116  $MNEW:  .ASCIZ   /  NEW = /
6441
6442                            .SBTTL  TRAP DECODER
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                ;*GO TO THAT ROUTINE.
036570  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
036572  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
036576  005740                          TST     -(R0)           ;;BACKUP BY 2
036600  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
036602  006300                          ASL     R0              ;;POSITION FOR INDEXING
036604  016000  036624                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
036610  000200                          RTS     R0              ;;GO TO ROUTINE
                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
036612  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
036614  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
036622  000002                          RTI                     ;;RESTORE THE PSW
```

```
                                        .SBTTL  TRAP TABLE
                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE "TRAP" INSTRUCTION.
                                        ;       ROUTINE
                                        ;       -------
 036624  036612                 $TRPAD: .WORD   $TRAP2
 036626  03505~                         $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 036630  035444                         $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 036632  035420                         $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 036634  035460                         $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 036636  036172                         $GTSWR  ;;CALL=GTSWR    TRAP+5(104405)  GET SOFT-SWR SETTING
 036640  036122                         $CKSWR  ;;CALL=CKSWR    TRAP+6(104406)  TEST FOR CHANGE IN SOFT-SWR
 036642  036404                         $RDCHR  ;;CALL=RDCHR    TRAP+7(104407)  TTY TYPEIN CHARACTER ROUTINE
 036644  034760                         $SAVREG ;;CALL=SAVREG   TRAP+10(104410) SAVE R0-R5 ROUTINE
 036646  035016                         $RESREG ;;CALL=RESREG   TRAP+11(104411) RESTORE R0-R5 ROUTINE
 036650  037544                         .RSET   ;;CALL=RSETUP   TRAP+12(104412) ROUTINE TO INITIALIZE AFTER EVERY TEST
 036652  037536                         .LPER   ;;CALL=LPERR    TRAP+13(104413) ROUTINE TO SET LOOP ON ERROR ADDRESS
 000030                  $TERM=.-$TRPAD

                                        .SBTTL  POWER DOWN AND UP ROUTINES
                                        ;;**************************************************************************
                                        ;POWER DOWN ROUTINE
 036654  012737  037032  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
 036662  012737  000340  000026         MOV     #340,@#PWRVEC+2 ;;PRIO:7
 036670  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 036672  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 036674  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 036676  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 036700  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 036702  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 036704  017746  142230                MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
 036710  010637  037036                MOV     SP,$SAVR6       ;;SAVE SP
 036714  012737  036726  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
 036722  000000                        HALT
 036724  000776                        BR      .-2             ;;HANG UP
                                    ;;**************************************************************************
                                    ;POWER UP ROUTINE
 036726  012737  037032  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
 036734  013706  037036                MOV     $SAVR6,SP       ;;GET SP
 036740  005037  037036                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
 036744  005237  037036          1$:   INC     $SAVR6          ;;WAIT FOR THE INC
 036750  001375                        BNE     1$              ;;OF  WORD
 036752  012677  142162                MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
 036756  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
 036760  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
 036762  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
 036764  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 036766  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 036770  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 036772  012737  036654  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
 037000  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
 037006  104401                        TYPE                    ;;REPORT THE POWER FAILURE
 037010  037740                $PWRMG: .WORD   POWERM          ;;POWER FAIL MESSAGE POINTER
 037012  012716                        MOV     (PC)+,(SP)      ;;RESTART AT START
 037014  004346                $PWRAD: .WORD   START           ;;RESTART ADDRESS
 037016  042766  000020  000002        BIC     #20,2(SP`       ;;CLEAR "T" BIT
 037024  005037  034076                CLR     $TBIT           ;;CLEAR THE "T" BIT FLAG
```

```
 037030  000002                          RTI
 037032  000000          $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
 037034  000776                  BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
 037036  000000          $SAVR6: 0                       ;;PUT THE SP HERE
6448
6449
6450                            .SBTTL  ERROR TYPE OUT ROUTINE
6451                    ;;**************************************************************
                        ;;**************************************************************
6452                    ;*THIS ROUTINE IS CALLED TO TYPE AN ERROR MESSAGE WHICH IS INCLUDED
6453                    ;*IN THE ERROR MESSAGE DATA TABLE. IT IS CALLED BY THE $ERROR ROUTINE
6454                    ;*OR BY FIRST SETTING $ITEMB EQUAL TO THE ERROR TABLE ITEM TO BE PRINTED
6455                    ;*OUT AND THEN ECECUTING A:
6456                    ;*              JSR     PC,ERTYPE
6457                    ;*
6458 037040  104401  001313    ERTYPE: TYPE    ,$CRLF          ;TYPE A CRLF
6459 037044  113737  001102  001232    MOVB    $TSTNM,$TMP0    ;MOVE TEST NUMBER TO $TMP0
6460 037052  042737  177400  001232    BIC     #177400,$TMP0   ;CLEAR THE UPPER BYTE
6461 037060  013737  001116  001234    MOV     $ERRPC,$TMP1    ;GET PC OF CALL
6462 037066  010046                    MOV     R0,-(SP)        ;SAVE R0
6463 037070  113700  001114            MOVB    $ITEMB,R0       ;GET THE ITEM NUMBER.
6464 037074  042700  177400            BIC     #177400,R0      ;CLEAR THE UPPER BYTE
6465 037100  001005                    BNE     1$              ;BRANCH IF ITEM IS ZERO
6466 037102  013746  001116            MOV     $ERRPC,-(SP)    ;MOVE THE ERROR PC TO THE STACK FOR PRINTING
6467 037106  104402                    TYPOC                   ;PRINT THE PC
6468 037110  000137  037410            JMP     22$             ;JUMP TO EXIT - ALL DONE
6469 037114  022700  000377    1$:     CMP     #377,R0         ;SEE IF ERROR # IS 377
6470 037120  001005                    BNE     3$              ;BRANCH IF NOT
6471 037122  016600  000004            MOV     4(SP),R0        ;MOVE ITEM ADDRESS ON STACK TO R0
6472 037126  011000                    MOV     (R0),R0         ;MOVE ITEM TO R0
6473 037130  062700  000400            ADD     #400,R0         ;ADD 400 TO R0
6474 037134  010037  001320    3$:     MOV     R0,$FATAL       ;SET ITEM NUMBER IN $FATAL FOR APT      ;DPM001
6475 037140  005300                    DEC     R0              ;DECREMENT R0 AND
6476 037142  006300                    ASL     R0              ;SHIFT THREE TIMES
6477 037144  006300                    ASL     R0              ;TO FORM AN INDEX
6478 037146  006300                    ASL     R0              ;FOR THE TABLE.
6479 037150  062700  001442            ADD     #$ERRTB,R0      ;ADD ERROR TABLE START TO R0 - FORMS STARTING ADDRESSS
6480 037154  012037  037164    4$:     MOV     (R0)+,5$        ;PICK UP THE ADDRESS OF THE ERROR MESSAGE
6481 037160  001404                    BEQ     6$              ;BRANCH IF NONE
6482 037162  104401                    TYPE                    ;TYPE THE MESSAGE
6483 037164  000000    5$:     .WORD   0                       ;LOCATION FOR ASCII MESSAGE ADDRESS
6484 037166  104401  001313            TYPE    ,$CRLF          ;TYPE A <CRLF>
6485 037172  012037  037202    6$:     MOV     (R0)+,7$        ;GET THE DATA HEADER
6486 037176  001404                    BEQ     8$              ;BRANCH IF NO HEADER
6487 037200  104401                    TYPE                    ;TYPE THE HEADER
6488 037202  000000    7$:     .WORD   0                       ;LOCATION FOR HEADER ADDRESS
6489 037204  104401  001313            TYPE    ,$CRLF          ;TYPE A <CRLF>
6490 037210  010146    8$:     MOV     R1,-(SP)        ;SAVE R1
6491 037212  010246            MOV     R2,-(SP)        ;SAVE R2
6492 037214  010346            MOV     R3,-(SP)        ;SAVE R3
6493 037216  012001            MOV     (R0)+,R1        ;GET VHE ADDRESS OF THE DATA TABLE.
6494 037220  001503            BEQ     23$             ;BRANCH TO RETURN IF NO DATA.
6495 037222  011000            MOV     (R0),R0         ;GET A POINTER TO THE DATA FORMAT TABLE.
6496 037224  105710    9$:     TSTB    (R0)            ;IS THE FORMAT ZERO?
6497 037226  001003            BNE     10$             ;BRANCH TO CHECK FOR FORMAT 2 IF NOT
6498 037230  013146            MOV     @(R1)+,-(SP)    ;FORMAT ZERO SO TYPE
6499 037232  104402            TYPOC                   ;AN OCTAL NUMBER.
```

ERROR TYPE OUT ROUTINE

```
6500 037234  000463                    BR      21$             ;BRANCH TO PRINT A TAB CHARACTER AFTER TABLE ENTRY
6501 037236  122710  000002    10$:    CMPB    #2,(R0)         ;IS THE FORMAT TWO?
6502 037242  001005                    BNE     11$             ;BRANCH TO CHECK FOR FORMAT 3 IF NOT
6503 037244  004737  037434            JSR     PC,TOCTNM       ;TYPE 1ST OCTAL NUMBER
6504 037250  004737  037434            JSR     PC,TOCTNM       ;TYPE 2ND OCTAL NUMBER
6505 037254  000453                    BR      21$             ;BRANCH TO PRINT A TAB CHARACTER AFTER TABLE ENTRY
6506 037256  122710  000003    11$:    CMPB    #3,(R0)         ;IS THE FORMAT THREE?
6507 037262  001006                    BNE     13$             ;BRANCH TO CHECK FOR FORMAT 4 IF NOT
6508 037264  012703  000004            MOV     #4,R3           ;SET LOOP COUNTER TO TYPE 4 OCTAL NUMBERS
6509 037270  004737  037434    12$:    JSR     PC,TOCTNM       ;TYPE AN OCTAL NUMBER
6510 037274  077303                    SOB     R3,12$          ;SUBTRACT 1 AND BRANCH IF NOT DONE
6511 037276  000442                    BR      21$             ;BRANCH TO PRINT A TAB CHARACTER AFTER TABLE ENTRY
6512
6513 037300  122710  000004    13$:    CMPB    #4,(R0)         ;IS THE FORMAT FOUR?
6514 037304  001004                    BNE     14$             ;BRANCH TO CHECK FOR FORMAT 5 IF NOT
6515 037306  013146                    MOV     @(R1)+,-(SP)    ;MOVE THE DATA TO THE STACK FOR TYPING
6516 037310  104403                    TYPOS                   ;GO TYPE AN OCTAL NUMBER
6517 037312     016                    .BYTE   16              ;TYPE UP TO 16 DIGITS
6518 037313     000                    .BYTE   0               ;SUPPRESSING LEADING ZEROES.
6519 037314  000433                    BR      21$             ;BRANCH TO PRINT A TAB CHARACTER AFTER TABLE ENTRY
6520 037316  122710  000005    14$:    CMPB    #5,(R0)         ;IS THE FORMAT FIVE?
6521 037322  001005                    BNE     16$             ;BRANCH TO CHECK FOR FORMAT 11 IF NOT
6522 037324  012137  037332            MOV     (R1)+,15$       ;PUT THE ADDRESS OF THE ASCII STRING IN THE LOCATION
6523 037330  104401                    TYPE                    ;TYPE THE ASCIZ STRING.
6524 037332  000000    15$:    .WORD   0                       ;LOCATION FOR THE ADDRESS OF THE ASCIZ STRING
6525 037334  000425                    BR      22$             ;BRANCH TO INCREMENT R0 AND CONTINUE
6526 037336  122710  000011    16$:    CMPB    #11,(R0)        ;IS THE FORMAT ELEVEN?
6527 037342  001005                    BNE     18$             ;BRANCH TO CHECK FOR FORMAT 12 IF NOT
6528 037344  013137  037352            MOV     @(R1)+,17$      ;MOVE THE DATA TO THE STACK FOR TYPING
6529 037350  104401                    TYPE                    ;TYPE THE ASCIZ STRING.
6530 037352  000000    17$:    .WORD   0                       ;LOCATION FOR THE ADDRESS OF THE ASCIZ STRING
6531 037354  000415                    BR      22$             ;BRANCH TO INCREMENT R0 AND CONTINUE
6532 037356  122710  000012    18$:    CMPB    #12,(R0)        ;IS THE FORMAT TWELVE?
6533 037362  001007                    BNE     20$             ;BRANCH TO HALT IF NOT - FORMAT NOT RECOGNIZED
6534 037364  013102                    MOV     @(R1)+,R2       ;MOVE THE DATA TO THE STACK FOR TYPING
6535 037366  012703  000006            MOV     #6,R3           ;TYPE SIX OCTAL NUMBERS
6536 037372  004737  037434    19$:    JSR     PC,TOCTNM       ;TYPE AN OCTAL NUMBER
6537 037376  077303                    SOB     R3,19$          ;SUBTRACT 1 AND BRANCH IF NOT DONE YET
6538 037400  000401                    BR      21$             ;BRANCH TO PRINT A TAB CHARACTER AFTER TABLE ENTRY
6539 037402  000000    20$:    HALT                            ;UNDEFINED FORMAT FOR DATA?????
6540 037404  104401  040005    21$:    TYPE    ,$TAB           ;PRINT A TAB AFTER TYPING A DATA TABLE ENTRY
6541                                                           ;OF ALL FORMATS EXCEPT FORMATS 5 OR 11
6542 037410  005200    22$:    INC     R0                      ;POINT TO THE NEXT FORMAT
6543 037412  005711            TST     (R1)                    ;HAS THE END OF THE DATA TABLE BEEN REACHED?
6544 037414  001303            BNE     9$                      ;BRANCH BACK IF NOT
6545 037416  104401  001313    TYPE    ,$CRLF                  ;DONE.
6546 037422  012603            MOV     (SP)+,R3                ;RESTORE R1,R2 AND R3
6547 037424  012602            MOV     (SP)+,R2
6548 037426  012601            MOV     (SP)+,R1
6549 037430  012600    23$:    MOV     (SP)+,R0                ;RESTORE R0.
6550 037432  000207            RTS     PC                      ;AND RETURN.
6551
6552 037434  013102    TOCTNM: MOV     @(R1)+,R2               ;FORMAT TWO SO TYPE TWO
6553 037436  012246            MOV     (R2)+,-(SP)             ;OCTAL NUMBERS.
6554 037440  104402            TYPOC                           ;TYPE THE OCTAL NUMBER
6555 037442  104401  040007    TYPE    ,SPACE                  ;TYPE A SPACE CHARACTER
6556 037446  000207            RTS     PC                      ;EXIT
```

FPP SPURIOUS TRAP TO 244 HANDLER

```
                                        .SBTTL  FPP SPURIOUS TRAP TO 244 HANDLER
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE HANDLES UNEXPECTED TRAPS TO THE FPP TRAP VECTOR AT 244.
                                ;*THE LAST FPP INSTRUCTION EXECUTED AND ITS ADDRESS HAS BEEN RECORDED
                                ;*THESE ALONG WITH THE FEC, FPS AND PC OF TRAP ARE REPORTED.
                                ;*
037450  011637  001236          FPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
037454  022626                          CMP     (SP)+,(SP)+             ;RESTORE SP.
037456  170200                          STFPS   R0                      ;GET FPS
037460  010037  001240                  MOV     R0,$TMP3
037464  170300                          STST    R0                      ;GET FEC
037466  010037  001242                  MOV     R0,$TMP4
037472  104247                  1$:     ERROR   +247
037474  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).
037476  000137  033340                  JMP     $EOP


                                        .SBTTL  CPU SPURIOUS TRAP TO 4 HANDLER
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 4.
                                ;*
037502  011637  001236          CPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
037506  022626                          CMP     (SP)+,(SP)+
037510  104250                  1$:     ERROR   +250
037512  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).
037514  000137  033340                  JMP     $EOP


                                        .SBTTL  CPU SPURIOUS TRAP TO 10 HANDLER
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 10.
                                ;*
037520  011637  001236          CPTWO:  MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
037524  022626                          CMP     (SP)+,(SP)+
037526  104251                  1$:     ERROR   +251
037530  104412                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                ;THE USER TYPED CONTROL G?).
037532  000137  033340                  JMP     $EOP
```

SET LOOP ON ERROR ADDRESS ROUTINE

```
                                        .SBTTL  SET LOOP ON ERROR ADDRESS ROUTINE
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*
037536  011637  001110          .LPER:  MOV     (SP).$LPERR
037542  000002                          RTI

                                        .SBTTL  FLAG RESET AND CONSOLE TEST ROUTINE
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE WILL BE CALLED AT THE END OF EACH TEST TO
                                ;*RESET THE STACK, CLEAR THE FPS AND SEE IF THE USER HAS TYPED
                                ;* CONTROL G ON THE TERMINAL. IF THE USER HAS TYPED CONTROL G AND
                                ;*THERE IS NO PHYSICAL CONSOLE SWITCH REGISTER THEN THE CONTENTS
                                ;*OF THE SOFTWARE SWITCH REGISTER WILL BE TYPED IN OCTAL ON THE
                                ;*TELETYPE AND THE USER CAN MODIFY IT.
                                ;*
037544  023727  001140  177570  .RSET:  CMP     SWR,#177570             ;SEE IF THERE IS A PHYSICAL
                                                                        ;CONSOLE SWITCH REGISTER.
037552  001001                          BNE     1$                      ;BRANCH IF NO.
037554  104406                          CKSWR                           ;OTHERWISE TYPE THE CONTENTS
                                                                        ;OF THE PROGRAM VIRTUAL SWITCH REGISTER
                                                                        ;AND GIVE THE USER A CHANCE TO
                                                                        ;MODIFY IT.
037556  012737  037450  000244  1$:     MOV     #FPSPUR,FPVECT
037564  012737  037502  000004          MOV     #CPSPUR,ERRVECT
037572  012737  037520  000010          MOV     #CPTWO,10
037600  011600                          MOV     (SP),R0                 ;SAVE RETURN ADDRESS.
037602  012706  001100                  MOV     #STACK,SP               ;RESET THE STACK POINTER.
037606  005004                          CLR     R4                      ;CLEAR THE FPS.
037610  170104                          LDFPS   R4
037612  000110                          JMP     (R0)                    ;RETURN.


                                        .SBTTL  SPECIAL MESSAGES
037614      124     122     101 MSA1:   .ASCIZ  'TRAPPED AT:'<TAB><TAB>
037632      105     130     120 MSA2:   .ASCIZ  'EXPECTED TRAP AT:'<TAB>
037655      107     117     124 MSA3:   .ASCIZ  'GOT R0:'<TAB><TAB>
037667      105     130     120 MSA4:   .ASCIZ  'EXPECTED R0:'<TAB>
037705      107     117     124 MSA5:   .ASCIZ  'GOT AC0:'<TAB><TAB>
037720      105     130     120 MSA6:   .ASCIZ  'EXPECTED AC0:'<TAB><TAB>
037740      200     120     117 POWERM: .ASCIZ  <CRLF>'POWER FAILURE. PROGRAM RESTARTING.'<CRLF>
040005      011     000         $TAB:   .ASCIZ  <TAB>
040007      040     040     000 SPACE:  .ASCIZ  ' '
040012      101     103     040 MS1:    .ASCIZ  'AC OPERAND:'<TAB><TAB>
040030      106     123     122 MS2:    .ASCIZ  'FSRC OPERAND:'<TAB><TAB>
040050      101     103     060 MS3:    .ASCIZ  'AC0 BEFORE EXECUTION:'<TAB>
040077      101     103     060 MS4:    .ASCIZ  'AC0 AFTER EXECUTION:'<TAB>
040125      105     130     120 MS5:    .ASCIZ  'EXPECTED RESULT:'<TAB>
040147      107     117     124 MS6:    .ASCIZ  'GOT RESULT:'<TAB><TAB>
040165      106     122     101 MS7:    .ASCIZ  'FRACTIONAL RESULT:'<TAB>
040211      111     116     124 MS10:   .ASCIZ  'INTEGER RESULT: '<TAB>
040233      105     130     120 MS11:   .ASCIZ  'EXPECTED FRACTION:'<TAB>
040257      105     130     120 MS12:   .ASCIZ  'EXPECTED INTEGER:'<TAB>
040302      114     117     101 MS37:   .ASCIZ  'LOADED DATA: '
040320      122     105     101 MS40:   .ASCIZ  'READ DATA: '
```

SPECIAL MESSAGES

```
6654 040334  105  130  120  MS415:   .ASCIZ  'EXPECTED DATA: '
6655 040354  104  101  124  MS41:    .ASCIZ  'DATA IN (R0) FSRC: '
6656 040400  104  101  124  MS42:    .ASCIZ  'DATA IN AC0: '
6657 040416  107  117  124  MS43:    .ASCIZ  'GOT RESULT: '
6658 040433  105  130  120  MS44:    .ASCIZ  'EXPECTED RESULT: '
6659 040455  200  124  105  CORMES:  .ASCIZ  <CRLF>'TEST 22, TESTING INTERRUPTS.'<CRLF>
```

ERROR MESSAGES

```
                                                .SBTTL  ERROR MESSAGES
                                        EM1:    .ASCIZ  'FPS BAD AFTER CMPD (R),A.'
                                        EM2:    .ASCIZ  'ACO MODIFIED BY CMPD (R),A.'
                                        EM3:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT) STATE 225 WENT TO 475 INSTEAD OF 075.'
                                        EM4:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT) STATE 225 WENT TO 075 INSTEAD OF 475.'
                                        EM5:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT) STATE 035 WENT TO 075 INSTEAD OF 475.'
                                        EM6:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT) STATE 035 WENT TO 475 INSTEAD OF 075.'
                                        EM7:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT Y8) STATE 777 SHOULD HAVE GONE TO 007.'
                                        EM10:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT ENBT Y8) STATE 777 SHOULD HAVE GONE TO 405.'
                                        EM11:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT NBIT ZBIT) STATE 456 SHOULD HAVE GONE TO 010.'
                                        EM12:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT NBIT ZBIT) STATE 456 SHOULD HAVE GONE TO 110.'
                                        EM13:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  /DIDN'T TAKE THE PATH: STATE 456, TO 012, TO 363 TO 120./
                                        EM14:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT XNBT XZBT) STATE 363 WENT TO 140 INSTEAD OF 100.'
                                        EM15:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  '(BUT XNBT XZBT) STATE 363 WENT TO 100 INSTEAD OF 140.'
                                        EM16:
                                                .ASCII  'FPS BAD AFTER CMPD.'<CRLF>
                                                .ASCIZ  /DIDN'T TAKE THE PATH: STATE 777, TO 407./
                                        EM17:   .ASCIZ  'DIVD (R),A TRAPPED TO 244. FSRC=0 AND FID=1.'
                                        EM20:   .ASCIZ  'FPS BAD AFTER DIVD (R),A.'
                                        EM21:   .ASCIZ  'FEC BAD AFTER DIVD (R),A.'
                                        EM22:   .ASCIZ  /DIVD (R),A DIDN'T TRAP TO 244. FSRC=0 AND FID=0./
                                        EM23:   .ASCIZ  'DIVF (R),A FAILED.'
                                        EM32:   .ASCIZ  'FPS BAD AFTER DIVF (R),A.'
                                        EM24:
                                                .ASCII  'DIVF (R),A FAILED.'
                                                .ASCIZ  '(BUT Y61) WENT TO STATE 006 INSTEAD OF 206.'
                                        EM25:
                                                .ASCII  'DIVF (R),A FAILED.'
                                                .ASCIZ  'XOR OF SIGN BITS FAILED STATE 470.'
                                        EM26:
                                                .ASCII  'DIVF (R),A FAILED.'
                                                .ASCIZ  '(BUT Y61) WENT TO STATE 206 INSTEAD OF 006.'
                                        EM27=EM25
                                        EM30:
                                                .ASCII  'DIVF (R),A FAILED.'
```

ERROR MESSAGES

```
6707 043115  124 122 125          .ASCIZ  'TRUNCATION ERROR. FT=1.'
6708 043145                 EM31:
     043145  104 111 126          .ASCII  'DIVF (R),A FAILED.'
6709 043167  122 117 125          .ASCIZ  'ROUND ERROR. FT=0.'
6710 043212  104 111 126  EM33:   .ASCIZ  'DIVD (R),A FAILED.'
6711 043235  106 120 123  EM34:   .ASCIZ  'FPS BAD AFTER DIVD (R),A.'
6715 043267                 EM35:
     043267  104 111 126          .ASCII  'DIVD (R),A FAILED.'<CRLF>
6716 043312  124 122 125          .ASCIZ  'TRUNCATION ERROR. FT=1.'
6717 043342                 EM36:
     043342  104 111 126          .ASCII  'DIVD (R),A FAILED.'<CRLF>
6718 043365  122 117 125          .ASCIZ  'ROUND ERROR. FT=0.'
6719 043410  115 125 114  EM37:   .ASCIZ  'MULF (R),A FAILED.'
6723 043433  106 120 123  EM40:   .ASCIZ  'FPS BAD AFTER MULF (R),A.'
6724 043465                 EM41:
     043465  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6725 043510  123 111 107          .ASCIZ  'SIGN BIT BAD STATE 511.'
6726 043540                 EM42:
     043540  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6727 043563  116 117 122          .ASCII  'NORMALIZATION FAILED.'<CRLF>
6728 043611  050 102 125          .ASCIZ  '(BUT Y62) STATE 252 WENT TO 044 INSTEAD OF 444.'
6729 043671                 EM43:
     043671  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6730 043714  116 117 122          .ASCII  'NORMALIZATION FAILED.'<CRLF>
6731 043742  050 102 125          .ASCIZ  '(BUT Y62) STATE 252 WENT TO 444 INSTEAD OF 044.'
6732 044022                 EM44:
     044022  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6733 044045  122 117 125          .ASCIZ  'ROUND ERROR. FT=0.'
6734 044070                 EM45:
     044070  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6735 044113  124 122 125          .ASCIZ  'TRUNCATION ERROR. FT=1.'
6736 044143  106 120 123  EM46:   .ASCIZ  'FPS BAD AFTER MULD (R),A.'
6740 044175  115 125 114  EM246:  .ASCIZ  'MULD (R),A FAILED.'
6741 044220                 EM47:
     044220  115 125 114          .ASCII  'MULD (R),A FAILED.'<CRLF>
6742 044243  102 101 104          .ASCII  'BAD CONSTANT USED IN THE MUL ALGORITHM.'
6743 044312  200 125 123          .ASCIZ  <CRLF>'USED 24 INSTEAD OF 56 STATE 020.'
6744 044354                 EM50:
     044354  115 125 114          .ASCII  'MULD (R),A FAILED.'<CRLF>
6745 044377  124 122 125          .ASCIZ  'TRUNCATION ERROR. FT=1.'
6746 044427                 EM51:
     044427  115 125 114          .ASCII  'MULD (R),A FAILED.'<CRLF>
6747 044452  122 117 125          .ASCIZ  'ROUND ERROR. FT=0.'
6748 044475                 EM52:
     044475  115 125 114          .ASCII  'MULD (R),A FAILED.'<CRLF>
6749 044520  102 101 104          .ASCIZ  'BAD CONSTANT USED IN ROUNDING, FT=0.'
6750 044565  106 120 123  EM111:  .ASCIZ  'FPS BAD AFTER MULF (R),A. EXPECTED OVERFLOW.'
6751 044642  106 120 123  EM112:  .ASCIZ  'FPS BAD AFTER MULF (R),A. EXPECTED UNDERFLOW.'
6752 044720                 EM113:
     044720  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6753 044743  105 130 120          .ASCIZ  'EXPECTING OVERFLOW, FIV=0.'
6754 044776                 EM114:
     044776  115 125 114          .ASCII  'MULF (R),A FAILED.'<CRLF>
6755 045021  105 130 120          .ASCIZ  'EXPECTING UNDERFLOW, FIU=0.'
6756 045055  115 125 114  EM115:  .ASCIZ  'MULF (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6757 045133  115 125 114  EM116:  .ASCIZ  'MULF (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6764 045212                 EM117:
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ERROR MESSAGES

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                045212  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6765            045270  050     102     125             .ASCIZ  '(BUT FIU) STATE 331 WENT TO 155 INSTEAD OF 115.'
6766            045350                          EM120:
                045350  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6767            045426  050     102     125             .ASCIZ  '(BUT FIU) STATE 137 WENT TO 155 INSTEAD OF 115.'
6768            045506                          EM121:
                045506  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6769            045563  050     102     125             .ASCIZ  '(BUT FIV) STATE 333 WENT TO 136 INSTEAD OF 116.'
6770            045643                          EM122:
                045643  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6771            045720  050     102     125             .ASCIZ  '(BUT FIV) STATE 133 WENT TO 136 INSTEAD OF 116.'
6772            046000  106     120     123     EM123:  .ASCIZ  'FPS BAD AFTER MULD (R),A. EXPECTING OVERFLOW.'
6773            046056  106     120     123     EM124:  .ASCIZ  'FPS BAD AFTER MULD (R),A. EXPECTING UNDERFLOW.'
6774            046135                          EM125:
                046135  115     125     114             .ASCII  'MULD (R),A FAILED.'<CRLF>
6775            046160  105     130     120             .ASCIZ  'EXPECTING OVERFLOW, FIV=0.'
6776            046213                          EM126:
                046213  115     125     114             .ASCII  'MULD (R),A FAILED.'<CRLF>
6777            046236  105     130     120             .ASCIZ  'EXPECTING UNDERFLOW, FIU=0.'
6778            046272  115     125     114     EM127:  .ASCIZ  'MULD (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6779            046350  115     125     114     EM130:  .ASCIZ  'MULD (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6786            046427                          EM131:
                046427  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6787            046505  050     102     125             .ASCIZ  '(BUT FIU) STATE 331 WENT TO 155 INSTEAD OF 115.'
6788            046565                          EM132:
                046565  115     125     114             .ASCII  'MULD (R),A FAILED.'<CRLF>
6789            046610  105     130     120             .ASCII  'EXPECTING UNDERFLOW, FIU=0.'
6790            046643  200     050     102             .ASCIZ  <CRLF>'(BUT FD) STATE 115 WENT TO 424 INSTEAD OF 425.'
6791            046723                          EM133:
                046723  115     125     114             .ASCII  'MULF (R),A TRAPPED TO 244 ON UNDERFLOW. FIU=0.'
6792            047001  050     102     125             .ASCIZ  '(BUT FIU) STATE 137 WENT TO 155 INSTEAD OF 115.'
6793            047061                          EM134:
                047061  115     125     114             .ASCII  'MULD (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6794            047136  050     102     125             .ASCIZ  '(BUT FIV) STATE 333 WENT TO 136 INSTEAD OF 116.'
6795            047216                          EM135:
                047216  115     125     114             .ASCII  'MULD (R),A FAILED.'<CRLF>
6796            047241  105     130     120             .ASCII  'EXPECTING OVERFLOW, FIV=0.'
6797            047273  200     050     102             .ASCIZ  <CRLF>'(BUT FD) STATE 116 WENT TO 424 INSTEAD OF 425.'
6798            047353                          EM136:
                047353  115     125     114             .ASCII  'MULD (R),A TRAPPED TO 244 ON OVERFLOW. FIV=0.'
6799            047430  050     102     125             .ASCIZ  '(BUT FIV) STATE 133 WENT TO 136 INSTEAD OF 116.'
6800            047510  106     105     103     EM137:  .ASCIZ  'FEC BAD AFTER MULF (R),A. EXPECTING OVERFLOW, FEC=10.'
6801            047576  106     105     103     EM140:  .ASCIZ  'FEC BAD AFTER MULF (R),A. EXPECTING UNDERFLOW, FEC=12.'
6802                    044565                  EM141=EM111
6803                    044642                  EM142=EM112
6804            047665                          EM143:
                047665  115     125     114             .ASCII  'MULF (R),A FAILED.'<CRLF>
6805            047710  105     130     120             .ASCIZ  'EXPECTING OVERFLOW, FIV=1.'
6806            047743                          EM144:
                047743  115     125     114             .ASCII  'MULF (R),A FAILED.'<CRLF>
6807            047766  105     130     120             .ASCIZ  'EXPECTING UNDERFLOW, FIU=1.'
6814            050022                          EM145:
                050022  115     125     114             .ASCII  'MULF (R),A FAILED TO TRAP TO 244 ON UNDERFLOW. FIU=1.'
6815            050107  050     102     125             .ASCIZ  '(BUT FIU) STATE 331 WENT TO 115 INSTEAD OF 155.'
6816            050167                          EM146:
                050167  115     125     114             .ASCII  'MULF (R),A FAILED TO TRAP TO 244 ON UNDERFLOW. FIU=1.'
6817            050254  050     102     125             .ASCIZ  '(BUT FIU) STATE 137 WENT TO 115 INSTEAD OF 155.'
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ERROR MESSAGES

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6818 050334                                EM147:
     050334    115   125   114                   .ASCII  'MULF (R),A FAILED TO TRAP TO 244 ON OVERFLOW. FIV=1.'
6819 050420    050   102   125                   .ASCIZ  '(BUT FIV) STATE 333 WENT TO 116 INSTEAD OF 136.'
6820 050500                                EM150:
     050500    115   125   114                   .ASCII  'MULF (R),A FAILED TO TRAP TO 244 ON OVERFLOW. FIV=1.'
6821 050564    050   102   125                   .ASCIZ  '(BUT FIV) STATE 133 WENT TO 116 INSTEAD OF A36.'
6822 050644    106   105   103   EM151:  .ASCIZ  'FEC BAD AFTER MULD (R),A. EXPECTING OVERFLOW, FEC=10.'
6823 050732    106   105   103   EM152:  .ASCIZ  'FEC BAD AFTER MULD (R),A. EXPECTING UNDERFLOW, FEC=12.'
6824          046000               EM153=EM123
6825          046056               EM154=EM124
6826 051021                                EM155:
     051021    115   125   114                   .ASCII  'MULD (R),A FAILED.'<CRLF>
6827 051044    105   130   120                   .ASCIZ  'EXPECTING OVERFLOW, FIV=1.'
6828 051077                                EM156:
     051077    115   125   114                   .ASCII  'MULD (R),A FAILED.'<CRLF>
6829 051122    105   130   120                   .ASCIZ  'EXPECTING UNDERFLOW, FIU=1.'
6836 051156                                EM157:
     051156    115   125   114                   .ASCII  'MULD (R),A FAILED TO TRAP TO 244 ON UNDERFLOW. FIU=1.'
6837 051243    050   102   125                   .ASCIZ  '(BUT FIU) STATE 331 WENT TO 115 INSTEAD OF 155.'
6838 051323                                EM160:
     051323    115   125   114                   .ASCII  'MULD (R),A FAILED.'<CRLF>
6839 051346    105   130   120                   .ASCII  'EXPECTING UNDERFLOW, FIU=1.'
6840 051401    200   050   102                   .ASCIZ  <CRLF>'(BUT FD) STATE 155 WENT TO 426 INSTEAD OF 427.'
6841 051461                                EM161:
     051461    115   125   114                   .ASCII  'MULD (R),A FAILED TO TRAP TO 244 ON UNDERFLOW. FIU=1.'
6842 051546    050   102   125                   .ASCIZ  '(BUT FIU) STATE 137 WENT TO 115 INSTEAD OF 155.'
6843 051626                                EM162:
     051626    115   125   114                   .ASCII  'MULD (R),A FAILED TO TRAP TO 244 ON OVERFLOW. FIV=1.'
6844 051712    050   102   125                   .ASCIZ  '(BUT FIV) STATE 333 WENT TO 116 INSTEAD OF 136.'
6845 051772                                EM163:
     051772    115   125   114                   .ASCII  'MULD (R),A FAILED.'<CRLF>
6846 052015    105   130   120                   .ASCII  'EXPECTING OVERFLOW, FIV=1.'
6847 052047    200   050   102                   .ASCIZ  <CRLF>'(BUT FD) STATE 700 WENT TO 426 INSTEAD OF 427.'
6848 052127                                EM164:
     052127    115   125   114                   .ASCII  'MULD (R),A FAILED TO TRAP TO 244 ON OVERFLOW. FIV=1.'
6849 052213    050   102   125                   .ASCIZ  '(BUT FIV) STATE 133 WENT TO 116 INSTEAD OF 136.'
6850 052273    106   120   123   EM55:   .ASCIZ  'FPS BAD AFTER MODF (R),A.'
6851 052325    115   117   104   EM53:   .ASCIZ  'MODF (R),A FRACTION BAD.'
6852 052356    115   117   104   EM54:   .ASCIZ  'MODF (R),A INTEGER BAD.'
6859 052406                                EM56:
     052406    115   117   104                   .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
6860 052437    101   103   060                   .ASCIZ  'AC0 DID NOT GET 0 IN STATE 424.'
6861 052477                                EM57:
     052477    115   117   104                   .ASCII  'MODF (R),A INTEGER BAD.'<CRLF>
6862 052527    101   103   061                   .ASCIZ  'AC1 DID NOT GET 0 IN STATE 142.'
6863 052567                                EM60:
     052567    115   117   104                   .ASCII  'MODF (R),A INTEGER BAD.'<CRLF>
6864 052617    101   103   061                   .ASCIZ  'AC1 DID NOT GET THE INTEGER IN STATE 134.'
6865 052671                                EM61:
     052671    115   117   104                   .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
6866 052722    101   040   102                   .ASCII  'A BAD CONSTANT WAS USED (NOT 24) IN STATE 046.'
6867 053000    200   117   122                   .ASCIZ  <CRLF>'OR (BUT NBIT) STATE 525 WENT TO 050 INSTEAD OF 150.'
6868 053065                                EM62:
     053065    115   117   104                   .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
6869 053116    101   040   102                   .ASCII  'A BAD CONSTANT WAS USED (NOT 24) IN STATE 046.'
6870 053174    200   117   122                   .ASCIZ  <CRLF>'OR (BUT NBIT) STATE 525 WENT TO 150 INSTEAD OF 050.'
6871 053261                                EM63:
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FRROR MESSAGES

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        053261      115     117     104             .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
   6872 053312      050     102     125             .ASCIZ  '(BUT ZBT) STATE 532 WENT TO 102 INSTEAD OF 122.'
   6873 053372                             EM64:
        053372      115     117     104             .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
   6874 053423      050     102     125             .ASCIZ  '(BUT ENBT EZBT) STATE 041 WENT TO 046 INSTEAD OF 246.'
   6875 053511                             EM65:
        053511      115     117     104             .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
   6876 053542      050     102     125             .ASCIZ  '(BUT FT) STATE 126 SHOULD HAVE GONE TO 133. FT=0.'
   6877 053624                             EM66:
        053624      115     117     104             .ASCII  'MODF (R),A FRACTION BAD.'<CRLF>
   6878 053655      123     111     107             .ASCIZ  'SIGN BIT BAD.'
   6879 053673                             EM67:
        053673      115     117     104             .ASCII  'MODF (R),A INTEGER BAD.'<CRLF>
   6880 053723      123     111     107             .ASCIZ  'SIGN BIT BAD IN STATE 733.'
   6881 053756      115     117     104     EM70:   .ASCIZ  'MODD (R),A FRACTION BAD.'
   6882 054007      115     117     104     EM71:   .ASCIZ  'MODD (R),A INTEGER BAD.'
   6883 054037      106     120     123     EM72:   .ASCIZ  'FPS BAD AFTER MODD (R),A.'
   6884          054037                     EM73=EM72
   6891 054071                             EM74:
        054071      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6892 054121      050     102     125             .ASCIZ  '(BUT FD) STATE 231 WENT TO 142 INSTEAD OF 143.'
   6893 054200                             EM75:
        054200      115     117     104             .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
   6894 054231      101     103     060             .ASCIZ  'AC0 GETS 0 IN STATE 425 FAILED.'
   6895 054271                             EM76:
        054271      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6896 054321      101     103     061             .ASCIZ  'AC1 GETS 0 IN STATE 143 FAILED.'
   6897 054361                             EM77:
        054361      115     117     104             .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
   6898 054412      050     102     125             .ASCIZ  '(BUT FD) STATE 526 WENT TO 134 INSTEAD OF 135.'
   6899 054471                             EM100:
        054471      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6900 054521      123     111     107             .ASCIZ  'SIGN BIT BAD IN STATE 526.'
   6901 054554                             EM101:
        054554      115     117     104             .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
   6902 054605      101     040     102             .ASCII  'A BAD CONSTANT WAS USED (NOT 56) IN STATE 046,'
   6903 054663      200     117     122             .ASCIZ  <CRLF>'OR (BUT NBIT) STATE 525 WENT TO 050 INSTEAD OF 151.'
   6904 054750                             EM102:
        054750      115     117     104             .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
   6905 055001      101     040     102             .ASCII  'A BAD CONSTANT WAS USED (NOT 56) IN STATE 046,'
   6906 055057      200     117     122             .ASCIZ  <CRLF>'OR (BUT NBIT) STATE 525 WENT TO 150 INSTEAD OF 050.'
   6907 055144                             EM103:
        055144      115     117     104             .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
   6908 055175      050     102     125             .ASCIZ  '(BUT ZBIT) STATE 532 WENT TO 122 INSTEAD OF 102.'
   6909 055256                             EM104:
        055256      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6910 055306      123     105     124             .ASCII  'SET INTEGER IN AC1 FAILED,'
   6911 055340      200     117     122             .ASCIZ  <CRLF>'OR (BUT FD) STATE 733 WENT TO 156 INSTEAD OF 157.'
   6912 055423                             EM105:
        055423      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6913 055453      050     102     125             .ASCIZ  '(BUT FD) STATE 122 WENT TO 424 INSTEAD OF 425.'
   6914 055532                             EM106:
        055532      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6915 055562      050     102     125             .ASCIZ  '(BUT FD) STATE 246 WENT TO 126 INSTEAD OF 127.'
   6916 055641                             EM107:
        055641      115     117     104             .ASCII  'MODD (R),A INTEGER BAD.'<CRLF>
   6917 055671      050     102     125             .ASCIZ  '(BUT FD) STATE 446 WENT TO 126 INSTEAD OF 127.'
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ERROR MESSAGES

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6918 055750                                EM110:
     055750  115  117  104                        .ASCII  'MODD (R),A FRACTION BAD.'<CRLF>
6919 056001  050  102  125                        .ASCIZ  '(BUT FT) STATE 127 WENT TO 313 INSTEAD OF 113.'
6932 056060                                EM165:
     056060  115  117  104                        .ASCII  /MODF (R),A FRACTION BAD. RESULT OVER OR UNDER FLOW./
6933 056143  000                                  .BYTE   0
6934 056144                                EM166:
     056144  115  117  104                        .ASCII  /MODF (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6935 056226  000                                  .BYTE   0
6936 056227                                EM167:
     056227  106  120  123                        .ASCII  /FPS BAD AFTER MODF (R),A./
6937 056260  000                                  .BYTE   0
6938 056261                                EM170:
     056261  106  105  103                        .ASCII  /FEC BAD AFTER MODF (R),A./
6939 056312  105  130  120                        .ASCIZ  'EXPECTING UNDERFLOW, FEC=12.'
6940 056347                                EM171:
     056347  115  117  104                        .ASCII  /MODF (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6941 056431  200  101  103                        .ASCIZ  <CRLF>'AC1 GETS 0 IN STATE 126 FAILED.'
6942 056472                                EM172:
     056472  106  105  103                        .ASCII  /FEC BAD AFTER MODF (R),A./
6943 056523  105  130  120                        .ASCIZ  'EXPECTING OVERFLOW, FEC=10.'
6944 056557                                EM173:
     056557  115  117  104                        .ASCII  /MODF (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6945 056641  200  050  102                        .ASCIZ  <CRLF>'(BUT FIV FD) STATE 520 WENT TO 142 INSTEAD OF 162.'
6946 056725                                EM174:
     056725  115  117  104                        .ASCII  /MODF (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6947 057007  200  050  102                        .ASCIZ  <CRLF>'(BUT FIV FD) STATE 520 WENT TO 162 INSTEAD OF 142.'
6948 057073                                EM175:
     057073  115  117  104                        .ASCII  /MODF (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6949 057155  200  123  111                        .ASCIZ  <CRLF>'SIGN BAD IN STATE 517.'
6950 057205                                EM176:
     057205  115  117  104                        .ASCII  /MODD (R),A FRACTION BAD. RESULT OVER OR UNDER FLOW./
6951 057270  000                                  .BYTE   0
6952 057271  120  117  127                EM177:  .ASCIZ  !POWER MONITOR BIT FOUND SET!
6953 057325                                EM200:
     057325  106  120  123                        .ASCII  /FPS BAD AFTER MODD (R),A./
6954 057356  000                                  .BYTE   0
6955 057357                                EM201:
     057357  106  105  103                        .ASCII  /FEC BAD AFTER MODD (R),A./
6956 057410  200  105  130                        .ASCIZ  <CRLF>'EXPECTING UNDERFLOW, FEC=12.'
6957 057446                                EM202:
     057446  115  117  104                        .ASCII  /MODD (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6958 057530  200  050  102                        .ASCIZ  <CRLF>'(BUT FD) STATE 241 WENT TO 126 INSTEAD OF 127.'
6959 057610                                EM203:
     057610  115  117  104                        .ASCII  /MODD (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6960 057672  200  050  102                        .ASCIZ  <CRLF>'(BUT FD) STATE 047 WENT TO 126 INSTEAD OF 127.'
6961 057752                                EM204:
     057752  106  105  103                        .ASCII  /FEC BAD AFTER MODD (R),A./
6962 060003  200  105  130                        .ASCIZ  <CRLF>'EXPECTING OVERFLOW, FEC=10.'
6963 060040                                EM205:
     060040  115  117  104                        .ASCII  /MODD (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6964 060122  200  050  102                        .ASCIZ  <CRLF>'(BUT FIV FD) STATE 520 WENT TO 162 INSTEAD OF 163.'
6965 060206                                EM206:
     060206  115  117  104                        .ASCII  /MODD (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
6966 060270  200  050  102                        .ASCIZ  <CRLF>'(BUT FIV FD) STATE 520 WENT TO 162 INSTEAD OF 143.'
6967
6968                                       ;*
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ERROR MESSAGES

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7061 060354                          EM207:
     060354  101  104  104                .ASCIZ  /ADDD (R),A PRODUCED A BAD RESULT./
7062 060416                          EM210:
     060416  124  110  105                .ASCIZ  /THE FPS WAS BAD AFTER ADDD (R),A./
7063 060460  101  104  104           EM211:  .ASCII  'ADDD (R),A FAILED IN THE ROUND\TRUNK FLOWS.'
7064 060533  200  127  105                .ASCII  <CRLF>'WENT FROM STATE 663 TO 313,'<CRLF>
7065 060570  111  116  123                .ASCIZ  'INSTEAD OF FROM 663 TO 353.'
7090 060624                          EM212:
     060624  101  104  104                .ASCII  'ADDD (R),A FAILED IN THE ROUND\TRUNK FLOWS.'
     060677  200  124  110                .ASCII  <CRLF>'THE FPS WAS BAD.'<CRLF>
     060721  104  111  104                .ASCII  'DID NOT TAKE THE PATH:'<CRLF>
     060750  106  122  117                .ASCIZ  /FROM STATE 664, TO 505, TO 251./
7091 061010                          EM213:
     061010  101  104  104                .ASCII  'ADDD (R),A FAILED IN THE ROUND\TRUNK FLOWS.'
     061063  200  124  110                .ASCII  <CRLF>'THE FPS WAS BAD.'<CRLF>
     061105  104  111  104                .ASCII  'DID NOT TAKE THE PATH:'<CRLF>
     061134  106  122  117                .ASCIZ  /FROM STATE 664, TO 505, TO 253./
7092 061174                          EM214:
     061174  101  104  104                .ASCII  'ADDD (R),A FAILED IN THE ROUND\TRUNK FLOWS.'
     061247  200  124  110                .ASCII  <CRLF>'THE FPS WAS BAD.'<CRLF>
     061271  104  111  104                .ASCII  'DID NOT TAKE THE PATH:'<CRLF>
     061320  106  122  117                .ASCIZ  /FROM STATE 664, TO 705, TO 735./
7093 061360                          EM215:
     061360  101  104  104                .ASCII  'ADDD (R),A FAILED IN THE ROUND\TRUNK FLOWS.'
     061433  200  124  110                .ASCII  <CRLF>'THE FPS WAS BAD.'<CRLF>
     061455  104  111  104                .ASCII  'DID NOT TAKE THE PATH:'<CRLF>
     061504  106  122  117                .ASCIZ  /FROM STATE 664, TO 705, TO 737./
7094 061544  124  110  105           EM216:  .ASCII  'THE (BUT FIU FORK IN THE OVER\UNDER FLOWS FAILED. FIU =1.'
7095 061635  200  127  105                .ASCII  <CRLF>'WENT FROM STATE 331 TO 115.'<CRLF>
7096 061672  111  116  123                .ASCIZ  'INSTEAD OF FROM 331 TO 155.'
7097 061726  101  104  104           EM217:  .ASCIZ  'ADDD (R)A TRAPPED TO 244,. FID=1.'
7098 061770                          EM220:
     061770  101  104  104                .ASCII  /ADDD (R),A TRAPPED TO 244./<CRLF>
     062023  124  110  105                .ASCII  'THE RESULT WAS AN OVERFLOW CONDITION BUT FIV= 0.'
     062103  200  050  102                .ASCIZ  <CRLF>/(BUT FIV) STATE 133 WENT TO 136 INSTEAD OF 116./
     062164  111  116  123                .ASCIZ  /INSTEAD OF FROM 133 TO 116./
7099 062220                          EM221:
     062220  101  104  104                .ASCII  /ADDD (R),A FAILED TO TRAP TO 244./<CRLF>
     062262  124  110  105                .ASCII  'THE RESULT WAS A OVERFLOW CONDITION AND FIV=1.'<CRLF>
     062341  124  110  105                .ASCII  /THE (BUT FIV) FORK FAILED./<CRLF>
     062374  127  105  116                .ASCII  /WENT FROM STATE 133 TO 116./<CRLF>
     062430  111  116  123                .ASCIZ  /INSTEAD OF FROM 133 TO 136./
7100 062464                          EM222:
     062464  101  104  104                .ASCII  /ADDD (R),A TRAPPED TO 244./<CRLF>
     062517  124  110  105                .ASCII  'THE RESULT WAS AN UNDERFLOW CONDITION BUT FIU= 0.'
     062600  200  050  102                .ASCIZ  <CRLF>/(BUT FIU) STATE 331 WENT TO 155 INSTEAD OF 115./
     062661  111  116  123                .ASCIZ  /INSTEAD OF FROM 331 TO 115./
7101 062715                          EM223:
     062715  101  104  104                .ASCII  /ADDD (R),A FAILED TO TRAP TO 244./<CRLF>
     062757  124  110  105                .ASCII  'THE RESULT WAS A UNDERFLOW CONDITION AND FIU=1.'<CRLF>
     063037  124  110  105                .ASCII  /THE (BUT FIU) FORK FAILED./<CRLF>
     063072  127  105  116                .ASCII  /WENT FROM STATE 331 TO 115./<CRLF>
     063126  111  116  123                .ASCIZ  /INSTEAD OF FROM 331 TO 155./
7102 063162                          EM224:
     063162  101  104  104                .ASCII  /ADDD (R),A TRAPPED TO 244./<CRLF>
     063215  124  110  105                .ASCII  'THE RESULT WAS AN UNDERFLOW CONDITION BUT FIU= 0.'
     063276  200  050  102                .ASCIZ  <CRLF>/(BUT FIU) STATE 137 WENT TO 155 INSTEAD OF 115./
```

ERROR MESSAGES

```
        063357      111     116     123             .ASCIZ  /INSTEAD OF FROM 137 TO 115./
 7103   063413                              EM225:
        063413      101     104     104             .ASCII  /ADDD (R),A FAILED TO TRAP TO 244./<CRLF>
        063455      124     110     105             .ASCII  'THE RESULT WAS A UNDERFLOW CONDITION AND FIU=1.'<CRLF>
        063535      124     110     105             .ASCII  /THE (BUT FIU) FORK FAILED./<CRLF>
        063570      127     105     116             .ASCII  /WENT FROM STATE 137 TO 115./<CRLF>
        063624      111     116     123             .ASCIZ  /INSTEAD OF FROM 137 TO 155./
 7104   063660                              EM226:
        063660      101     104     104             .ASCII  /ADDD (R),A TRAPPED TO 244./
        063712      200     102     105             .ASCII  <CRLF>'BECAUSE OF AN EXPECTED OVERFLOW CONDITION,'<CRLF>
        063766      102     125     124             .ASCIZ  'BUT THE FEC WAS BAD.'
 7105   064013                              EM227:
        064013      101     104     104             .ASCII  /ADDD (R),A TRAPPED TO 244./
        064045      200     102     105             .ASCII  <CRLF>'BECAUSE OF AN EXPECTED OVERFLOW CONDITION,'<CRLF>
        064121      102     125     124             .ASCIZ  'BUT THE FPS WAS BAD.'
 7106   064146                              EM230:
        064146      101     104     104             .ASCII  /ADDD (R),A TRAPPED TO 244./
        064200      200     102     105             .ASCII  <CRLF>'BECAUSE OF AN EXPECTED UNDERFLOW CONDITION,'<CRLF>
        064255      102     125     124             .ASCIZ  'BUT THE FEC WAS BAD.'
 7107   064302                              EM231:
        064302      101     104     104             .ASCII  /ADDD (R),A TRAPPED TO 244./
        064334      200     102     105             .ASCII  <CRLF>'BECAUSE OF AN EXPECTED UNDERFLOW CONDITION,'<CRLF>
        064411      102     125     124             .ASCIZ  'BUT THE FPS WAS BAD.'
 7108           060416                      EM232=EM210
 7109
 7110
 7111
 7116
 7120
 7127
 7137
 7138   064436                              EM233:
        064436      114     104     103             .ASCIZ  \LDCFD (R)+,A RESULT INCORRECT.\
 7139   064475                              EM234:
        064475      122     060     040             .ASCII  \R0 BAD AFTER LDCFD (R)+,A.\
        064527      200     101     040             .ASCIZ  <CRLF>'A BAD CONSTANT WAS USED.'
 7140   064561                              EM235:
        064561      120     103     040             .ASCIZ  \PC BAD AFTER LDCFD #NUM,A. TRAP TO 4.\
 7141   064627                              EM236:
        064627      120     103     040             .ASCIZ  \PC BAD AFTER LDCFD #NUM,A.\
 7142   064662                              EM237:
        064662      122     060     040             .ASCII  \R0 BAD AFTER LDCDF (R)+,A.\
        064714      200     101     040             .ASCIZ  <CRLF>'A BAD CONSTANT WAS USED.'
 7143   064746                              EM240:
        064746      106     120     123             .ASCIZ  \FPS BAD AFTER LDCFD (R)+,A.\
 7144   065002                              EM241:
        065002      114     104     103             .ASCII  \LDCFD (R)+,A FAILED.\
        065026      200     124     110             .ASCII  <CRLF>'THE FD '
        065036      102     111     124             .ASCII  'BIT WAS NOT COMPLIMENTED '
        065067      111     116     040             .ASCIZ  'IN STATE 017.'
 7145   065105                              EM242:
        065105      106     120     123             .ASCIZ  \FPS BAD AFTER LDCDF (R)+,A.\
 7146   065141                              EM243:
        065141      114     104     103             .ASCII  \LDCDF (R)+,A FAILED.\
        065165      200     124     110             .ASCII  <CRLF>'THE FD '
        065175      102     111     124             .ASCII  'BIT WAS NOT COMPLIMENTED '
        065226      111     116     040             .ASCIZ  'IN STATE 017.'
```

ERROR MESSAGES

```
7147 065244                                EM244:
     065244  114  104  103                       .ASCIZ  \LDCDF (R)+,A RESULT INCORRECT.\
7148
7149 065303  114  104  103  EM245:  .ASCII  'LDCFD (R),A FAILED.'
7150 065326  200  123  105           .ASCII  <CRLF>'SET SIGN FAILED '
7151 065347  111  116  040           .ASCIZ  'IN STATE 512.'
7152 065365  125  116  105  EM247:  .ASCIZ  'UNEXPECTED FPP TRAP TO 244.'
7153 065421  125  116  105  EM250:  .ASCIZ  'UNEXPECTED CPU TRAP TO 4.'
7154 065453  125  116  105  EM251:  .ASCIZ  'UNEXPECTED CPU TRAP TO 10.'
7155
7156 065506  103  117  122  EM252:  .ASCIZ  'CORRECT FLOWS INTERRUPT TEST MODULE FAILED TO INTERRUPT.'
7157
7161
7162 065577                                EM253:
     065577  101  104  104                       .ASCIZ  /ADDD AC0,AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7163 065663                                EM254:
     065663  101  104  104                       .ASCIZ  /ADDD (R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7164 065750                                EM255:
     065750  101  104  104                       .ASCIZ  /ADDD (R0)+,AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7165 066036                                EM256:
     066036  101  104  104                       .ASCIZ  /ADDD @(R0)+,AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7166 066125                                EM257:
     066125  101  104  104                       .ASCIZ  /ADDD -(R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7167 066213                                EM260:
     066213  101  104  104                       .ASCIZ  /ADDD @-(R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7168 066302                                EM261:
     066302  101  104  104                       .ASCIZ  /ADDD NUM(R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7169 066372                                EM262:
     066372  101  104  104                       .ASCIZ  /ADDD @NUM(R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7170 066463                                EM263:
     066463  104  111  126                       .ASCIZ  /DIVD (R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7171 066550                                EM264:
     066550  115  125  114                       .ASCIZ  /MULD (R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7172 066635                                EM265:
     066635  115  117  104                       .ASCIZ  /MODD (R0),AC0 FAILED IN THE INTERRUPT CORRECT FLOWS./
7173
7174 066722  103  117  122  EM266:  .ASCIZ  'CORRECT FLOWS INTERRUPT TEST MODULE CAUSED UNEXPECTED INTERRUPT.'
7175 067023                                EM267:
     067023  115  117  104                .ASCII  /MODD (R),A INTEGER BAD. RESULT OVER OR UNDER FLOW./
7176 067105  000                           .BYTE   0
```

ERROR DATA TABLE HEADERS

```
                                                .SBTTL  ERROR DATA TABLE HEADERS

                                        DH1:    .ASCII  '  TEST.'<TAB>'CALL AT PC.'<TAB>'ERROR AT PC.'<TAB>
                                                .ASCIZ  'GOT FPS.'<TAB>'EXPECTED FPS.'
                                        DH2:    .ASCIZ  '  TEST.'<TAB>'CALL AT PC.'<TAB>'ERROR AT PC.'
                                        DH3=DH1
                                        DH4=DH1
                                        DH5=DH1
                                        DH6=DH1
                                        DH7=DH1
                                        DH10=DH1
                                        DH11=DH1
                                        DH12=DH1
                                        DH13=DH1
                                        DH14=DH1
                                        DH15=DH1
                                        DH16=DH1
                                        DH17:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>'FEC.'<TAB>'FPS.'
                                        DH20=DH1
                                        DH21:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
                                                .ASCIZ  'GOT FEC.'<TAB>'EXPECTED FEC.'
                                        DH22:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>'FPS.'
                                        DH23=DH1
                                        DH32=DH1
                                        DH24=DH1
                                        DH25=DH1
                                        DH26=DH1
                                        DH27=DH1
                                        DH30=DH1
                                        DH31=DH1
                                        DH33=DH1
                                        DH34=DH1
                                        DH35=DH1
                                        DH36=DH1
                                        DH37=DH1
                                        DH40=DH1
                                        DH41=DH1
                                        DH42=DH1
                                        DH43=DH1
                                        DH44=DH1
                                        DH45=DH1
                                        DH246=DH1
                                        DH46=DH1
                                        DH47=DH1
                                        DH50=DH1
                                        DH51=DH1
                                        DH52=DH1
                                        DH111=DH1
                                        DH112=DH1
                                        DH113=DH1
                                        DH114=DH1
                                        DH115:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
                                                .ASCIZ  'GOT FEC.''GOT FPS.''EXPECTED FPS.'
                                        DH116=DH115
                                        DH117=DH115
                                        DH120=DH115
                                        DH121=DH115
```

ERROR DATA TABLE HEADERS

```
7234    067447          DH122=DH115
7235    067106          DH123=DH1
7236    067106          DH124=DH1
7237    067106          DH125=DH1
7238    067106          DH126=DH1
7239    067447          DH127=DH115
7240    067447          DH130=DH115
7241    067447          DH131=DH115
7242    067106          DH132=DH1
7243    067447          DH133=DH115
7244    067447          DH134=DH115
7245    067106          DH135=DH1
7246    067447          DH136=DH115
7247    067447          DH137=DH115
7248    067447          DH140=DH115
7249    067447          DH141=DH115
7250    067447          DH142=DH115
7251    067447          DH143=DH115
7252    067447          DH144=DH115
7253    067106          DH145=DH1
7254    067106          DH146=DH1
7255    067106          DH147=DH1
7256    067106          DH150=DH1
7257    067447          DH151=DH115
7258    067447          DH152=DH115
7259    067447          DH153=DH115
7260    067447          DH154=DH115
7261    067447          DH155=DH115
7262    067447          DH156=DH115
7263    067106          DH157=DH1
7264    067447          DH160=DH115
7265    067106          DH161=DH1
7266    067106          DH162=DH1
7267    067447          DH163=DH115
7268    067106          DH164=DH1
7269    067106          DH53=DH1
7270    067106          DH54=DH1
7271    067106          DH55=DH1
7272    067106          DH56=DH1
7273    067106          DH57=DH1
7274    067106          DH60=DH1
7275    067106          DH61=DH1
7276    067106          DH62=DH1
7277    067106          DH63=DH1
7278    067106          DH64=DH1
7279    067106          DH65=DH1
7280    067106          DH66=DH1
7281    067106          DH67=DH1
7282    067106          DH70=DH1
7283    067106          DH71=DH1
7284    067106          DH72=DH1
7285    067106          DH73=DH1
7286    067106          DH74=DH1
7287    067106          DH75=DH1
7288    067106          DH76=DH1
7289    067106          DH77=DH1
7290    067106          DH100=DH1
```

ERROR DATA TABLE HEADERS

```
7291            067106                  DH101=DH1
7292            067106                  DH102=DH1
7293            067106                  DH103=DH1
7294            067106                  DH104=DH1
7295            067106                  DH105=DH1
7296            067106                  DH106=DH1
7297            067106                  DH107=DH1
7298            067106                  DH110=DH1
7299            067447                  DH165=DH115
7300            067447                  DH166=DH115
7301            067447                  DH167=DH115
7302            067447                  DH170=DH115
7303            067447                  DH171=DH115
7304            067447                  DH172=DH115
7305            067447                  DH173=DH115
7306            067447                  DH174=DH115
7307            067447                  DH175=DH115
7308            067447                  DH176=DH115
7309 067546      040      040     124   DH177:  .ASCIZ  !  TEST!<TAB>!ERR PC!<TAB>!CPU ERROR REGISTER!
7310            067447                  DH200=DH115
7311            067447                  DH201=DH115
7312            067447                  DH202=DH115
7313            067447                  DH203=DH115
7314            067447                  DH204=DH115
7315            067447                  DH205=DH115
7316            067447                  DH206=DH115
7317 067607      040      040     124   DH220:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
7318 067647      040      040     124   DH207:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
7319 067707      011      107     117           .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
7320 067737      040      040     124   DH210:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
7321            067737                  DH211=DH210
7322            067647                  DH212=DH207
7323            067647                  DH213=DH207
7324            067647                  DH214=DH207
7325            067647                  DH215=DH207
7326            067737                  DH216=DH210
7327 070000      040      040     124   DH217:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
7328 070040      011      106     120           .ASCIZ  <TAB>'FPS.'<TAB>'FEC.'
7329            067737                  DH221=DH210
7330            067607                  DH222=DH220
7331            067737                  DH223=DH210
7332            067607                  DH224=DH220
7333            067737                  DH225=DH210
7334 070053      040      040     124   DH226:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
7335 070112      011      107     117           .ASCIZ  <TAB>'GOT FEC.'<TAB>'EXPECTED FEC.'
7336 070142      040      040     124   DH227:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
7337 070201      011      107     117           .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
7338            070053                  DH230=DH226
7339            070142                  DH231=DH227
7340            070142                  DH232=DH227
7341
7342
7343 070231      040      040     124   DH233:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
7344
7345 070272      040      040     124   DH234:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
7346 070332      011      107     117           .ASCIZ  <TAB>'GOT R0.'<TAB>'EXPECTED R0.'
7347
```

ERROR DATA TABLE HEADERS

```
7348 070360     040     040     124  DH235:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>
7349 070404     120     103     040          .ASCII  'PC OF TRAP.'<TAB>
7350
7351 070420     040     040     124  DH236:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>
7352 070444     120     103     040          .ASCII  'PC OF ERROR.'<TAB>'GOT PC.'
7353 070470     011     105     130          .ASCIZ  <TAB>'EXPECTED PC.'
7354
7355          070272                  DH237=DH234
7356
7357 070506     040     040     124  DH240:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>
7358 070532     120     103     040          .ASCII  'PC OF ERROR.'<TAB>
7359 070547     107     117     124          .ASCIZ  'GOT FPS.'<TAB>'EXPECTED FPS.'
7360
7361          070231                  DH241=DH233
7362          070506                  DH242=DH240
7363          070231                  DH243=DH233
7364          070231                  DH244=DH233
7365          070231                  DH245=DH233
7366 070576     040     040     124  DH247:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FEC.'
7367 070643     040     040     124  DH250:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
7368          070643                  DH251=DH250
7369
7370          067176                  DH252=DH2
7371          067106                  DH253=DH1
7372          067106                  DH254=DH1
7373          067106                  DH255=DH1
7374          067106                  DH256=DH1
7375          067106                  DH257=DH1
7376          067106                  DH260=DH1
7377          067106                  DH261=DH1
7378          067106                  DH262=DH1
7379          067106                  DH263=DH1
7380          067106                  DH264=DH1
7381          067106                  DH265=DH1
7382 070703     040     040     124  DH266:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
7383          067447                  DH267=DH115
```

DATA FORMAT SPECIFIERS

```
7384                                                    .SBTTL  DATA FORMAT SPECIFIERS
7385 070743     004     000     005    DF1:     .BYTE   4,0,5,0,5,0,5,0,5,5,3,5,5,3
7386 070761     004     000     005    DF2:     .BYTE   4,0,5,0,5,5,3,5,5,3
7387            070743                 DF3=DF1
7388            070743                 DF4=DF1
7389            070743                 DF5=DF1
7390            070743                 DF6=DF1
7391            070743                 DF7=DF1
7392            070743                 DF10=DF1
7393            070743                 DF11=DF1
7394            070743                 DF12=DF1
7395            070743                 DF13=DF1
7396            070743                 DF14=DF1
7397            070743                 DF15=DF1
7398            070743                 DF16=DF1
7399 070773     004     000     005    DF17:    .BYTE   4,0,5,0,5,0,0
7400 071002     004     000     005    DF20:    .BYTE   4,0,5,0,5,0,5,0
7401            071002                 DF21=DF20
7402            071002                 DF22=DF20
7403 071012     004     000     005    DF23:    .BYTE   4,0,5,0,5,0,5,0,5,5,2,5,5,2,5,5,2,5,5,2
7404            071012                 DF24=DF23
7405            071012                 DF32=DF23
7406            071012                 DF25=DF23
7407            071012                 DF26=DF23
7408            071012                 DF27=DF23
7409            071012                 DF30=DF23
7410            071012                 DF31=DF23
7411 071036     004     000     005    DF33:    .BYTE   4,0,5,0,5,0,5,0,5,5,3,5,5,3,5,5,3,5,5,3
7412            071036                 DF34=DF33
7413            071036                 DF35=DF33
7414            071036                 DF36=DF33
7415            071012                 DF37=DF23
7416            071012                 DF40=DF23
7417            071012                 DF41=DF23
7418            071012                 DF42=DF23
7419            071012                 DF43=DF23
7420            071012                 DF44=DF23
7421            071012                 DF45=DF23
7422            071036                 DF246=DF33
7423            071036                 DF46=DF33
7424            071036                 DF47=DF33
7425            071036                 DF50=DF33
7426            071036                 DF51=DF33
7427            071036                 DF52=DF33
7428            071012                 DF111=DF23
7429            071012                 DF112=DF23
7430            071012                 DF113=DF23
7431            071012                 DF114=DF23
7432 071062     004     000     005    DF115:   .BYTE   4,0,5,0,5,0,0,0,5,5,2,5,5,2,5,5,2,5,5,2
7433            071062                 DF116=DF115
7434            071062                 DF117=DF115
7435            071062                 DF120=DF115
7436            071062                 DF121=DF115
7437            071062                 DF122=DF115
7438            071036                 DF123=DF33
7439            071036                 DF124=DF33
7440            071036                 DF125=DF33
```

DATA FORMAT SPECIFIERS

```
 7441            071036                  DF126=DF33
 7442 071106        004      000    005  DF127:   .BYTE   4,0,5,0,5,0,0,0,5,5,3,5,5,3,5,5,3,5,5,3
 7443            071106                  DF130=DF127
 7444            071106                  DF131=DF127
 7445            071036                  DF132=DF33
 7446            071106                  DF133=DF127
 7447            071106                  DF134=DF127
 7448            071036                  DF135=DF33
 7449            071106                  DF136=DF127
 7450            071062                  DF137=DF115
 7451            071062                  DF140=DF115
 7452            071062                  DF141=DF115
 7453            071062                  DF142=DF115
 7454            071062                  DF143=DF115
 7455            071062                  DF144=DF115
 7456            071012                  DF145=DF23
 7457            071012                  DF146=DF23
 7458            071012                  DF147=DF23
 7459            071012                  DF150=DF23
 7460            071106                  DF151=DF127
 7461            071106                  DF152=DF127
 7462            071106                  DF153=DF127
 7463            071106                  DF154=DF127
 7464            071106                  DF155=DF127
 7465            071106                  DF156=DF127
 7466            071036                  DF157=DF33
 7467            071106                  DF160=DF127
 7468            071036                  DF161=DF33
 7469            071036                  DF162=DF33
 7470            071106                  DF163=DF127
 7471            071036                  DF164=DF33
 7472 071132        004      000    005  DF53:    .BYTE   4,0,5,0,5,0,5,0,5,5,2,5,5,2,5,5,2,5,5,2,5,5,2,5,5,2
 7473            071132                  DF54=DF53
 7474            071132                  DF55=DF53
 7475            071132                  DF56=DF53
 7476            071132                  DF57=DF53
 7477            071132                  DF60=DF53
 7478            071132                  DF61=DF53
 7479            071132                  DF62=DF53
 7480            071132                  DF63=DF53
 7481            071132                  DF64=DF53
 7482            071132                  DF65=DF53
 7483            071132                  DF66=DF53
 7484            071132                  DF67=DF53
 7485 071164        004      000    005  DF70:    .BYTE   4,0,5,0,5,0,5,0,5,5,3,5,5,3,5,5,3,5,5,3,5,5,3,5,5,3
 7486            071164                  DF71=DF70
 7487            071164                  DF72=DF70
 7488            071164                  DF73=DF70
 7489            071164                  DF74=DF70
 7490            071164                  DF75=DF70
 7491            071164                  DF76=DF70
 7492            071164                  DF77=DF70
 7493            071164                  DF100=DF70
 7494            071164                  DF101=DF70
 7495            071164                  DF102=DF70
 7496            071164                  DF103=DF70
 7497            071164                  DF104=DF70
```

DATA FORMAT SPECIFIERS

```
7498            071164                  DF105=DF70
7499            071164                  DF106=DF70
7500            071164                  DF107=DF70
7501            071164                  DF110=DF70
7502 071216        004      000    005  DF165:  .BYTE   4,0,5,0,5,0,0,0,5,5,2,5,5,2,5,5,2,5,5,2,5,5,2,5,5,2
7503            071216                  DF166=DF165
7504            071216                  DF167=DF165
7505            071216                  DF170=DF165
7506            071216                  DF171=DF165
7507            071216                  DF172=DF165
7508            071216                  DF173=DF165
7509            071216                  DF174=DF165
7510            071216                  DF175=DF165
7511 071250        004      000    005  DF176:  .BYTE   4,0,5,0,5,0,0,0,5,5,3,5,5,3,5,5,3,5,5,3,5,5,3,5,5,3
7512 071302        004      000    000  DF177:  .BYTE   4,0,0
7513            071250                  DF200=DF176
7514            071250                  DF201=DF176
7515            071250                  DF202=DF176
7516            071250                  DF203=DF176
7517            071250                  DF204=DF176
7518            071250                  DF205=DF176
7519            071250                  DF206=DF176
7520 071305        004      000    005  DF210:  .BYTE   4,0,5,0,5,0,5,0
7521 071315        004      000    005  DF207:  .BYTE   4,0,5,0,5,5,5,3,5,5,5,3,5,5,5,3,5,5,5,3
7522            071315                  DF211=DF207
7523 071341        004      000    005  DF212:  .BYTE   4,0,5,0,5,0,5,0,5,5,5,3,5,5,5,3,5,5,5,3,5,5,5,3
7524            071341                  DF213=DF212
7525            071341                  DF214=DF212
7526            071341                  DF215=DF212
7527            071315                  DF216=DF207
7528 071371        004      000    005  DF217:  .BYTE   4,0,5,0,5,0,0
7529            071315                  DF220=DF207
7530            071315                  DF221=DF207
7531            071315                  DF222=DF207
7532            071315                  DF223=DF207
7533            071315                  DF224=DF207
7534            071315                  DF225=DF207
7535            071341                  DF226=DF212
7536            071341                  DF227=DF212
7537            071341                  DF230=DF212
7538            071341                  DF231=DF212
7539            071341                  DF232=DF212
7540 071400        004      000    005  DF233:  .BYTE   4,0,5,0,5,5,3,5,5,3,5,5,3
7541 071415        004      000    005  DF234:  .BYTE   4,0,5,0,5,0,0
7542
7543 071424        004      000    005  DF235:  .BYTE   4,0,5,0
7544            071415                  DF236=DF234
7545            071415                  DF237=DF234
7546            071415                  DF240=DF234
7547            071400                  DF241=DF233
7548            071415                  DF242=DF234
7549            071400                  DF243=DF233
7550            071400                  DF244=DF233
7551            071400                  DF245=DF233
7552 071430        004      000    005  DF247:  .BYTE   4,0,5,0,5,0
7553            071430                  DF250=DF247
7554            071430                  DF251=DF247
```

DATA FORMAT SPECIFIERS

```
 7555
 7556 071436      004      000      005  DF252:  .BYTE   4,0,5,0
 7557 071442      004      000      005  DF253:  .BYTE   4,0,5,0,5,0,5,0,5,5,0,5,5,0,5,5,0,5,5,0,5,5,3,5,5,3
 7558           071442                    DF254=DF253
 7559           071442                    DF255=DF253
 7560           071442                    DF256=DF253
 7561           071442                    DF257=DF253
 7562           071442                    DF260=DF253
 7563           071442                    DF261=DF253
 7564           071442                    DF262=DF253
 7565           071442                    DF263=DF253
 7566           071442                    DF264=DF253
 7567           071442                    DF265=DF253
 7568           071436                    DF266=DF252
 7569           071250                    DF267=DF176
 7570                                             .EVEN
```

ERROR DATA TABLES

```
                                                        .SBTTL  ERROR DATA TABLES
7572 071474  001232  001234  040005  DT1:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP5,$TAB,$TMP6
7573 071514  001313  040012  001240          .WORD   $CRLF,MS1,$TMP3,$CRLF,MS2,$TMP4,0
7574 071532  001232  001234  040005  DT2:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS3,$TMP3,$CRLF,MS4,$TMP4,0
7575         071474                  DT3=DT1
7576         071474                  DT4=DT1
7577         071474                  DT5=DT1
7578         071474                  DT6=DT1
7579         071474                  DT7=DT1
7580         071474                  DT10=DT1
7581         071474                  DT11=DT1
7582         071474                  DT12=DT1
7583         071474                  DT13=DT1
7584         071474                  DT14=DT1
7585         071474                  DT15=DT1
7586         071474                  DT16=DT1
7587 071560  001232  001234  040005  DT17:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP4,$TMP5,0
7588 071600  001232  001234  040005  DT20:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP4,$TAB,$TMP5,0
7589 071622  001232  001234  040005  DT21:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP4,$TAB,$TMP3,0
7590 071644  001232  001234  040005  DT22:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP5,0
7591 071662  001232  001234  040005  DT23:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP7,$TAB,$TMP10,$CRLF,MS1,$TMP3,$CRLF,MS2,$TMP
7592 071716  001313  040125  001244          .WORD   $CRLF,MS5,$TMP5,$CRLF,MS6,$TMP6,0
7593         071662                  DT32=DT23
7594         071662                  DT24=DT23
7595         071662                  DT25=DT23
7596         071662                  DT26=DT23
7597         071662                  DT27=DT23
7598         071662                  DT30=DT23
7599         071662                  DT31=DT23
7600         071662                  DT33=DT23
7601         071662                  DT34=DT23
7602         071662                  DT35=DT23
7603         071662                  DT36=DT23
7604         071662                  DT37=DT23
7605         071662                  DT40=DT23
7606         071662                  DT41=DT23
7607         071662                  DT42=DT23
7608         071662                  DT43=DT23
7609         071662                  DT44=DT23
7610         071662                  DT45=DT23
7611         071662                  DT46=DT23
7612         071662                  DT47=DT23
7613         071662                  DT50=DT23
7614         071662                  DT51=DT23
7615         071662                  DT52=DT23
7616 071734  001232  001234  040005  DT53:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP11,$TAB,$TMP12
7617 071754  001313  040012  001240          .WORD   $CRLF,MS1,$TMP3,$CRLF,MS2,$TMP4
7618 071770  001313  040233  001244          .WORD   $CRLF,MS11,$TMP5,$CRLF,MS12,$TMP6
7619 072004  001313  040165  001250          .WORD   $CRLF,MS7,$TMP7,$CRLF,MS10,$TMP10,0
7620         071734                  DT54=DT53
7621         071734                  DT55=DT53
7622         071734                  DT56=DT53
7623         071734                  DT57=DT53
7624         071734                  DT60=DT53
7625         071734                  DT61=DT53
7626         071734                  DT62=DT53
7627         071734                  DT63=DT53
```

ERROR DATA TABLES

```
7628            071734                  DT64=DT53
7629            071734                  DT65=DT53
7630            071734                  DT66=DT53
7631            071734                  DT67=DT53
7632            071734                  DT70=DT53
7633            071734                  DT71=DT53
7634            071734                  DT72=DT53
7635            071734                  DT73=DT53
7636            071734                  DT74=DT53
7637            071734                  DT75=DT53
7638            071734                  DT76=DT53
7639            071734                  DT77=DT53
7640            071734                  DT100=DT53
7641            071734                  DT101=DT53
7642            071734                  DT102=DT53
7643            071734                  DT103=DT53
7644            071734                  DT104=DT53
7645            071734                  DT105=DT53
7646            071734                  DT106=DT53
7647            071734                  DT107=DT53
7648            071734                  DT110=DT53
7649            071662                  DT111=DT23
7650            071662                  DT112=DT23
7651            071662                  DT113=DT23
7652            071662                  DT114=DT23
7653 072022    001232  001234  040005  DT115:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP11,$TMP7,$TAB,$TMP10
7654 072044    001313  040012  001240          .WORD   $CRLF,MS1,$TMP3,$CRLF,MS2,$TMP4
7655 072060    001313  040125  001244          .WORD   $CRLF,MS5,$TMP5,$CRLF,MS6,$TMP6,0
7656            072022                  DT116=DT115
7657            072022                  DT117=DT115
7658            072022                  DT120=DT115
7659            072022                  DT121=DT115
7660            072022                  DT122=DT115
7661            071662                  DT123=DT23
7662            071662                  DT124=DT23
7663            071662                  DT125=DT23
7664            071662                  DT126=DT23
7665            072022                  DT127=DT115
7666            072022                  DT130=DT115
7667            072022                  DT131=DT115
7668            071662                  DT132=DT23
7669            072022                  DT133=DT115
7670            072022                  DT134=DT115
7671            071662                  DT135=DT23
7672            072022                  DT136=DT115
7673            072022                  DT137=DT115
7674            072022                  DT140=DT115
7675            072022                  DT141=DT115
7676            072022                  DT142=DT115
7677            072022                  DT143=DT115
7678            072022                  DT144=DT115
7679            071662                  DT145=DT23
7680            071662                  DT146=DT23
7681            071662                  DT147=DT23
7682            071662                  DT150=DT23
7683            072022                  DT151=DT115
7684            072022                  DT152=DT115
```

```
 7685           072022                  DT153=DT115
 7686           072022                  DT154=DT115
 7687           072022                  DT155=DT115
 7688           072022                  DT156=DT115
 7689           071662                  DT157=DT23
 7690           072022                  DT160=DT115
 7691           071662                  DT161=DT23
 7692           071662                  DT162=DT23
 7693           072022                  DT163=DT115
 7694           071662                  DT164=DT23
 7695 072076   001232  001234  040005  DT165:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP13,$TMP11,$TMP12
 7696 072116   001313  040012  001240          .WORD   $CRLF,MS1,$TMP3,$CRLF,MS2,$TMP4
 7697 072132   001313  040233  001244          .WORD   $CRLF,MS11,$TMP5,$CRLF,MS12,$TMP6
 7698 072146   001313  040165  001250          .WORD   $CRLF,MS7,$TMP7,$CRLF,MS10,$TMP10,0
 7699           072076                  DT166=DT165
 7700           072076                  DT167=DT165
 7701           072076                  DT170=DT165
 7702           072076                  DT171=DT165
 7703           072076                  DT172=DT165
 7704           072076                  DT173=DT165
 7705           072076                  DT174=DT165
 7706           072076                  DT175=DT165
 7707           072076                  DT176=DT165
 7708 072164   001232  001234  034422  DT177:  .WORD   $TMP0,$TMP1,CPSAVE,0
 7709           072076                  DT200=DT165
 7710           072076                  DT201=DT165
 7711           072076                  DT202=DT165
 7712           072076                  DT203=DT165
 7713           072076                  DT204=DT165
 7714           072076                  DT205=DT165
 7715           072076                  DT206=DT165
 7716 072174   001232  001234  040005  DT207:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS41,$CRLF,$TMP3
 7717 072214   001313  040400  001313          .WORD   $CRLF,MS42,$CRLF,$TMP4,$CRLF,MS43,$CRLF,$TMP5
 7718 072234   001313  040433  001313          .WORD   $CRLF,MS44,$CRLF,$TMP6,0
 7719 072246   001232  001234  040005  DT210:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
 7720 072262   040005  001242  000000          .WORD   $TAB,$TMP4,0
 7721           072174                  DT211=DT207
 7722 072270   001232  001234  040005  DT212:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP10,$TAB,$TMP11
 7723 072310   001313  040354  001313          .WORD   $CRLF,MS41,$CRLF,$TMP3,$CRLF,MS42,$CRLF,$TMP4
 7724 072330   001313  040416  001313          .WORD   $CRLF,MS43,$CRLF,$TMP5,$CRLF,MS44,$CRLF,$TMP6,0
 7725           072270                  DT213=DT212
 7726           072270                  DT214=DT212
 7727           072270                  DT215=DT212
 7728           072174                  DT216=DT207
 7729 072352   001232  001234  040005  DT217:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,0
 7730           072174                  DT220=DT207
 7731           072174                  DT221=DT207
 7732           072174                  DT222=DT207
 7733           072174                  DT223=DT207
 7734           072174                  DT224=DT207
 7735           072174                  DT225=DT207
 7736           072270                  DT226=DT212
 7737           072270                  DT227=DT212
 7738           072270                  DT230=DT212
 7739           072246                  DT231=DT210
 7740           072174                  DT232=DT207
 7741 072372   001232  001234  040005  DT233:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF
```

ERROR DATA TABLES

```
7742 072404  040302  001244  001313          .WORD   MS37,$TMP5,$CRLF,MS40,$TMP6
7743 072416  001313  040354  001250          .WORD   $CRLF,MS41,$TMP7,0
7744 072426  001232  001234  040005  DT234:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,0
7745 072446  001232  001234  040005  DT235:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
7746         072426                  DT236=DT234
7747         072426                  DT237=DT234
7748         072426                  DT240=DT234
7749         072372                  DT241=DT233
7750         072426                  DT242=DT234
7751         072372                  DT243=DT233
7752         072372                  DT244=DT233
7753         072372                  DT245=DT233
7754         071662                  DT246=DT23
7755 072460  001232  001234  040005  DT247:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,0
7756 072476  001232  001234  040005  DT250:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
7757         072476                  DT251=DT250
7758 072510  001232  001234  040005  DT252:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
7759 072522  001232  001234  040005  DT253:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP7,$TAB,$TMP1C
7760 072542  001313  037614  001254          .WORD   $CRLF,MSA1,$TMP11,$CRLF,MSA2,$TMP12
7761 072556  001313  037655  001244          .WORD   $CRLF,MSA3,$TMP5,$CRLF,MSA4,$TMP6
7762 072572  001313  037705  001240          .WORD   $CRLF,MSA5,$TMP3,$CRLF,MSA6,$TMP4,0
7763         072522                  DT254=DT253
7764         072522                  DT255=DT253
7765         072522                  DT256=DT253
7766         072522                  DT257=DT253
7767         072522                  DT260=DT253
7768         072522                  DT261=DT253
7769         072522                  DT262=DT253
7770         072522                  DT263=DT253
7771         072522                  DT264=DT253
7772         072522                  DT265=DT253
7773         072510                  DT266=DT252
7774         072076                  DT267=DT165
7775 072610  007070  007070  007070          .WORD   7070,7070,7070,7070     ;KLUDGE FOR APT LOAD PROBLEM
7776         000001                  .END
```

SYMBOL TABLE

```
AAADON  014602
AAA1    013600
AAA10   014216
AAA11   014254
AAA12   014312
AAA13   014350
AAA2    013636
AAA3    013674
AAA4    013732
AAA5    013770
AAA6    014026
AAA7    014064
AAA8    014122
AAA9    014160
ABASE = 000000
ACDW1 = 000000
ACDW2 = 000000
ACPUOP= 000000
AC0   =%000000
AC1   =%000001
AC2   =%000002
AC3   =%000003
AC4   =%000004
AC5   =%000005
AC6   =%000006
AC7   =%000007
ADDW0 = 000000
ADDW1 = 000000
ADDW10= 000000
ADDW11= 000000
ADDW12= 000000
ADDW13= 000000
ADDW14= 000000
ADDW15= 000000
ADDW2 = 000000
ADDW3 = 000000
ADDW4 = 000000
ADDW5 = 000000
ADDW6 = 000000
ADDW7 = 000000
ADDW8 = 000000
ADDW9 = 000000
ADEVCT= 000000
ADEVM = 000000
AENV  = 000000
AENVM = 000000
AFATAL= 000000
AMADR1  000000
AMADR2= 000000
AMADR3= 000000
AMADR4= 000000
AMAMS1= 000000
AMAMS2= 000000
AMAMS3= 000000
AMAMS4= 000000
AMSGAD= 000000
AMSGLG= 000000
AMSGTY= 000000
AMTYP1= 000000
AMTYP2= 000000
AMTYP3= 000000
AMTYP4= 000000
APASS = 000000
APRIOR= 000000
APTCSU= 000040
APTENV= 000001
APTSIZ= 000200
APTSPO= 000100
ASWREG= 000000
ATESTN= 000000
AUNIT = 000000
AUSWR = 000000
AVECT1= 000000
AVECT2= 000000
BBBDON  015304
BBBER1  015060
BBBER2  015144
BBBER3  015172
BBBER4  015220
BBBP1   015264
BBBP2   015274
BBB0    014610
BBB1    014644
BBB2    014672
BBB3    014722
BBB4    014750
BBB5    015006
BBB6    015014
BIT0  = 000001
BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT1  = 000002
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
BIT2  = 000004
BIT3  = 000010
BIT4  = 000020
BIT5  = 000040
BIT6  = 000100
BIT7  = 000200
BIT8  = 000400
BIT9  = 001000
BPTVEC= 000014
CCCDON  016314
CCC1    015310
CCC10   015704
CCC11   015740
CCC12   015774
CCC13   016030
CCC2    015344
CCC3    015400
CCC4    015434
CCC5    015470
CCC6    015524
CCC7    015560
CCC8    015614
CCC9    015650
CKSWR = 104406
CMPSUB  014412
CMPTMP  014572
CNT   = 000270
CORDON  033336
CORFLG  033320
CORINT  033332
CORMES  040455
CORSUB  033036
CORTMP  033322
CORTRP  033334
CORTV   033134
CORTV0  033276
CORTV1  033302
COR1    032204
COR10   032626
COR11   032672
COR12   032732
COR13   032772
COR2    032230
COR3    032244
COR33   032256
COR4    032316
COR5    032356
COR6    032416
COR7    032462
COR8    032522
COR9    032566
CPSAVE  034422
CPSPUR  037502
CPTWO   037520
CR    = 000015
CRLF  = 000200
DDDDON  017250
DDD1    016320
DDD2    016374
DDD3    016450
DDD4    016524
DDD5    016600
DDD6    016654
DDD7    016730
DDISP = 177570
DF1     070743
DF10  = 070743
DF100 = 071164
DF101 = 071164
DF102 = 071164
DF103 = 071164
DF104 = 071164
DF105 = 071164
DF106 = 071164
DF107 = 071164
DF11  = 070743
DF110 = 071164
DF111 = 071012
DF112 = 071012
DF113 = 071012
DF114 = 071012
DF115   071062
DF116 = 071062
DF117 = 071062
DF12  = 070743
DF120 = 071062
DF121 = 071062
DF122 = 071062
DF123 = 071036
DF124 = 071036
DF125 = 071036
DF126 = 071036
DF127   071106
DF13  = 070743
DF130 = 071106
DF131 = 071106
DF132 = 071036
DF133 = 071106
DF134 = 071106
DF135 = 071036
DF136 = 071106
DF137 = 071062
DF14  = 070743
DF140 = 071062
DF141 = 071062
DF142 = 071062
DF143 = 071062
DF144 = 071062
DF145 = 071012
DF146 = 071012
DF147 = 071012
DF15  = 070743
DF150 = 071012
DF151 = 071106
DF152 = 071106
DF153 = 071106
DF154 = 071106
DF155 = 071106
DF156 = 071106
DF157 = 071036
DF16  = 070743
DF160 = 071106
DF161 = 071036
DF162 = 071036
DF163 = 071106
DF164 = 071036
DF165   071216
DF166 = 071216
DF167 = 071216
DF17    070773
DF170 = 071216
DF171 = 071216
DF172 = 071216
DF173 = 071216
DF174 = 071216
DF175 = 071216
DF176   071250
DF177   071302
DF2     070761
DF20    071002
DF200 = 071250
DF201 = 071250
DF202 = 071250
DF203 = 071250
DF204 = 071250
DF205 = 071250
DF206 = 071250
DF207   071315
DF21  = 071002
DF210   071305
DF211 = 071315
DF212   071341
DF213 = 071341
DF214 = 071341
DF215 = 071341
DF216 = 071315
DF217   071371
DF22  = 071002
DF220 = 071315
DF221 = 071315
DF222 = 071315
DF223 = 071315
DF224 = 071315
DF225 = 071315
DF226 = 071341
DF227 = 071341
DF23    071012
DF230 = 071341
DF231 = 071341
DF232 = 071341
DF233   071400
DF234   071415
DF235   071424
DF236 = 071415
DF237 = 071415
DF24  = 071012
DF240 = 071415
DF241 = 071400
DF242 = 071415
```

SYMBOL TABLE

```
DF243 = 071400
DF244 = 071400
DF245 = 071400
DF246 = 071036
DF247   071430
DF2?  - 071012
DF250 = 071430
DF251 = 071430
DF252   071436
DF253   071442
DF254 = 071442
DF255 = 071442
DF256 = 071442
DF257 = 071442
DF26  = 071012
DF260 = 071442
DF261 = 071442
DF262 = 071442
DF263 = 071442
DF264 = 071442
DF265 = 071442
DF266 = 071436
DF267 = 071250
DF27  = 071012
DF3   = 070743
DF30  = 071012
DF31  = 071012
DF32  = 071012
DF33    071036
DF34  = 071036
DF35  = 071036
DF36  = 071036
DF37  = 071012
DF4   = 070743
DF40  = 071012
DF41  = 071012
DF42  = 071012
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DF44  = 071012
DF45  = 071012
DF46  = 071036
DF47  = 071036
DF5   = 070743
DF50  = 071036
DF51  = 071036
DF52  = 071036
DF53    071132
DF54  = 071132
DF55  = 071132
DF56  = 071132
DF57  = 071132
DF6   = 070743
DF60  = 071132
DF61  = 071132
DF62  = 071132
DF63  = 071132
DF64  = 071132
DF65  = 071132
DF66  = 071132
DF67  = 071132
DF7   = 070743
DF70    071164
DF71  = 071164
DF72  = 071164
DF73  = 071164
DF74  = 071164
DF75  = 071164
DF76  = 071164
DF77  = 071164
DH1     067106
DH10  = 067106
DH100 = 067106
DH101 = 067106
DH102 = 067106
DH103 = 067106
DH104 = 067106
DH105 = 067106
DH106 = 067106
DH107 = 067106
DH11  = 067106
DH110 = 067106
DH111 = 067106
DH112 = 067106
DH113 = 067106
DH114 = 067106
DH115   067447
DH116 = 067447
DH117 = 067447
DH12  = 067106
DH120 = 067447
DH121 = 067447
DH122 = 067447
DH123 = 067106
DH124 = 067106
DH125 = 067106
DH126 = 067106
DH127 = 067447
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DH130 = 067447
DH131 = 067447
DH132 = 067106
DH133 = 067447
DH134 = 067447
DH135 = 067106
DH136 = 067447
DH137 = 067447
DH14  = 067106
DH140 = 067447
DH141 = 067447
DH142 = 067447
DH143 = 067447
DH144 = 067447
DH145 = 067106
DH146 = 067106
DH147 = 067106
DH15  = 067106
DH150 = 067106
DH151 = 067447
DH152 = 067447
DH153 = 067447
DH154 = 067447
DH155 = 067447
DH156 = 067447
DH157 = 067106
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DH160 = 067447
DH161 = 067106
DH162 = 067106
DH163 = 067447
DH164 = 067106
DH165 = 067447
DH166 = 067447
DH167 = 067447
DH17    067237
DH170 = 067447
DH171 = 067447
DH172 = 067447
DH173 = 067447
DH174 = 067447
DH175 = 067447
DH176 = 067447
DH177   067546
DH2     067176
DH20  = 067106
DH200 = 067447
DH201 = 067447
DH202 = 067447
DH203 = 067447
DH204 = 067447
DH205 = 067447
DH206 = 067447
DH207   067647
DH21    067312
DH210   067737
DH211 = 067737
DH212 = 067647
DH213 = 067647
DH214 = 067647
DH215 = 067647
DH216 = 067737
DH217   070000
DH22    067401
DH220   067607
DH221 = 067737
DH222 = 067607
DH223 = 067737
DH224 = 067607
DH225 = 067737
DH226   070053
DH227   070142
DH23  = 067106
DH230 = 070053
DH231 = 070142
DH232 = 070142
DH233   070231
DH234   070272
DH235   070360
DH236   070420
DH237 = 070272
DH24  = 067106
DH240   070506
DH241 = 070231
DH242 = 070506
DH243 = 070231
DH244 = 070231
DH245 = 070231
DH246 = 067106
DH247   070576
DH25  = 067106
DH250   070643
DH251 = 070643
DH252 = 067176
DH253 = 067106
DH254 = 067106
DH255 = 067106
DH256 = 067106
DH257 = 067106
DH26  = 067106
DH260 = 067106
DH261 = 067106
DH262 = 067106
DH263 = 067106
DH264 = 067106
DH265 = 067106
DH266   070703
DH267 = 067447
DH27  = 067106
DH3   = 067106
DH30  = 067106
DH31  = 067106
DH32  = 067106
DH33  = 067106
DH34  = 067106
DH35  = 067106
DH36  = 067106
DH37  = 067106
DH4   = 067106
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DH7   = 067106
DH70  = 067106
DH71  = 067106
DH72  = 067106
DH73  = 067106
DH74  = 067106
DH75  = 067106
DH76  = 067106
DH77  = 067106
DISPLA  001142
DISPRE  000174
DIVDSU  017010
DIVDT   017240
DIVFSU  016070
DIVFT   016304
DSWR  = 177570
DT1     071474
DT10  = 071474
DT100 = 071734
DT101 = 071734
DT102 = 071734
DT103 = 071734
DT104 = 071734
DT105 = 071734
DT106 = 071734
DT107 = 071734
DT11  = 071474
DT110 = 071734
DT111 = 071662
DT112 = 071662
DT113 = 071662
DT114 = 071662
DT115   072022
DT116 = 072022
DT117 = 072022
DT12  = 071474
DT120 = 072022
DT121 = 072022
DT122 = 072022
DT123 = 071662
DT124 = 071662
DT125 = 071662
```

SYMBOL TABLE

```
DT126 = 071662   DT21   071622   DT31  = 071662   EMTVEC= 000030   EM160  051323
DT127 = 072022   DT210  072246   DT32  = 071662   EM1     040514   EM161  051461
DT13  = 071474   DT211 = 072174  DT33  = 071662   EM10    041333   EM162  051626
DT130 = 072022   DT212  072270   DT34  = 071662   EM100   054471   EM163  051772
DT131 = 072022   DT213 = 072270  DT35  = 071662   EM101   054554   EM164  052127
DT132 = 071662   DT214 = 072270  DT36  = 071662   EM102   054750   EM165  056060
DT133 = 072022   DT215 = 072270  DT37  = 071662   EM103   055144   EM166  056144
DT134 = 072022   DT216 = 072174  DT4   = 071474   EM104   055256   EM167  056227
DT135 = 071662   DT217  072352   DT40  = 071662   EM105   055423   EM17   042313
DT136 = 072022   DT22   071644   DT41  = 071662   EM106   055532   EM170  056261
DT137 = 072022   DT220 = 072174  DT42  = 071662   EM107   055641   EM171  056347
DT14  = 071474   DT221 = 072174  DT43  = 071662   EM11    041440   EM172  056472
DT140 = 072022   DT222 = 072174  DT44  = 071662   EM110   055750   EM173  056557
DT141 = 072022   DT223 = 072174  DT45  = 071662   EM111   044565   EM174  056723
DT142 = 072022   DT224 = 072174  DT46  = 071662   EM112   044642   EM175  057073
DT143 = 072022   DT225 = 072174  DT47  = 071662   EM113   044720   EM176  057205
DT144 = 072022   DT226 = 072270  DT5   = 071474   EM114   044776   EM177  057271
DT145 = 071662   DT227 = 072270  DT50  = 071662   EM115   045055   EM2    040546
DT146 = 071662   DT23   071662   DT51  = 071662   EM116   045133   EM20   042370
DT147 = 071662   DT230 = 072270  DT52  = 071662   EM117   045212   EM200  057325
DT15  = 071474   DT231 = 072246  DT53    071734   EM12    041547   EM201  057357
DT150 = 071662   DT232 = 072174  DT54  = 071734   EM120   045350   EM202  057446
DT151 = 072022   DT233  072372   DT55  = 071734   EM121   045506   EM203  057610
DT152 = 072022   DT234  072426   DT56  = 071734   EM122   045643   EM204  057752
DT153 = 072022   DT235  072446   DT57  = 071734   EM123   046000   EM205  060040
DT154 = 072022   DT236 = 072426  DT6   = 071474   EM124   046056   EM206  060206
DT155 = 072022   DT237 = 072426  DT60  = 071734   EM125   046135   EM207  060354
DT156 = 072022   DT24  = 071662  DT61  = 071734   EM126   046213   EM21   042422
DT157 = 071662   DT240 = 072426  DT62  = 071734   EM127   046272   EM210  060416
DT16  = 071474   DT241 = 072372  DT63  = 071734   EM13    041656   EM211  060460
DT160 = 072022   DT242 = 072426  DT64  = 071734   EM130   046350   EM212  060624
DT161 = 071662   DT243 = 072372  DT65  = 071734   EM131   046427   EM213  061010
DT162 = 071662   DT244 = 072372  DT66  = 071734   EM132   046565   EM214  061174
DT163 = 072022   DT245 = 072372  DT67  = 071734   EM133   046723   EM215  061360
DT164 = 071662   DT246 = 071662  DT7   = 071474   EM134   047061   EM216  061544
DT165   072076   DT247  072460   DT70  = 071734   EM135   047216   EM217  061726
DT166 = 072076   DT25  = 071662  DT71  = 071734   EM136   047353   EM22   042454
DT167 = 072076   DT250  072476   DT72  = 071734   EM137   047510   EM220  061770
DT17    071560   DT251 = 072476  DT73  = 071734   EM14    041772   EM221  062220
DT170 = 072076   DT252  072510   DT74  = 071734   EM140   047576   EM222  062464
DT171 = 072076   DT253  072522   DT75  = 071734   EM141 = 044565   EM223  062715
DT172 = 072076   DT254 = 072522  DT76  = 071734   EM142 = 044642   EM224  063162
DT173 = 072076   DT255 = 072522  DT77  = 071734   EM143   047665   EM225  063413
DT174 = 072076   DT256 = 072522  EEEDON  020260   EM144   047743   EM226  063660
DT175 = 072076   DT257 = 072522  EEE1    017254   EM145   050022   EM227  064013
DT176 = 072076   DT26  = 071662  EEE10   017650   EM146   050167   EM23   042535
DT177   072164   DT260 = 072522  EEE11   017704   EM147   050334   EM230  064146
DT2     071532   DT261 = 072522  EEE12   017740   EM15    042104   EM231  064302
DT20    071600   DT262 = 072522  EEE13   017774   EM150   050500   EM232 = 060416
DT200 = 072076   DT263 = 072522  EEE2    017310   EM151   050644   EM233  064436
DT201 = 072076   DT264 = 072522  EEE3    017344   EM152   050732   EM234  064475
DT202 = 072076   DT265 = 072522  EEE4    017400   EM153 = 046000   EM235  064561
DT203 = 072076   DT266 = 072510  EEE5    017434   EM154 = 046056   EM236  064627
DT204 = 072076   DT267 = 072076  EEE6    017470   EM155   051021   EM237  064662
DT205 = 072076   DT27  = 071662  EEE7    017524   EM156   051077   EM24   042612
DT206 = 072076   DT3   = 071474  EEE8    017560   EM157   051156   EM240  064746
DT207   072174   DT30  = 071662  EEE9    017614   EM16    042216   EM241  065002
```

SYMBOL TABLE

EM242	065105	EM64	053372	GGG4	024610	HHER9	006602	HXER10	013342
EM243	065141	EM65	053511	GGG5	024660	HHIDON	030200	HXER11	013374
EM244	065244	EM66	053624	GGG6	024730	HHH1	026076	HXER12	013414
EM245	065303	EM67	053673	GGG7	025000	HHH10	027176	HXER13	013444
EM246	044175	EM7	041226	GGG8	025050	HHH11	027276	HXER2	013112
EM247	065365	EM70	053756	GGG9	025120	HHH12	027376	HXER22	013126
EM25	042710	EM71	054007	GGP1	011744	HHH13	027476	HXER3	013142
EM250	065421	EM72	054037	GGP2	011754	HHH2	026176	HXER33	013156
EM251	065453	EM73 =	054037	GGP3	011764	HHH3	026276	HXER4	013172
EM252	065506	EM74	054071	GGP4	011774	HHH4	026376	HXER5	013072
EM253	065577	EM75	054200	GGP5	012004	HHH5	026476	HXER6	013226
EM254	065663	EM76	054271	GGP6	012014	HHH6	026576	HXER66	013242
EM255	065750	EM77	054361	GGP7	012024	HHH7	026676	HXER7	013256
EM256	066036	EPENDS	034104	GGP8	012034	HHH8	026776	HXER8	013210
EM257	066125	ERM10	034756	GGP9	012044	HHH9	027076	HXER9	013306
EM26	042775	ERROR =	104000	GG1	007142	HHP0	006776	HXP1	013474
EM260	066213	ERRVEC=	000004	GG10	007436	HHP1	007006	HXP2	013504
EM261	066302	ERTYPE	037040	GG11	007474	HHP10	007116	HXP3	013514
EM262	066372	FFFDON	021010	GG12	007516	HHP11	007126	HXP4	013524
EM263	066463	FFF1	020264	GG13	007526	HHP2	007016	HXP5	013534
EM264	066550	FFF2	020340	GG14	007544	HHP3	007026	HXP6	013544
EM265	066635	FFF3	020414	GG15	007602	HHP4	007036	HXP7	013554
EM266	066722	FFF4	020470	GG16	007620	HHP5	007046	HXP8	013564
EM267	067023	FPSPUR	037450	GG17	007666	HHP6	007056	HX1	012060
EM27 =	042710	FPVECT=	000244	GG18	007676	HHP7	007066	HX10	012266
EM3	040602	GGDATO	011734	GG19	007732	HHP8	007076	HX11	012310
EM30	043073	GGDONE	012054	GG2	007200	HHP9	007106	HX12	012330
EM31	043145	GGER0	010232	GG20	007770	HHTRAP	006716	HX13	012340
EM32	042560	GGER1	010330	GG21	010012	HH1	005216	HX14	012346
EM33	43212	GGER10	011042	GG22	010022	HH10	005430	HX15	012364
EM34	043235	GGER11	011110	GG23	010040	HH11	005446	HX16	012412
EM35	043267	GGER12	011156	GG24	010076	HH12	005476	HX165	012416
EM36	043342	GGER13	011224	GG25	010114	HH13	005520	HX17	012444
EM37	043410	GGER14	011272	GG26	010162	HH14	005540	HX18	012502
EM4	040707	GGER15	011370	GG27	010172	HH15	005550	HX19	012522
EM40	043433	GGER16	011436	GG28	010226	HH16	005556	HX2	012110
EM41	043465	GGER17	011504	GG3	007222	HH17	005574	HX20	012532
EM42	043540	GGER18	011552	GG4	007232	HH18	005632	HX21	012534
EM43	043671	GGER19	011620	GG5	007250	HH19	005654	HX22	012564
EM44	044022	GGER2	010376	GG6	007306	HH2	005246	HX23	012604
EM45	044070	GGER20	011666	GG7	007324	HH20	005664	HX24	012624
EM46	044143	GGER3	010444	GG8	007372	HH21	005702	HX25	012634
EM47	044220	GGER4	010512	GG9	007402	HH22	005732	HX26	012642
EM5	041014	GGER5	010514	GTSWR =	104405	HH23	005754	HX27	012644
EM50	044354	GGER6	010562	HHDATO	006766	HH24	005764	HX28	012676
EM51	044427	GGER7	010630	HHDONE	007136	HH25	006002	HX29	012720
EM52	044475	GGER8	010726	HHER0	006006	HH3	005270	HX3	012124
EM53	052325	GGER9	010774	HHER00	006122	HH4	005310	HX30	012730
EM54	052356	GGGDON	026072	HHER1	006054	HH5	005320	HX31	012746
EM55	052273	GGG1	024420	HHER10	006650	HH6	005326	HX32	012776
EM56	052406	GGG10	025170	HHER2	006170	HH7	005340	HX33	013020
EM57	052477	GGG11	025240	HHER3	006236	HH8	005376	HX34	013030
EM6	041121	GGG12	025310	HHER4	006304	HH9	005420	HX35	013046
EM60	052567	GGG13	025360	HHER5	006352	HT =	000011	HX4	012144
EM61	052671	GGG14	025430	HHER6	006420	HXDATO	013464	HX5	012164
EM62	053065	GGG2	024470	HHER7	006466	HXDONE	013574	HX6	012174
EM63	053261	GGG3	024540	HHER8	006534	HXER1	013052	HX7	012202

SYMBOL TABLE

```
HX8      012220    MS2      040030    SWR      001140    TYPOS = 104403    $ERTTL  001112
HX9      012252    MS3      040050    SWREG    000176    $APTHD  004332    $ESCAP  001304
IBSAVE   034424    MS37     040302    SW0    = 000001    $ATYC   035700    $ETABL  001336
IIIDON   021650    MS4      040077    SW00   = 000001    $ATY1   035654    $ETEND  001442
IIII     021014    MS40     040320    SW01   = 000002    $ATY3   035662    $FATAL  001320
IIII2    021060    MS41     040354    SW02   = 000004    $ATY4   035672    $FFLG   036120
IIII3    021124    MS415    040334    SW03   = 000010    $AUTOB  001134    $FILLC  001156
IIII4    021170    MS42     040400    SW04   = 000020    $BASE   001372    $FILLS  001155
IOTVEC=  000020    MS43     040416    SW05   = 000040    $BDADR  001122    $GDADR  001120
JJJDON   022610    MS44     040433    SW06   = 000100    $BDDAT  001126    $GDDAT  001124
JJJ1     021654    MS5      040125    SW07   = 000200    $BELL   001306    $GET42  033664
JJJ2     021740    MS6      040147    SW08   = 000400    $CDW1   001376    $GTSWR  036172
JJJ3     022024    MS7      040165    SW09   = 001000    $CDW2   001400    $GT42C  033776
JJJ4     022110    MULDSU   020550    SW1    = 000002    $CHARC  035414    $HD     = 000003
KKKDON   023452    MULDT    021000    SW10   = 002000    $CKSWR  036122    $HIBTS  004332
KKK1     022614    MULFSU   020034    SW11   = 004000    $CLR.T  034014    $ICNT   001104
KKK3     022660    MULFT    020250    SW12   = 010000    $CMTAG  001100    $ILLUP  037032
KKK4     022724    NNNDON   032154    SW13   = 020000    $CM1    = 000024  $INTAG  001135
KKK5     022770    NNN1     031132    SW14   = 040000    $CM2    = 000050  $ITEMB  001114
LF     = 000012    NNN2     031234    SW15   = 100000    $CM3    = 000024  $LF     001314
LLLDON   024414    NNN3     031336    SW2    = 000004    $CM4    = 000024  $LFLG   036117
LLL1     023456    NNN4     031440    SW3    = 000010    $CNTLG  036541    $LOOP   034072
LLL2     023542    OVDNTT   022600    SW4    = 000020    $CNTLU  036534    $LPADR  001106
LLL3     023626    OVDTT    024404    SW5    = 000040    $CPUOP  001344    $LPERR  001110
LLL4     023712    OVFNTT   021640    SW6    = 000100    $CRLF   001313    $MADR1  001350
LOOP     005214    OVFTT    023442    SW7    = 000200    $DDW0   001402    $MADR2  001354
LPERR  = 104413    OVUNDN   022200    SW8    = 000400    $DDW1   001404    $MADR3  001360
MMMDON   031126    OVUNDT   024002    SW9    = 001000    $DDW10  001426    $MADR4  001364
MMM1     030204    OVUNFN   021240    TAB    = 000011    $DDW11  001430    $MAIL   001316
MMM2     030256    OVUNFT   023040    TBITVE= 000014     $DDW12  001432    $MAMS1  001345
MMM3     030330    PIRQ   = 177772    TKVEC  = 000060    $DDW13  001434    $MAMS2  001352
MMM4     030402    PIRQVE= 000240     TOCTNM   037434    $DDW14  001436    $MAMS3  001356
MMM5     030454    POWERM   037740    TPVEC  = 000064    $DDW15  001440    $MAMS4  001362
MNUMBE=  000267    PROGNU= 000002     TRAPVE= 000034     $DDW2   001406    $MBADR  004334
MODDD0   032134    PR0    = 000000    TRTVEC= 000014     $DDW3   001410    $MFLC   036116
MODDD1   032144    PR1    = 000040    TST1     005214    $DDW4   001412    $MNEW   036557
MODDOV   031546    PR2    = 000100    TST10    017252    $DDW5   001414    $MSGAD  001332
MODDSU   027602    PR3    = 000140    TST11    020262    $DDW6   001416    $MSGLG  001334
MODDT0   030160    PR4    = 000200    TST12    021012    $DDW7   001420    $MSGTY  001316
MODDT1   030170    PR5    = 000240    TST13    021652    $DDW8   001422    $MSWR   036546
MODFD0   031106    PR6    = 000300    TST14    022612    $DDW9   001424    $MTYP1  001347
MODFD1   031116    PR7    = 000340    TST15    023454    $DEVCT  001326    $MTYP2  001353
MODFOV   030532    PS     = 177776    TST16    024416    $DEVM   001374    $MTYP3  001357
MODFSU   025504    PSW    = 177776    TST17    026074    $DISAB  033744    $MTYP4  001363
MODFT0   026042    PWRVEC= 000024     TST2     007140    $DOAGN  034034    $MXCNT  034420
MODFT1   026052    RDCHR  = 104407    TST20    030202    $ENDAD  034024    $NULL   001154
MODP1    026062    RESREG= 104411     TST21    031130    $ENDCT  033404    $NWTST= 000001
MSA1     037614    RESVEC= 000010     TST22    032156    $ENULL  034100    $OCNT   035650
MSA2     037632    RSETUP= 104412     TST23    033340    $ENV    001336    $OMODE  035652
MSA3     037655    R6     =%000006    TST3     012056    $ENVM   001337    $OVER   034404
MSA4     037667    R7     =%000007    TST4     013576    $EOP    033340    $PASS   001324
MSA5     037705    SAVREG= 104410     TST5     014604    $EOPCT  033372    $PASS2  034106
MSA6     037720    SCOPE  = 000004    TST6     015306    $ERFLG  001103    $PASTM  004340
MS1      040012    SPACE    040007    TST7     016316    $ERMAX  001115    $PURAD  037014
MS10     040211    STACK  = 001100    TYPE   = 104401    $ERROR  034426    $PURDN  036654
MS11     040233    START    004346    TYPOC  = 104402    $ERRPC  001116    $PURMG  037010
MS12     040257    STKLMT= 177774     TYPON  = 104404    $ERRTB  001442    $PURUP  036726
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SYMBOL TABLE

$QUES	001312	$REG3	001170	$TAB	040005	$TMP21	001274	$TYPEC	035266
$RDCHR	036404	$REG4	001172	$TBIT	034076	$TMP22	001276	$TYPEX	035416
$RDSZ =	000001	$REG5	001174	$TERM =	000030	$TMP23	001300	$TYPOC	035444
$REGAD	001160	$REG6	001176	$TESTN	001322	$TMP3	001240	$TYPON	035460
$REG0	001162	$REG7	001200	$TIMES	001302	$TMP4	001242	$TYPOS	035420
$REG1	001164	$RESRE	035016	$TKB	001146	$TMP5	001244	$UNIT	001330
$REG10	001202	$RTNAD	034074	$TKS	001144	$TMP6	001246	$UNITM	004342
$REG11	001204	$RTRN	034070	$TMP0	001232	$TMP7	001250	$USWR	001342
$REG12	001206	$SAVRE	034760	$TMP1	001234	$TN =	000023	$VECT1	001366
$REG13	001210	$SAVR6	037036	$TMP10	001252	$TPB	001152	$VECT2	001370
$REG14	001212	$SCOPE	034110	$TMP11	001254	$TPFLG	001157	$XOFF =	000023
$REG15	001214	$SETUP=	000137	$TMP12	001256	$TPS	001150	$XON =	000021
$REG16	001216	$STUP =	177777	$TMP13	001260	$TRAP	036570	$XTSTR	034122
$REG17	001220	$SVLAD	034350	$TMP14	001262	$TRAP2	036612	$$GET4=	000001
$REG2	001166	$SVPC =	004332	$TMP15	001264	$TRP =	000014	$OFILL	035651
$REG20	001222	$SWR =	177400	$TMP16	001266	$TRPAD	036624	.LPER	037536
$REG21	001224	$SWREG	001340	$TMP17	001270	$TSTM	004336	.RSET	037544
$REG22	001226	$SWRMK=	000000	$TMP2	001236	$TSTNM	001102	.$X =	004332
$REG23	001230	$SWRMS=	000200	$TMP20	001272	$TYPE	035054		

. ABS. 072620 000
        000000 001
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 60776 WORDS (238 PAGES)
DYNAMIC MEMORY: 20034 WORDS (77 PAGES)
ELAPSED TIME: 03:05:19
CKFPBC.BIN,CKFPBC/CR/-SP/NL:TOC=CKFPBC.MLB/ML,CKFPBC.P11