```
                .REM    &

                        IDENTIFICATION

PRODUCT CODE:   AC-F630D-ML

PRODUCT NAME:   CKFPADO FP11F FLTG PNT PRT A

DATE CREATED:   OCTOBER, 1981

MAINTAINER:     DIAGNOSTIC ENGINEERING

AUTHOR:         DAN MILLEVILLE
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HISTORY

NO CHANGES TO THE 11/34 FLOATING POINT DIAGNOSTIC 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 PART 'B' 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 PART 'C' COVER THE 11/44:

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

2. TESTS 77 THROUGH 106 - CHECK 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 A NEW SYSMAC THAT CHECKS 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 PART 'D':

THE ABILITY OF THE PROGRAM TO PRINT AN END-OF-PASS MESSAGE ONLY EVERY 1000TH PASS. EOP MESSAGES CAN BE DISABLED ALTOGETHER BY TYPING ANY KEY, AND CAN BE REENABLED BY AGAIN TYPING ANY KEY. THIS IS A PAPER-SAVING ADDITION WHEN THE DIAGNOSTIC IS TO BE RUN OVERNIGHT WITH A HARD COPY TERMINAL, NOT TO MENTION TURNING THE DIAGNOSTIC INTO A HARDWARE INTENSIVE TEST INSTEAD OF A TEST OF THE TERMINAL.

CONTENTS

1. ABSTRACT

THE THREE PROGRAMS:

CKFPADO CKFPBCO CKFPCDO

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 VERIFY 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. CKFPADO

CKFPADO 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. CKFPBCO

CKFPBCO TESTS:

- ADDF, ADDD AND SUFD (ALL CONDITIONS NOT TESTED IN CKFPADO)
- CMPD AND CMPF
- DIVD AND DIVF
- MULD AND MULF
- MODD AND MODF

C. CKFPCDO

CKFPCDO 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 DIAGNOSTICS 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.

6. ERRORS

6.1 SUMMARIES

IN PROGRAM CKFPADO 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 CKFPADO 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>=1 THIS TEST WILL BE RUN. IF SW<7>=0 THIS TEST WILL BE DESELECTED.

8.7 ACT, APT AND XXDP COMPATIBILTY

THESE PROGRAMS ARE FULLY COMPATIBLE WITH:

- APT
- ACT
- XXDP MONITOR AND CHAIN PROGRAMS.

9. PROGRAM DESCRIPTION

TEST 1 — LDFPS, STFPS AND DATA PATHS TEST

THIS IS A TEST OF THE LDFPS (LOAD FLOATING POINT STATUS) AND STFPS (STORE FLOATING POINT STATUS) INSTRUCTIONS. A COUNT PATTERN IS GENERATED AND RUN THROUGH THE FLOATING POINT STATUS REGISTER. THIS WILL TEST THE 16-BIT TRI STATE BUS WHICH CONNECTS THE CPU WITH THE FPP AND ALSO RUNS INTERNALLY WITHIN THE FPP. ONLY DM0 AND SM0 ARE USED. NOTE THAT A MASK MUST BE USED BECAUSE SOME OF THE FPS BITS CANNOT BE SET.

ONLY THE FIRST FIVE ERRORS WILL BE REPORTED INDIVIDUALLY. THIS IS TO PREVENT LOCKING OUT THE COMPLETION OF THE TEST BECAUSE OF VIRTUALLY ENDLESS NUMBER OF ERRORS. ONLY FIVE INDIVIDUAL ERRORS WILL BE REPORTED THEN THE TEST WILL BE COMPLETED AND AN ERROR SUMMARY GIVEN (SEE NOTE BELOW).

NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR' OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13) OFF, THEN THE USER WILL RECEIVE EACH INDIVIDUAL ERROR MESSAGE PLUS AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OUT WILL INHIBIT ERROR SUMMARY PRINT OUT, EXCEPT IN THE CASE DESCRIBED BELOW. TO GET JUST THE ERROR SUMMARY WITH NO INDIVIDUAL ERROR REPORTS, SET SWITCH REGISTER BIT13 AND SWITCH REGISTER BIT7 BOTH ON.

TEST 2 — CFCC TEST

THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.

TEST 3 — SETF, SETD, SETI AND SETL TEST

THIS IS A TEST OF THE SETF, SETD, SETI AND SETL INSTRUCTIONS. EACH INSTRUCTION IS EXECUTED WITH THE FPS CONTAINING ALL ONES AND ALSO WITH THE FPS CLEAR. THE RESULT OF EACH SITUATION IS CHECKED.

```
                        TEST 4          ILLEGAL FPP OP CODES AND STST TEST
                        ------          ----------------------------------

                THIS IS A TEST OF THE FPP OPERATION CODES:

                                        170003
                                        170004
                                          :
                                        170010
                                        170013
                                        170014
                                          :
                                        170077

                THESE  ARE ILLEGAL INSTRUCTIONS AND WITH  INTERRUPTS
                ENABLED  SHOULD  CAUSE  A  TRAP TO 244.  ALSO TESTED
                HERE IS THE INSTRUCTION:  STST R1, WHICH SHOULD  PUT
                THE  FEC  CODE  2  IN  R1, AFTER ANY OF THE ABOVE OP
                CODES IS EXECUTED.

                        TEST 5          FID, INTERRUPT DISABLE, BIT TEST
                        ------          --------------------------------

                THIS IS A TEST OF  FPS  BIT  14  (FID)  OR  FLOATING
                INTERRUPT   DISABLE.    AN  ILLEGAL  INSTRUCTION  IS
                EXECUTED WITH FID=1.  NO INTERRUPT SHOULD OCCUR.

                        TEST 6          LDD AND STD, WITH SRC AND DST MODE 1, TEST
                        ------          ------------------------------------------

                THIS IS A TEST OF BOTH THE INSTRUCTION:
                                LDD     (R0),AC0
                AND THE INSTRUCTION:
                                STD     AC0,(R0)        MOST OF THE
                FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS.  NOTE
                THAT THE INTEGRITY OF  AC0  HAS  NOT  BEEN  ASSURED.
                THIS  MEANS THAT IN SOME CASES IT WILL BE IMPOSSIBLE
                TO ISOLATE CERTAIN DATA PATTERN FAILURES  TO  EITHER
                THE FLOWS OR THIS ACCUMULATOR.

                        TEST 7          FSRC MODE 0 TEST
                        ------          ----------------

                THIS IS A TEST OF FSRC MODE ZERO USING THE  LDD  AND
                LDF INSTRUCTIONS.


                        TEST 10         FDST MODE 0 TEST
                        -------         ----------------

                THIS IS A TEST OF THE STORE  INSTRUCTIONS,  STD  AND
                STF, WITH FDST MODE 0.
```

TEST 11 ACCUMULATORS DATA PATTERNS TEST

THIS IS A TEST OF THE FLOATING POINT PROCESSOR ACCUMULATORS.

EACH ACCUMULATOR IS TESTED IN TWO WAYS:

1 TEST PATTERN GENERATED BY FLOATING A ONE ACROSS A FIELD OF ZEROES.

2 TEST PATTERN GENERATED BY FLOATING A ZERO ACROSS A FIELD OF ONES.

EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.

NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR' OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13) OFF, THEN THE USER WILL RECEIVE EACH INDIVIDUAL ERROR MESSAGE PLUS AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OUT WILL INHIBIT ERROR SUMMARY PRINT OUT, EXCEPT IN THE CASE DESCRIBED BELOW. TO GET JUST THE ERROR SUMMARY WITH NO INDIVIDUAL ERROR REPORTS, SET SWITCH REGISTER BIT13 AND SWITCH REGISTER BIT7 BOTH ON.

THE FOLLOWING PROCEDURE IS PRESENTED TO AID THE TROUBLE SHOOTER IN SITUATIONS WHERE AM2901 CHIP ISOLATION IS ATTEMPTED.

WARNING: THIS PROCEDURE ASSUMES THAT THE FAULT IS IN ONE OF THE AM2901 CHIPS. THIS ASSUMPTION IS NOT NECESSARILY VALID IN ALL SITUATIONS. IT REMAINS TO BE SEEN WHAT NUMBER OF FAILURES CAN PROBABLILISTICALLY ASSOCIATED WITH THEM. NOTE ALSO THAT THIS INFORMATION SHOULD NOT BE TAKEN AS ABSOLUTE, THAT IS THIS INFORMATION IS THE AUTHOR'S SUGGESTION FOR ACHIEVING ISOLATION WHEN CHIP LEVEL REPAIR IS NECESSARY.

WHEN THIS TEST HAS FINISHED RUNNING, IF ERRORS HAVE OCCURRED, AN ERROR SUMMARY WILL BE TYPED. THUS SUMMARY WILL CONSIST OF TWO IMPORTANT QUANTITIES:

A. FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'AND' ('*') OF THE FAILING DATA PATTERNS.

B. FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'OR' ('+') OF THE FAILING DATA PATTERNS.

```
542                     A BIT STUCK HIGH IN THE HARDWARE WILL SHOW UP AS A 0
543                     IN THAT BIT POSITION OF THE 'OR' OF THE FAILING DATA
544                     PATTERNS.
545
546                     A BIT STUCK LOW IN THE HARDWARE WILL SHOW UP AS A  1
547                     IN  THAT  BIT  POSITION  OF THE 'AND' OF THE FAILING
548                     DATA PATTERNS.
549
550                     THUS IF A FAILURE OCCURS:
551                             A.      STUCK HIGHS WILL SHOW AS 0'S IN  THE
552                             'OR' PATTERN.
553                             B.      STUCK LOWS WILL SHOW AS 1'S  IN  THE
554                             'AND' PATTERN.
555
556                     IF THE FAILURE IS  INTERMITTANT  THEN  THIS  PROCEDURE  WILL
557                     STILL  APPLY!!  IF THE FAILURE MOVES FROM ONE BIT TO
558                     ANOTHER, OR FROM ONE GROUP OF BITS TO ANOTHER  GROUP
559                     OF  BITS THEN THE FAULT WILL PROBABLY NOT SHOW UP IN
560                     THE 'AND' OR THE 'OR' PATTERNS;  IN  THIS  CASE  THE
561                     'AND'  PATTERN  WILL BE ALL 0'S AND THE 'OR' PATTERN
562                     WILL BE ALL 1'S.  WHEN THIS OCCURS SOME OTHER METHOD
563                     OF  REPAIR MUST BE FOUND (SUCH AS INSPECTION OF EACH
564                     INDIVIDUAL  ERROR  REPORT  RATHER  THAN  USING   THE
565                     SUMMARY).
566
567                     MAP THE FOLLOWING NOTATION ONTO EACH BIT POSITION IN
568                     THE  'AND'  AND THE 'OR' PATTERNS WHICH ARE TYPED IN
569                     THE ERROR SUMMARY.
570
571                     A15,A14,...A1,A0        B15,B14,...B1,B0
572                             C15,C14,...C1,C0        D15,D14,...C1,C0
573
574                     IN THIS NOTATION A15 THROUGH A0 IS THE FIRST OF  THE
575                     FOUR  16  BIT OCTAL NUMBERS TYPED, B15 THROUGH B0 IS
576                     THE SECOND, ETC.
577
578                     THIS TABLE SHOWS THE CORRESPONDING AM2901 CHIP  ('E'
579                     NUMBER)  WHICH  IS RESPONSIBLE FOR EACH BIT POSITION
580                     USING THE ABOVE NOTATION.  NOTE THAT  ECO'S  TO  THE
581                     HARDWARE MIGHT MAKE THIS TABLE OBSOLETE IF IT IS NOT
582                     UP DATED.  NOTE ALSO THAT THERE ARE  FOUR  BITS  FOR
583                     EACH AM2901 CHIP:
```

BITS	AM2901 CHIP NUMBER
A15,A14,A13,A12	E37
A11,A10,A9,A8	E45
A7,A6,A5,A4	E34
A3,A2,A1,A0	E42
B15,B14,B13,B12	E33
B11,B10,B9,B8	E41
B7,B6,B5,B4	E36
B3,B2,B1,B0	E44
C15,C14,C13,C12	E35
C11,C10,C9,C8	E43
C7,C6,C5,C4	E38
C3,C2,C1,C0	E46
D15,D14,D13,D12	E39
D11,D10,D9,D8	E47
D7,D6,D5,D4	E40
D3,D2,D1,D0	E48

NOW FIVE IMPORTANT CASES WHICH WILL ARRISE WHEN A FAULTY AM2901 IS PRESENT CAN BE DESCRIBED:

1.) IF ONLY ONE BIT OF THE 64 BITS IS INCORRECT THE CHIP INDICATED IN THE ABOVE TABLE IS MOST PROBABLY AT FAULT. BUT IF THAT CHIP IS REPLACED AND THE ERROR PERSISTS THEN SUPPOSE THAT BIT IS,

LN   WHERE 'L' IS A, B, C OR D
      AND N IS 15, 14, ... OR 0

THEN IN GENERAL ANY OF THE FOUR CHIPS RESPONSIBLE FOR AN, BN, CN OR DN COULD BE AT FAULT, WITH LN BEING MOST PROBABLE.

FOR EXAMPLE IF BIT C12 IS FAULTY, THEN CHIP E79 IS THE MOST PROBABLE SOURCE OF THE ERROR. IF REPAIRING THAT CHIP DOES NOT REMOVE THE FAULT THEN TRY EACH OF THE CHIPS ASSOCIATED WITH BITS A12, B12 AND D12 SHOULD BE TRIED WITH EQUAL PROBABILITY OF THE FAULT BEING IN ANY ONE OF THESE OTHER THREE CHIPS. TRY CHIPS E61, E86 AND E78.

```
                        2.)     IF THERE ARE FOUR CONSECUTIVE BITS IN ERROR,
                                FOLLOWING THE PATTERN:

                                LN, LN+1, LN+2 AND LN+3     WHERE 'L' IS A, B, C OR D
                                                            N=0, 4, 8 OR 12

                                THEN THE ABOVE TABLE SHOULD DIRECTLY
                                IDENTIFY THE FAILING CHIP.

                        3.)     IF FOUR BITS ARE DROPPED WHICH FIT THE
                                PATTERN:

                                AN, BN, CN AND DN       WHERE N=15, 14, ... OR 0
                                OR 0

                                THEN ANY ONE OF THE FOUR CHIPS ASSOCIATED
                                WITH EACH OF THE BITS AN, BN, CN AND DN
                                COULD BE AT FAULT WITH EQUAL PROBABILITY.

                        4.)     IF 16 BITS ARE IN ERROR, FITTING THE
                                PATTERN:

                                AN, AN+1, AN+2, AN+3    WHERE N=0, 4, 8 OR 12
                                BN, BN+1, BN+2, BN+3
                                CN, CN+1, CN+2, CN+3
                                        AND
                                DN, DN+1, DN+2, AN+3

                                THEN ANY ONE OF THE FOUR CHIPS ASSOCIATED
                                WITH THESE BITS COULD BE AT FAULT WITH EQUAL
                                PROBABILITY.

                        5.)     IF THE FAILING BIT PATTERNS DISPLAYED IN THE
                                'AND' AND THE 'OR' DATA TYPED IN THE SUMMARY
                                DOES NOT CONFORM EXPLICITELY TO ANY OF THE
                                ABOVE PATTERNS, THEN THE TROUBLE SHOOTER
                                MUST INTUITIVELY TRY TO FIND WHICH OF THE
                                ABOVE CASES (1 THROUGH 4) IS A 'BEST FIT' OF
                                THE SYMPTOMS.

TEST 12         FPP ACCUMULATORS DUAL ADDRESS TEST
-------         ----------------------------------

        THIS TEST PERFORMS A DUAL ADDRESSING TEST ON THE
        FLOATING ACCUMULATORS.  NOTE THAT ACCUMULATOR ZERO
        IS USED TO ACCESS ALL THE OTHERS.

TEST 13         FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
-------         -----------------------------------------

        THIS IS A TEST OF FSRC MODE 0 WITH ACCUMULATORS 6
        AND 7.  USE OF EITHER OF THESE NON-EXISTENT
        ACCUMULATORS SHOULD RESULT IN A TRAP TO 244 WITH
        FEC=2 (ILLEGAL FPP INSTRUCTION).
```

```
                TEST 14         FSRC MODE 2 TEST
                -------         ----------------

                        THIS IS A TEST OF FSRC MODE 2, AUTO INCREMENT MODE.

                TEST 15         FSRC MODE 4 TEST
                -------         ----------------

                        THIS IS A TEST OF FSRC MODE 4, AUTO DECREMENT MODE.

                TEST 16         FSRC MODE 2, WITH FD=0, TEST
                -------         ----------------------------

                        THIS IS A TEST OF FSRC  MODE  2  WITH  FD=0.   (AUTO
                        INCREMENT)

                TEST 17         FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
                -------         ------------------------------------------

                        THIS IS A TEST OF FSRC MODE 2 USING  GR7  (THE  PC).
                        THIS IS IMMEDIATE MODE.

                TEST 20         FSRC MODE 3 TEST
                -------         ----------------

                        THIS IS A  TEST  OF  FSRC  MODE  3,  AUTO  INCREMENT
                        DEFERRED

                TEST 21         FSRC MODE 5 TEST
                -------         ----------------

                        THIS IS A  TEST  OF  FSRC  MODE  5,  AUTO  DECREMENT
                        DEFERRED.

                TEST 22         FSRC MODE 6 TEST
                -------         ----------------

                        THIS IS A TEST OF FSRC MODE 6, INDEX MODE

                TEST 23         FSRC MODE 7 TEST
                -------         ----------------

                        THIS IS A TEST OF FSRC MODE 7, INDEX DEFERRED MODE.
```

```
                TEST 24         (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
                -------         --------------------------------------------

        THIS IS A TEST OF THE (BUT EZBT Y8) FORK, THE (BUT
        ENBT) FORK AND (BUT FIUV) FORK IN THE LOAD
        INSTRUCTION FLOWS.
        EACH OF THE PATTERNS:

                        0
                        +NUM
                        -NUM
                        -0

        IS LOADED TWICE, ONCE WITH AC>0 THEN WITH AC=0.
       AFTER EACH LOAD THE FPS IS CHECK TO INSURE THAT
        CONTROL WAS PASSED THROUGH WITH THE FORKS PROPERLY.

                TEST 25         ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
                -------         -------------------------------------------

        THIS IS A TEST OF ADD AND SUB WITH FSRC=AC=0

                TEST 26         ADDD AND SUB WITH FSRC=0
                -------         ------------------------

        THIS IS A TEST OF ADD AND SUB WITH FSRC=0.

                TEST 27         SUBD WITH AC=0 TEST
                -------         -------------------

        THIS IS A TEST OF SUBD WITH AC=0.  BOTH POSITIVE AND
        NEGATIVE FSRC'S ARE TRIED.

                TEST 30         ADDD WITH AC=0 TEST
                -------         -------------------

        POSITIVE AND NEGATIVE FSRC'S ARE TRIED.

                TEST 31         ADDF AND ADDD WITH E(AC)=E(FSRC) AND (BUT FT) TEST
                -------         ---------------------------------------------------

        THIS IS A TEST OF THE ADD INSTRUCTION WITH THE
        OPERANDS HAVING EQUAL EXPONENTS.  THE (BUF FT) FORK
        IN THE ROUND/TRUNK FLOWS IS ALSO TESTED.

                TEST 32         ADDF AND ADDD WITH E(AC) LESS THAN E(FSRC) TEST
                -------         ---------------------------------------------

        THIS IS ATEST OF THE ADDD AND ADDF INSTRUCTIONS AND
        THE ALIGN AC ALGORITHM FLOWS.  THE CONSTANT (25 FOR
        FLOATING, 57 FOR DOUBLE) USED IS CHECKED.  THEN
        SIMPLE AND WORST CASE ALIGNMENT SITUATIONS ARE
        TRIED.  NOTE E(AC) IS LESS THEN E(FSRC)
```

```
TEST 33         ADDF AND ADDD WITH E(AC) GRFATER THAN E(FSRC) TEST
-------         ---------------------------------------------------

                THIS IS A TEST OF THE ADDD AND ADDF INSTRUCTIONS AND
                THE  ALIGN FSRC ALGORITHM FLOWS.  FIRST THE CONSTANT
                USED  IS  CHECKED.   THEN  SIMPLE  AND  WORST   CASE
                ALIGNMENT  SITUATIONS  ARE  TRIED.   NOTE  E(AC)  IS
                GREATER THAN E(FSRC).

TEST 34         ADDD WITH NEGATVE OPRANDS TEST
-------         ------------------------------

                THIS IS A TEST OF THE ADDD INSTRUCTION WITH NEGATIVE
                OPERANDS.  EVERY  COMBINATION  OF  OPERAND SIGNS IS
                TRIED.

TEST 35         SUBD TEST
-------         ---------

                THIS IS A TEST OF  THE  SUBD  INSTRUCTION.   BOTH  A
                POSITIVE AND A NEGATIVE NUMBER IS SUBTRACTED FROM IT
                SELF

TEST 36         NORMALIZE ALGORITHM TEST
-------         ------------------------

                THIS IS A TEST OF THE NORMALIZE FLOW ALGORITHM.  TWO
                PATTERNS  ARE  USED,  FIRST  THE  MINIMUM  SITUATION
                REQUIRING  ONE  LEFT  SHIFT  AND  THEN  THE  MAXIMUM
                SITUATION REQUIRING 56 SHIFTS.
```

```
                        10.                     LISTING
                                                -------

                        &
        000214          MNUMBER=214
        000001          PROGNUM=1
                        .LIST   ME
                        .NLIST  MD,MC,CND
                        ;#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*
                        ;#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*#*


                        ;******************** .$EOP ********************
                        ;
                        ;.$EOP IS USED TO HANDLE THE END OF A PASS
                        ;
                        ;ARGUMENTS ARE:
                        ;
                        ;1)  ADR --      WILL RETURN TO ADR IF NON-BLANK
                        ;                WILL RETURN TO 200 IF BLANK
                        ;
                        ;2)  NUM --      SPECIFIES THE NUMBER OF PROGRAM PASSES
                        ;                BEFORE INDICATING AN END OF PROGRAM
                        ;                NOTE: IF BLANK IT DEFAULTS TO 1
                        ;
                        ;3)  OPTION --   SPECIFIES HOW THE END OF PROGRAM IS TO BE INDICATED.
                        ;                THE AVAILABLE ARGUMENTS AND THEIR INDICATIONS ARE:
                        ;                1) BELL         RING TTY BELL
                        ;                2) END          TYPE "END PASS"
                        ;                3) PASCNT       TYPE "END PASS #XXXXX"
                        ;                                WHERE XXXXX IS A DECIMAL NUMBER
                        ;                4) ENDPAS       IS THE NAME OF A MACRO THAT
                        ;                                MUST BE DEFINED IN THE USERS
                        ;                                PROGRAM
                        ;                5) REPORT       TYPE "END PASS #XXXXX TOTAL ERRORS
                        ;                                SINCE LAST REPORT YYYYY"
                        ;                                WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
                        ;
                        ;                THE DEFAULT IS NO INDICATION
                        ;
                        ;4)  INSTR1 --   THIS WILL BE THE FIRST INSTRUCTION IF NON-BLANK
                        ;                SCOPE WILL BE THE FIRST INSTRUCTION IF BLANK
                        ;
                        ;5)  INSTR2 --   THIS ARGUMENT ALLOWS CODE TO BE INSERTED BETWEEN
                        ;                THE TESTING OF LOCATION "42" AND THE "RESET"
                        ;                INSTRUCTION IMMEDIATELY PRECEEDING THE "XXDP" OR "ACT11"
                        ;                RETURN LINKAGE.
                        ;                NOTE: CAN BE A MACRO
                        ;
                        ;NOTE:  THIS ROUTINE IS CONDITIONALLY ASSEMBLED BY $SWR FOR SWR<12>
                        ;
                        ;ROUTINES REQUIRED:
                        ;
                        ;1)     TYPE AN ASCIZ STRING (.$TYPE) DEPENDING ON $SWR
                        ;
                        ;2)     CHANGE BINARY TO DECIMAL AND TYPE (.$TYPDEC).
                        ;       ONLY REQUIRED WHEN "OPTION" IS DEFINED AS "PASCNT"
                        ;       OR "REPORT"
```

```
 950                                    ;
 951                                    ;*************************************************
1771 000000                             .ENABL  ABS
1772                                            .MCALL  .HEADER,.SWRHI,.EQUAT,.SETUP,.$CATCH,.$ACT11,.$CMTAG
1773                                            .MCALL  .$TYPE,.$SAVE
1774                                            .MCALL  .$TYPDEC,.$TRAP,.$POWER,.$APTHDR,.$APTBLS
1775                                            .MCALL  .$APTYPE,.$READ
1776                                            .MCALL  .EQUIV                  ;*REMOVE FOR ASSEMBLY ON PDP-10
1777                                    .TITLE  CKFPADO FP11F FLTG PNT PRT A
                                        ;*COPYRIGHT (C) 1981
                                        ;*DIGITAL EQUIPMENT CORP.
                                        ;*MAYNARD, MASS. ^1754
                                        ;*
                                        ;*
                                        ;*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
1778        000244                      FPVECT=244
1779        177400                      $SWR=177400
1780        000200                      $SWRMSK=200
1781        000011                      TAB=11
1782        000015                      CRLF=15
1783                                    .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
            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
```

BASIC DEFINITIONS

```
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
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
1784                                    .SBTTL  FPP REGISTER DEFINITIONS
1785        000000              AC0     =%0
1786        000001              AC1     =%1
1787        000002              AC2     =%2
1788        000003              AC3     =%3
1789        000004              AC4     =%4
1790        000005              AC5     =%5
1791        000006              AC6     =%6
1792        000007              AC7     =%7
1794                            .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  003616              JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
```

```
1795                                    .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)
```

```
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
001311     000
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:
```

```
                                        .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:
1802 001442  045352  065631  072314             .WORD   EM1,DH1,DT1,DF1         ;ERROR ITEM # 1
     001452  045407  065721  072336             .WORD   EM2,DH2,DT2,DF2         ;ERROR ITEM # 2
     001462  045453  066014  072360             .WORD   EM3,DH3,DT3,DF3         ;ERROR ITEM # 3
     001472  045520  066105  072360             .WORD   EM4,DH4,DT4,DF4         ;ERROR ITEM # 4
     001502  045560  066201  072402             .WORD   EM5,DH5,DT5,DF5         ;ERROR ITEM # 5
     001512  045614  066201  072434             .WORD   EM6,DH6,DT6,DF6         ;ERROR ITEM # 6
     001522  045646  066201  072434             .WORD   EM7,DH7,DT7,DF7         ;ERROR ITEM # 7
     001532  045560  066201  072434             .WORD   EM10,DH10,DT10,DF10     ;ERROR ITEM # 10
     001542  045701  066201  072434             .WORD   EM11,DH11,DT11,DF11     ;ERROR ITEM # 11
     001552  000000  000000  072456             .WORD   EM12,DH12,DT12,DF12     ;ERROR ITEM # 12
     001562  000000  000000  072544             .WORD   EM13,DH13,DT13,DF13     ;ERROR ITEM # 13
     001572  045762  066201  072434             .WORD   EM14,DH14,DT14,DF14     ;ERROR ITEM # 14
     001602  046105  066201  072434             .WORD   EM15,DH15,DT15,DF15     ;ERROR ITEM # 15
     001612  046230  066241  072576             .WORD   EM16,DH16,DT16,DF16     ;ERROR ITEM # 16
     001622  046301  066321  072360             .WORD   EM17,DH17,DT17,DF17     ;ERROR ITEM # 17
     001632  046534  066411  072616             .WORD   EM20,DH20,DT20,DF20     ;ERROR ITEM # 20
     001642  046712  066201  072640             .WORD   EM21,DH21,DT21,DF21     ;ERROR ITEM # 21
     001652  047043  066477  072652             .WORD   EM22,DH22,DT22,DF22     ;ERROR ITEM # 22
     001662  047043  066534  072700             .WORD   EM23,DH23,DT23,DF23     ;ERROR ITEM # 23
     001672  047043  066672  072722             .WORD   EM24,DH24,DT24,DF24     ;ERROR ITEM # 24
     001702  047130  067031  072746             .WORD   EM25,DH25,DT25,DF25     ;ERROR ITEM # 25
     001712  047243  067073  073016             .WORD   EM26,DH26,DT26,DF26     ;ERROR ITEM # 26
     001722  047243  067073  073072             .WORD   EM27,DH27,DT27,DF27     ;ERROR ITEM # 27
     001732  047311  000000  073134             .WORD   EM30,DH30,DT30,DF30     ;ERROR ITEM # 30
     001742  047363  067073  073016             .WORD   EM31,DH31,DT31,DF31     ;ERROR ITEM # 31
     001752  047363  067073  073072             .WORD   EM32,DH32,DT32,DF32     ;ERROR ITEM # 32
     001762  047431  067161  073166             .WORD   EM33,DH33,DT33,DF33     ;ERROR ITEM # 33
     001772  047472  067161  073244             .WORD   EM34,DH34,DT34,DF34     ;ERROR ITEM # 34
     002002  047574  067161  073244             .WORD   EM35,DH35,DT35,DF35     ;ERROR ITEM # 35
     002012  047676  067161  073244             .WORD   EM36,DH36,DT36,DF36     ;ERROR ITEM # 36
     002022  047777  067161  073244             .WORD   EM37,DH37,DT37,DF37     ;ERROR ITEM # 37
     002032  050100  067161  073166             .WORD   EM40,DH40,DT40,DF40     ;ERROR ITEM # 40
     002042  050251  000000  073316             .WORD   EM41,DH41,DT41,DF41     ;ERROR ITEM # 41
     002052  050306  067264  073350             .WORD   EM42,DH42,DT42,DF42     ;ERROR ITEM # 42
     002062  050427  067264  073350             .WORD   EM43,DH43,DT43,DF43     ;ERROR ITEM # 43
     002072  050550  000000  073426             .WORD   EM44,DH44,DT44,DF44     ;ERROR ITEM # 44
     002102  050550  067366  073476             .WORD   EM45,DH45,DT45,DF45     ;ERROR ITEM # 45
     002112  050613  067405  073552             .WORD   EM46,DH46,DT46,DF46     ;ERROR ITEM # 46
     002122  050671  067366  073640             .WORD   EM47,DH47,DT47,DF47     ;ERROR ITEM # 47
     002132  051007  067431  073244             .WORD   EM50,DH50,DT50,DF50     ;ERROR ITEM # 50
     002142  051105  067431  073672             .WORD   EM51,DH51,DT51,DF51     ;ERROR ITEM # 51
     002152  051146  066201  073640             .WORD   EM52,DH52,DT52,DF52     ;ERROR ITEM # 52
     002162  051267  067073  073730             .WORD   EM53,DH53,DT53,DF53     ;ERROR ITEM # 53
     002172  051464  067503  073750             .WORD   EM54,DH54,DT54,DF54     ;ERROR ITEM # 54
     002202  051530  066201  073640             .WORD   EM55,DH55,DT55,DF55     ;ERROR ITEM # 55
     002212  051651  067073  073730             .WORD   EM56,DH56,DT56,DF56     ;ERROR ITEM # 56
```

ERROR POINTER TABLE

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002222  052046  067503  073750          .WORD   EM57,DH57,DT57,DF57         ;ERROR ITEM # 57
002232  052112  067073  073730          .WORD   EM60,DH60,DT60,DF60         ;ERROR ITEM # 60
002242  052307  067503  073750          .WORD   EM61,DH61,DT61,DF61         ;ERROR ITEM # 61
002252  052353  067503  073750          .WORD   EM62,DH62,DT62,DF62         ;ERROR ITEM # 62
002262  052545  067503  073750          .WORD   EM63,DH63,DT63,DF63         ;ERROR ITEM # 63
002272  052737  067613  074006          .WORD   EM64,DH64,DT64,DF64         ;ERROR ITEM # 64
002302  052737  067544  074006          .WORD   EM65,DH65,DT65,DF65         ;ERROR ITEM # 65
002312  053073  067503  073750          .WORD   EM66,DH66,DT66,DF66         ;ERROR ITEM # 66
002322  053136  066201  072640          .WORD   EM67,DH67,DT67,DF67         ;ERROR ITEM # 67
002332  053367  066201  074026          .WORD   EM70,DH70,DT70,DF70         ;ERROR ITEM # 70
002342  053512  067031  074026          .WORD   EM71,DH71,DT71,DF71         ;ERROR ITEM # 71
002352  053614  067073  074074          .WORD   EM72,DH72,DT72,DF72         ;ERROR ITEM # 72
002362  053670  067503  073750          .WORD   EM73,DH73,DT73,DF73         ;ERROR ITEM # 73
002372  053730  066201  072640          .WORD   EM74,DH74,DT74,DF74         ;ERROR ITEM # 74
002402  054161  066201  074026          .WORD   EM75,DH75,DT75,DF75         ;ERROR ITEM # 75
002412  054304  067031  074026          .WORD   EM76,DH76,DT76,DF76         ;ERROR ITEM # 76
002422  054406  067073  074074          .WORD   EM77,DH77,DT77,DF77         ;ERROR ITEM # 77
002432  054462  067503  073750          .WORD   EM100,DH100,DT100,DF100             ;ERROR ITEM # 100
002442  054522  066201  074026          .WORD   EM101,DH101,DT101,DF101             ;ERROR ITEM # 101
002452  054646  067073  074026          .WORD   EM102,DH102,DT102,DF102             ;ERROR ITEM # 102
002462  054720  067031  074026          .WORD   EM103,DH103,DT103,DF103             ;ERROR ITEM # 103
002472  055023  067503  073750          .WORD   EM104,DH104,DT104,DF104             ;ERROR ITEM # 104
002502  055064  066201  074026          .WORD   EM105,DH105,DT105,DF105             ;ERROR ITEM # 105
002512  055211  067073  074074          .WORD   EM106,DH106,DT106,DF106             ;ERROR ITEM # 106
002522  055264  067031  074026          .WORD   EM107,DH107,DT107,DF107             ;ERROR ITEM # 107
002532  055370  067503  073750          .WORD   EM110,DH110,DT110,DF110             ;ERROR ITEM # 110
002542  055432  067031  074114          .WORD   EM111,DH111,DT111,DF111             ;ERROR ITEM # 111
002552  055432  067701  074114          .WORD   EM112,DH112,DT112,DF112             ;ERROR ITEM # 112
002562  055534  067031  074114          .WORD   EM113,DH113,DT113,DF113             ;ERROR ITEM # 113
002572  055534  067701  074114          .WORD   EM114,DH114,DT114,DF114             ;ERROR ITEM # 114
002602  055432  070120  074114          .WORD   EM115,DH115,DT115,DF115             ;ERROR ITEM # 115
002612  055534  070120  074114          .WORD   EM116,DH116,DT116,DF116             ;ERROR ITEM # 116
002622  055636  066321  072360          .WORD   EM117,DH117,DT117,DF117             ;ERROR ITEM # 117
002632  055772  070404  072360          .WORD   EM120,DH120,DT120,DF120             ;ERROR ITEM # 120
002642  056126  066201  073640          .WORD   EM121,DH121,DT121,DF121             ;ERROR ITEM # 121
002652  056245  067431  073244          .WORD   EM122,DH122,DT122,DF122             ;ERROR ITEM # 122
002662  056344  067431  073672          .WORD   EM123,DH123,DT123,DF123             ;ERROR ITEM # 123
002672  056405  066321  074126          .WORD   EM124,DH124,DT124,DF124             ;ERROR ITEM # 124
002702  056500  066321  074126          .WORD   EM125,DH125,DT125,DF125             ;ERROR ITEM # 125
002712  056570  066201  074114          .WORD   EM126,DH126,DT126,DF126             ;ERROR ITEM # 126
002722  056777  067503  074114          .WORD   EM127,DH127,DT127,DF127             ;ERROR ITEM # 127
002732  057212  070404  072360          .WORD   EM130,DH130,DT130,DF130             ;ERROR ITEM # 130
002742  057312  067503  074212          .WORD   EM131,DH131,DT131,DF131             ;ERROR ITEM # 131
002752  057352  067503  074212          .WORD   EM132,DH132,DT132,DF132             ;ERROR ITEM # 132
002762  057412  070474  074254          .WORD   EM133,DH133,DT133,DF133             ;ERROR ITEM # 133
002772  057451  070474  074254          .WORD   EM134,DH134,DT134,DF134             ;ERROR ITEM # 134
003002  057510  070474  074254          .WORD   EM135,DH135,DT135,DF135             ;ERROR ITEM # 135
003012  057547  070474  074254          .WORD   EM136,DH136,DT136,DF136             ;ERROR ITEM # 136
003022  057412  070604  074326          .WORD   EM137,DH137,DT137,DF137             ;ERROR ITEM # 137
003032  057451  070604  074326          .WORD   EM140,DH140,DT140,DF140             ;ERROR ITEM # 140
003042  057510  070604  074326          .WORD   EM141,DH141,DT141,DF141             ;ERROR ITEM # 141
003052  057547  070604  074326          .WORD   EM142,DH142,DT142,DF142             ;ERROR ITEM # 142
003062  057606  070474  074254          .WORD   EM143,DH143,DT143,DF143             ;ERROR ITEM # 143
003072  057641  070474  074254          .WORD   EM144,DH144,DT144,DF144             ;ERROR ITEM # 144
003102  057606  070604  074326          .WORD   EM145,DH145,DT145,DF145             ;ERROR ITEM # 145
003112  057641  070604  074326          .WORD   EM146,DH146,DT146,DF146             ;ERROR ITEM # 146
003122  057674  067503  074254          .WORD   EM147,DH147,DT147,DF147             ;ERROR ITEM # 147
```

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003132  057674  070774  074254          .WORD   EM150,DH150,DT150,DF150           ;ERROR ITEM # 150
003142  057674  070604  074326          .WORD   EM151,DH151,DT151,DF151           ;ERROR ITEM # 151
003152  057726  070474  074254          .WORD   EM152,DH152,DT152,DF152           ;ERROR ITEM # 152
003162  057726  070604  074326          .WORD   EM153,DH153,DT153,DF153           ;ERROR ITEM # 153
003172  057760  071065  074346          .WORD   EM154,DH154,DT154,DF154           ;ERROR ITEM # 154
003202  060212  071065  074346          .WORD   EM155,DH155,DT155,DF155           ;ERROR ITEM # 155
003212  060445  067503  074254          .WORD   EM156,DH156,DT156,DF156           ;ERROR ITEM # 156
003222  060662  067503  074254          .WORD   EM157,DH157,DT157,DF157           ;ERROR ITEM # 157
003232  061101  067503  074254          .WORD   EM160,DH160,DT160,DF160           ;ERROR ITEM # 160
003242  061306  067503  074254          .WORD   EM161,DH161,DT161,DF161           ;ERROR ITEM # 161
003252  061513  067503  074254          .WORD   EM162,DH162,DT162,DF162           ;ERROR ITEM # 162
003262  061560  067503  074254          .WORD   EM163,DH163,DT163,DF163           ;ERROR ITEM # 163
003272  061625  066321  072360          .WORD   EM164,DH164,DT164,DF164           ;ERROR ITEM # 164
003302  061672  066321  072360          .WORD   EM165,DH165,DT165,DF165           ;ERROR ITEM # 165
003312  061737  067503  074254          .WORD   EM166,DH166,DT166,DF166           ;ERROR ITEM # 166
003322  062047  067503  074254          .WORD   EM167,DH167,DT167,DF167           ;ERROR ITEM # 167
003332  062306  067503  074254          .WORD   EM170,DH170,DT170,DF170           ;ERROR ITEM # 170
003342  062416  067503  074254          .WORD   EM171,DH171,DT171,DF171           ;ERROR ITEM # 171
003352  062655  067503  074254          .WORD   EM172,DH172,DT172,DF172           ;ERROR ITEM # 172
003362  063114  067503  074254          .WORD   EM173,DH173,DT173,DF173           ;ERROR ITEM # 173
003372  063353  067503  074254          .WORD   EM174,DH174,DT174,DF174           ;ERROR ITEM # 174
003402  063612  067503  074254          .WORD   EM175,DH175,DT175,DF175           ;ERROR ITEM # 175
003412  064051  067503  074254          .WORD   EM176,DH176,DT176,DF176           ;ERROR ITEM # 176
003422  064206  071125  074360          .WORD   EM177,DH177,DT177,DF177           ;ERROR ITEM # 177
003432  064242  067503  074254          .WORD   EM200,DH200,DT200,DF200           ;ERROR ITEM # 200
003442  064377  067503  074254          .WORD   EM201,DH201,DT201,DF201           ;ERROR ITEM # 201
003452  064534  067503  074254          .WORD   EM202,DH202,DT202,DF202           ;ERROR ITEM # 202
003462  064671  067503  074254          .WORD   EM203,DH203,DT203,DF203           ;ERROR ITEM # 203
003472  065026  067503  074254          .WORD   EM204,DH204,DT204,DF204           ;ERROR ITEM # 204
003502  065163  066321  072360          .WORD   EM205,DH205,DT205,DF205           ;ERROR ITEM # 205
003512  065230  067503  074254          .WORD   EM206,DH206,DT206,DF206           ;ERROR ITEM # 206
003522  065275  067503  074254          .WORD   EM207,DH207,DT207,DF207           ;ERROR ITEM # 207
003532  065417  067503  074254          .WORD   EM210,DH210,DT210,DF210           ;ERROR ITEM # 210
003542  045560  071171  074370          .WORD   EM211,DH211,DT211,DF211           ;ERROR ITEM # 211
003552  045614  066201  074406          .WORD   EM212,DH212,DT212,DF212           ;ERROR ITEM # 212
003562  045646  066201  074406          .WORD   EM213,DH213,DT213,DF213           ;ERROR ITEM # 213
003572  065474  067503  074254          .WORD   EM214,DH214,DT214,DF214           ;ERROR ITEM # 214
```

```
1806                                    .SBTTL  ACT11 HOOKS
                                        ;;*****************************************************************
                                        ;HOOKS REQUIRED BY ACT11
                003602                          $SVPC=.                 ;SAVE PC
                000046                          .=46
000046          036432                          $ENDAD                  ;.1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                000052                          .=52
000052          000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
                003602                          .=$SVPC                 ;; RESTORE PC
```

```
'808                                    .SBTTL  APT PARAMETER BLOCK
                                        ;;*****************************************************************
                                        ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                        ;;*****************************************************************
            003602                              .$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 003602                              $APTHDR ;;POINT TO APT HEADER BLOCK
            003602                              .=.$X   ;;RESET LOCATION COUNTER
                                        ;;*****************************************************************
                                        ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                        ;INTERFACE SPEC.
     003602                             $APTHD:
     003602 000000                      $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
     003604 001316                      $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
     003606 000010                      $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
     003610 000040                      $PASTM: .WORD   40      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
     003612 000000                      $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
     003614 000052                              .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                                .SBTTL  INITIALIZE THE COMMON TAGS
003616                          START:
                                .SBTTL  INITIALIZE THE COMMON TAGS
                                ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
003616  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
003622  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
003624  022706  001140                  CMP     #SWR,R6 ;;DONE?
003630  001374                          BNE     .-6             ;;LOOP BACK IF NO
003632  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                ;;INITIALIZE A FEW VECTORS
003636  012737  036516  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
003644  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
003652  012737  037146  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
003660  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
003666  012737  041540  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
003674  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
003702  012737  041624  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
003710  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
003716  013737  036124  036112          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
003724  005037  001302                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
003730  005037  001304                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
003734  112737  000001  001115          MOVB    #1,$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".
003742  012737  036476  000014          MOV     #$RTRN,@#TBITVEC ;;SET "T" BIT VECTOR TO $RTRN
003750  012737  000340  000016          MOV     #340,@#TBITVEC+2 ;;LEVEL 7
003756  012737  000002  036476          MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
003764  012737  004012  000010          MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
003772  005046                          CLR     -(SP)           ;;DUMMY PS
003774  012746  004002                  MOV     #64$,-(SP)      ;;AND PC
004000  000006                          RTT                     ;;TRY THE RTT
004002  012737  000006  036476  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
004010  000402                          BR      66$
004012  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
004016  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
004024  005037  036504                  CLR     $TBIT           ;;CLEAR "T" BIT SWITCH
004030  012737  004030  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
004036  012737  004036  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
004044  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
004050  012737  004104  000004          MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
004056  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
004064  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
004072  022777  177777  175040          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
004100  001012                          BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                ;;AND  THE HARDWARE SWR IS NOT = -1
004102  000403                          BR      68$             ;;BRANCH IF NO TIMEOUT
004104  012716  004112          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
004110  000002                          RTI
004112  012737  000176  001140  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
004120  012737  000174  001142          MOV     #DISPREG,DISPLAY
004126  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
004132  005037  001324                  CLR     $PASS           ;;CLEAR PASS COUNT
004136  132737  000200  001337          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
004144  001403                          BEQ     70$             ;;YES,USE NON-APT SWITCH
004146  012737  001340  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
```

```
      004154                           70$:
1812                                   .SBTTL  TYPE PROGRAM NAME
                                       ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
      004154  005227  177777                   INC     #-1                ;;FIRST TIME?
      004160  001047                           BNE     71$                ;;BRANCH IF NO
      004162  022737  036432  000042           CMP     #$ENDAD,@#42       ;;ACT-11?
      004170  001443                           BEQ     71$                ;;BRANCH IF YES
      004172  104401  004240                   TYPE    ,72$               ;;TYPE ASCIZ STRING
                                       .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
      004176  005737  000042                   TST     @#42               ;;ARE WE RUNNING UNDER XXDP/ACT?
      004202  001012                           BNE     73$                ;;BRANCH IF YES
      004204  123727  001336  000001           CMPB    $ENV,#1            ;;ARE WE RUNNING UNDER APT?
      004212  001406                           BEQ     73$                ;;BRANCH IF YES
      004214  023727  001140  000176           CMP     SWR,#SWREG         ;;SOFTWARE SWITCH REG SELECTED?
      004222  001005                           BNE     74$                ;;BRANCH IF NO
      004224  104406                           GTSWR                      ;;GET SOFT-SWR SETTINGS
      004226  000403                           BR      74$
      004230  112737  000001  001134   73$:    MOVB    #1,$AUTOB          ;;SET AUTO-MODE INDICATOR
      004236                           74$:
      004236  000420                           BR      71$                ;;GET OVER THE ASCIZ
                                       ;;72$:   .ASCIZ  <CRLF>*CKFPADO FP11F FLTG PNT PRT A*<CRLF>
      004300                           71$:
1813  004300  104401  004306                   TYPE    ,76$               ;;TYPE ASCIZ STRING
      004304  000431                           BR      75$                ;;GET OVER THE ASCIZ
                                       ;;76$:   .ASCIZ  'EOP MSGS WILL PRINT EVERY 4 PASSES (15 SECONDS)'<CRLF>
      004370                           75$:
1814  004370  104401  004376                   TYPE    ,78$               ;;TYPE ASCIZ STRING
      004374  000426                           BR      77$                ;;GET OVER THE ASCIZ
                                       ;;78$:   .ASCIZ  !HIT ANY KEY TO DISABLE/ENABLE EOP MESSAGES.<CRLF>
      004452                           77$:
1815  004452  005037  036512                   CLR     EPENDS             ;CLR THE ENABLE/DISABLE EOP FLAG        ;DPM002
1816  004456                           LOOP:
```

```
1835                                    .SBTTL  TEST # 1 - LDFPS, STFPS AND DATA PATHS TEST
                                        ;**************************************************************
                                        ;*TEST 1        LDFPS, STFPS AND DATA PATHS TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE LDFPS (LOAD FLOATING POINT STATUS) AND STFPS
                                        ;*(STORE FLOATING POINT STATUS) INSTRUCTIONS. A COUNT PATTERN IS GENERATED
                                        ;*AND RUN THROUGH THE FLOATING POINT STATUS REGISTER.
                                        ;*THIS WILL TEST THE 16-BIT TRI STATE BUS WHICH CONNECTS THE CPU
                                        ;*WITH THE FPP AND ALSO RUNS INTERNALLY WITHIN THE FPP. ONLY DMO AND
                                        ;*SMO ARE USED.
                                        ;*NOTE THAT A MASK MUST BE USED BECAUSE SOME OF THE FPS BITS CANNOT
                                        ;*BE SET.
                                        ;*
                                        ;*ONLY THE FIRST FIVE ERRORS WILL BE REPORTED INDIVIDUALLY.
                                        ;*THIS IS TO PREVENT LOCKING OUT THE COMPLETION OF THE TEST BECAUSE
                                        ;*OF VIRTUALLY ENDLESS NUMBER OF ERRORS. ONLY FIVE INDIVIDUAL ERRORS
                                        ;*WILL BE REPORTED THEN THE TEST WILL BE COMPLETED AND AN ERROR
                                        ;*SUMMARY GIVEN (SEE NOTE BELOW).
                                        ;*
                                        ;*NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR'
                                        ;*OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING
                                        ;*STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13)
                                        ;*OFF, THEN THE USER WILL RECIEVE EACH INDIVIDUAL ERROR MESSAGE PLUS
                                        ;*AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OUT
                                        ;*WILL INHIBIT ERROR SUMMARY PRINT OUT, EXCEPT IN THE CASE DESCRIBED BELOW.
                                        ;*TO GET JUST THE ERROR SUMMARY WITH NO INDIVIDUAL ERROR REPORTS,
                                        ;*SET SWITCH REGISTER BIT13 AND SWITCH REGISTER BIT7 BOTH ON.
                                        ;*
                                        ;**************************************************************
     004456  000004                     TST1:   SCOPE
1836 004460  005037  004736                     CLR     AERFLG
1837 004464  012737  004526  001110             MOV     #A1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1838 004472  012700  177777                     MOV     #-1,R0                  ;INITIALIZE THE COUNT PATTERN.
1839 004476  012737  004740  000244             MOV     #AERR1,FPVECT           ;SET UP FOR UNABLE TO DECODE
1840 004504  012737  004752  000010             MOV     #AERR2,10               ;FPP INSTRUCTION TRAP TO 244 OR 10.
1841 004512  005002                             CLR     R2                      ;R2 IS THE 'AND' OF BAD DATA.
1842 004514  005102                             COM     R2
1843 004516  005003                             CLR     R3                      ;R3 IS THE 'OR' OF BAD DATA.
1844 004520  012737  005004  000004             MOV     #AERR3,ERRVECT          ;IF EITHER INSTRUCTION
1845                                                                             ;FAILS TO GO THROUGH THE
1846                                                                             ;CORRECT SRC OR DST MODE AN
1847                                                                             ;ODD ADDRESS TRAP WILL OCCUR.
1848 004526                             A1:
1849 004526  010004                     A11:    MOV     R0,R4
1850 004530  042704  030020                     BIC     #30020,R4
1851 004534  170104                             LDFPS   R4                      ;TEST INSTRUCTION.
1852
1853 004536  012701  177777                     MOV     #-1,R1
1854 004542  170201                     A12:    STFPS   R1                      ;TEST INSTRUCTION.
1855 004544  012737  042534  000244             MOV     #FPSPUR,FPVECT          ;SET UP FOR UNEXPECTED TRAPS.
1856 004552  010004                             MOV     R0,R4                   ;MASK OFF UNSETTABLE BITS.
1857 004554  042704  030020                     BIC     #30020,R4
1858 004560  012737  042566  000004             MOV     #CPSPUR,ERRVECT
1859 004566  012737  042604  000010             MOV     #CPTWO,10
1860 004574  020401                             CMP     R4,R1                   ;COMPARE DATA EXPECTED WITH
1861                                                                             ;THE DATA READ.
1862 004576  001002                             BNE     A3                      ;IF NOT EQUAL GO REPORT ERROR.
```

```
1863
1864 004600  077026                A2:     SOB     R0,A1                   ;OTHERWISE DECREMENT COUNT PATTERN
1865 004602  000425                        BR      A5                      ;UNTIL IT IS ZERO.
1866
1867 004604  005237  004736        A3:     INC     AERFLG                  ;RECORD ERROR.
1868 004610  050003                        BIS     R0,R3                   ;COMPUTE 'OR' OF FAILING PATTERNS.
1869 004612  010005                        MOV     R0,R5                   ;COMPUTE 'AND' OF FAILING PATTERNS.
1870 004614  005105                        COM     R5
1871 004616  040502                        BIC     R5,R2
1872
1873 004620  022737  000005  004736        CMP     #5,AERFLG               ;SEE IF MORE THAN 5 ERRORS HAVE
1874 004626  103412                        BLO     A05                     ;OCCURRED. BR IF YES.
1875                                                                        ;OTHERWISE
 876                                                                        ;REPORT ERROR.
1877 004630  012737  00452.  001236        MOV     #A1,$TMP2
1878 004636  010037  001240                MOV     R0,$TMP3
1879 004642  010137  001242                MOV     R1,$TMP4
1880 004646  010437  001244                MOV     R4,$TMP5
1881 004652  104001                A4:     ERROR   +1
1882
1883 004654  000751                A05:    BR      A2                      ;CONTINUE TESTING.
1884
1885 004656  005737  004736        A5:     TST     AERFLG                  ;SEE IF ANY ERRORS OCCURRED.
1886 004662  001471                        BEQ     ADONE                   ;IF NOT GO TO NEXT TEST.
1887 004664  032777  020000  174246        BIT     #SW13,@SWR              ;OTHERWISE SEE IF A SUMMARY
1888 004672  001404                        BEQ     A6                      ;SHOULD BE TYPED.
1889 004674  032777  000200  174236        BIT     #SW7,@SWR
1890 004702  001461                        BEQ     ADONE
1891
1892 004704                        A6:                                     ;TYPE ERROR SUMMARY.
1893 004704  010237  001236                MOV     R2,$TMP2
1894 004710  010337  001240                MOV     R3,$TMP3
1895 004714  012737  004730  001116        MOV     #A7,$ERRPC
1896 004722  112737  000002  001114        MOVB    #2,$ITEMB
1897 004730  004737  042010        A7:     JSR     PC,ERTYPE
1898 004734  000444                        BR      ADONE
1899
1900 004736  000000                AERFLG:.WORD    0
1901
1902                                ;UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 244.
1903 004740  011637  001236        AERR1:  MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
1904 004744  022626                        CMP     (SP)+,(SP)+
1905 004746  104010                1$:     ERROR   +10
1906 004750  000436                        BR      ADONE
1907
1908                                ;UNABLE TO DECODE INSTRUCTION. TRAPPED TO 10.
1909 004752  021627  004530        AERR2:  CMP     (SP),#A11+2             ;DID TRAP OCCUR OF FPP INSTRUCTION?
1910 004756  001405                        BEQ     1$
1911 004760  021627  004544                CMP     (SP),#A12+2
1912 004764  001402                        BEQ     1$
1913 004766  000137  042604                JMP     CPTWO                   ;IF NOT FPP INSTRUCTION THEN
1914                                                                        ;REPORT SPURIOUS TRAP TO 10.
1915
1916 004772  011637  001236        1$:     MOV     (SP),$TMP2              ;OTHERWISE REPORT IR DECIDE ERROR.
1917 004776  022626                        CMP     (SP)+,(SP)+
1918 005000  104011                2$:     ERROR   +11
1919 005002  000421                        BR      ADONE
```

```
1920
1921                                        ;TRAP TO 4 HANDLER:
1922 005004  021627  004530    AERR3:  CMP     (SP),#A11+2         ;DID THE TRAP OCCUR ON THE
1923 005010  001405                    BEQ     1$                  ;LDFPS INSTRUCTION?
1924 005012  021627  004544            CMP     (SP),#A12+2         ;OR THE STFPS INSTRUCTION?
1925 005016  001407                    BEQ     2$
1926 005020  000137  042556            JMP     CPSPUR              ;IF NEITHER THEN REPORT
1927                                                               ;UNEXPECTED TRAP TO 4.
1928
1929 005024  011637  001236    1$:     MOV     (SP),$TMP2
1930 005030  022626                    CMP     (SP)+,(SP)+
1931 005032  104014            15$:    ERROR   +14
1932 005034  000404                    BR      ADONE
1933
1934 005036  011637  001236    2$:     MOV     (SP),$TMP2
1935 005042  022626                    CMP     (SP)+,(SP)+
1936 005044  104015            25$:    ERROR   +15
1937
1938 005046                    ADONE:
     005046  104413                    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?).
1939
1940
```

```
                                .SBTTL  TEST # 2 - CFCC TEST
                                ;*****************************************************************
                                ;*TEST 2         CFCC TEST
                                ;*
                                ;*THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.
                                ;*
                                ;*****************************************************************
 005050  000004                 TST2:   SCOPE
1947 005052  012737  005064  001110        MOV     #B1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1948 005060  012700  000017                MOV     #17,R0                  ;R0 CONTAINS TO TEST PATTERN.
1949
1950 005064                        B1:
1951 005064  170100                        LDFPS   R0                      ;LOAD THE TEST PATTERN
1952
1953 005066                        B2:
1954 005066  170000                        CFCC                            ;COPY CONDITION CODES.
1955
1956 005070  013703  177776                MOV     PSW,R3                  ;SEE IF PATTERN TRANSFERED.
1957 005074  042703  177760                BIC     #177760,R3
1958 005100  020003                        CMP     R0,R3
1959 005102  001002                        BNE     BERR
1960
1961 005104  077011                B3:     SOB     R0,B1
1962 005106  000422                        BR      BDONE
1963
1964 005110                        BERR:
1965 005110  170201                        STFPS   R1                      ;WAS FPS MODIFIED BY CFCC?
1966 005112  012737  005066  001236        MOV     #B2,$TMP2
1967 005120  020001                        CMP     R0,R1
1968 005122  001006                        BNE     BERR1
1969
1970 005124  010337  001240                MOV     R3,$TMP3
1971 005130  010037  001242                MOV     R0,$TMP4
1972 005134  104003                1$:     ERROR   +3
1973 005136  000762                        BR      B3
1974
1975 005140                        BERR1:
1976 005140  010037  001240                MOV     R0,$TMP3
1977 005144  010137  001242                MOV     R1,$TMP4
1978 005150  104004                1$:     ERROR   +4
1979 005152  000754                        BR      B3
1980
1981 005154                        BDONE:
 005154  104413                          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?).
1982
```

```
 1991                                   .SBTTL  TEST # 3 - SETF, SETD, SETI AND SETL TEST
                                        ;;*****************************************************************
                                        ;*TEST 3        SETF, SETD, SETI AND SETL TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE SETF, SETD, SETI AND SETL INSTRUCTIONS.
                                        ;*EACH INSTRUCTION IS EXECUTED WITH THE FPS CONTAINING
                                        ;*ALL ONES AND ALSO WITH THE FPS CLEAR. THE RESULT OF EACH
                                        ;* SITUATION IS CHECKED.
                                        ;*
                                        ;;*****************************************************************
     005156  000004                     TST3:   SCOPE
 1992 005160  012737  005174  001110             MOV     #C1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 1993 005166  012737  000760  001244             MOV     #760,$TMP5
 1994 005174  012737  000202  001250     C1:     MOV     #202,$TMP7
 1995 005202  012737  043677  001252             MOV     #SETF1,$TMP10
 1996 005210  005000                             CLR     R0
 1997
 1998 005212  170100                             LDFPS   R0                      ;CLEAR THE FPS.
 1999 005214  012737  005222  001236             MOV     #C15,$TMP2
 2000
 2001 005222  170001                     C15:    SETF                            ;TEST INSTRUCTION.
 2002
 2003 005224  170201                             STFPS   R1                      ;GET RESULT.
 2004 005226  005002                             CLR     R2
 2005 005230  020201                             CMP     R2,R1                   ;DID AN ERROR OCCUR?
 2006 005232  001402                             BEQ     1$
 2007 005234  004737  005654                     JSR     PC,CERR1
 2008
 2009 005240                             1$:
      005240  012737  005246  001110             MOV     #C2,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 2010 005246  012700  147757             C2:     MOV     #147757,R0
 2011
 2012 005252  170100                             LDFPS   R0                      ;PUT 147757 IS FPS
 2013 005254  012737  005262  001236             MOV     #C25,$TMP2
 2014 005262  170001                     C25:    SETF                            ;CLEAR FD BIT.
 2015
 2016 005264  170201                             STFPS   R1                      ;GET RESULT
 2017 005266  012702  147557                     MOV     #147557,R2
 2018 005272  020102                             CMP     R1,R2                   ;RESULT CORRECT.
 2019 005274  001402                             BEQ     1$
 2020 005276  004737  005752                     JSR     PC,CERR2
 2021
 2022 005302                             1$:
      005302  012737  005310  001110             MOV     #C3,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 2023 005310  012737  000203  001250     C3:     MOV     #203,$TMP7
 2024 005316  012737  043705  001252             MOV     #SETD1,$TMP10
 2025 005324  012700  147757                     MOV     #147757,R0
 2026
 2027 005330  170100                             LDFPS   R0                      ;LOAD 147757 INTO FPS.
 2028 005332  012737  005340  001236             MOV     #C35,$TMP2
 2029 005340  170011                     C35:    SETD                            ;SETD FD BIT.
 2030
 2031 005342  170201                             STFPS   R1
 2032 005344  012702  147757                     MOV     #147757,R2
 2033 005350  020102                             CMP     R1,R2                   ;RESULT CORRECT?
 2034 005352  001402                             BEQ     1$
 2035 005354  004737  005752                     JSR     PC,CERR2
```

```
2076
2037 005360                                    1$:
     005360  012737  005366  001110                    MOV     #C4,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2038 005366  005000                            C4:     CLR     R0
2039 005370  170100                                    LDFPS   R0                      ;CLEAR FPS.
2040 005372  012737  005400  001236                    MOV     #C45,$TMP2
2041
2042 005400  170011                            C45:    SETD                            ;SET FD BIT.
2043
2044 005402  170201                                    STFPS   R1                      ;GET RESULT.
2045 005404  012702  000200                            MOV     #200,R2
2046 005410  020102                                    CMP     R1,R2                   ;RESULT CORRECT?
2047 005412  001402                                    BEQ     1$
2048 005414  004737  005654                            JSR     PC,CERR1
2049
2050 005420                                    1$:
     005420  012737  005426  001110                    MOV     #C5,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2051 005426  012737  000204  001250            C5:     MOV     #204,$TMP7
2052 005434  012737  043713  001252                    MOV     #SETI1,$TMP10
2053 005442  005000                                    CLR     R0
2054
2055 005444  170100                                    LDFPS   R0                      ;CLEAR FPS
2056 005446  012737  005454  001236                    MOV     #C55,$TMP2
2057
2058 005454  170002                            C55:    SETI                            ;CLEAR FL BIT.
2059
2060 005456  170201                                    STFPS   R1                      ;GET RESULT.
2061 005460  005002                                    CLR     R2
2062 005462  020201                                    CMP     R2,R1                   ;RESULT CORRECT?
2063 005464  001402                                    BEQ     1$
2064 005466  004737  005654                            JSR     PC,CERR1
2065
2066 005472                                    1$:
     005472  012737  005500  001110                    MOV     #C6,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2067 005500  012700  147757                    C6:     MOV     #147757,R0
2068 005504  170100                                    LDFPS   R0                      ;PUT 147757 INTO FPS
2069 005506  012737  005514  001236                    MOV     #C65,$TMP2
2070
2071 005514  170002                            C65:    SETI                            ;CLEAR FL BIT.
2072
2073 005516  170201                                    STFPS   R1                      ;GET THE RESULT.
2074 005520  012702  147657                            MOV     #147657,R2
2075 005524  020102                                    CMP     R1,R2                   ;RESULT CORRECT?
2076 005526  001402                                    BEQ     1$
2077 005530  004737  005752                            JSR     PC,CERR2
2078
2079 005534                                    1$:
     005534  012737  005542  001110                    MOV     #C7,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2080 005542  012737  000205  001250            C7:     MOV     #205,$TMP7
2081 005550  012737  043721  001252                    MOV     #SETL1,$TMP10
2082 005556  012700  147757                            MOV     #147757,R0
2083 005562  170100                                    LDFPS   R0                      ;SET FPS TO 147757.
2084 005564  012737  005572  001236                    MOV     #C75,$TMP2
2085
2086 005572  170012                            C75:    SETL                            ;SET FL BIT.
2087
2088 005574  170201                                    STFPS   R1                      ;GET THE RESULT.
```

```
2089 005576  012702  147757                MOV     #147757,R2
2090 005602  020102                        CMP     R1,R2                   ;RESULT CORRECT?
2091 005604  001402                        BEQ     1$
2092 005606  004737  005752                JSR     PC,CERR2
2093
2094 005612                        1$:
     005612  012737  005620  001110        MOV     #C8,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2095 005620  005000                C8:     CLR     R0
2096 005622  170100                        LDFPS   R0                      ;CLEAR FPS.
2097 005624  012737  005632  001236        MOV     #C85,$TMP2
2098
2099 005632  170012                C85:    SETL                            ;SET FL BIT.
2100
2101 005634  170201                        STFPS   R1
2102 005636  012702  000100                MOV     #100,R2
2103 005642  020102                        CMP     R1,R2                   ;RESULT CORRECT.
2104 005644  001402                        BEQ     1$
2105 005646  004737  005654                JSR     PC,CERR1
2106
2107 005652  000522                1$:     BR      CDONE
2108
2109                                ;THESE ARE ERROR ANALYSIS ROUTINES:
2110 005654  010103                CERR1:  MOV     R1,R3
2111 005656  032703  177477                BIT     #177477,R3              ;ARE ANY OTHER BITS SET?
2112 005662  001401                        BEQ     2$
2113 005664  000503                1$:     BR      CERR4
2114
2115 005666  022703  000300          2$:   CMP     #300,R3                 ;ARE BOTH FD AND FL SET?
2116 005672  001774                        BEQ     1$
2117 005674  032703  000300                BIT     #300,R3                 ;ARE THEY BOTH CLEAR?
2118 005700  001771                        BEQ     1$
2119
2120 005702  032703  000200                BIT     #200,R3                 ;IS FD SET?
2121 005706  001407                        BEQ     3$
2122 005710  012737  043705  001254        MOV     #SETD1,$TMP11
2123 005716  012737  000203  001246        MOV     #203,$TMP6
2124 005724  000452                        BR      CERR3
2125
2126 005726  032703  000100          3$:   BIT     #100,R3                 ;IS FL SET
2127 005732  001754                        BEQ     1$
2128 005734  012737  043721  001254        MOV     #SETL1,$TMP11
2129 005742  012737  000205  001246        MOV     #205,$TMP6
2130 005750  000440                        BR      CERR3
2131
2132 005752  010103                CERR2:  MOV     R1,R3
2133 005754  005103                        COM     R3
2134
2135 005756  032703  177477                BIT     #177477,R3              ;ARE ANY OTHER BITS SET?
2136 005762  001401                        BEQ     2$
2137 005764  000443                1$:     BR      CERR4
2138
2139 005766  032703  000300          2$:   BIT     #300,R3                 ;ARE BOTH FD AND FL SET?
2140 005772  001774                        BEQ     1$
2141 005774  032701  000300                BIT     #300,R1                 ;ARE THEY BOTH CLEAR?
2142 006000  001771                        BEQ     1$
2143
2144 006002  032701  000200                BIT     #200,R1                 ;IS FD CLEAR?
```

```
2145 006006  001007                    BNE     3$
2146 006010  012737  043077  001254    MOV     #SETF1,$TMP11
2147 006016  012737  000202  001246    MOV     #202,$TMP6
2148 006024  000412                    BR      CERR3
2149
2150 006026  032701  000100    3$:     BIT     #100,R1
2151 006032  001354                    BNE     1$                      ;IS FL CLEAR.
2152 006034  012737  043713  001254    MOV     #SETI1,$TMP11
2153 006042  012737  000204  001246    MOV     #204,$TMP6
2154 006050  000400                    BR      CERR3
2155
2156                             ;REPORT THE ERRORS:
2157 006052                      CERR3:
2158 006052  010137  001240            MOV     R1,$TMP3
2159 006056  010237  001242            MOV     R2,$TMP4
2160 006062  012637  006116            MOV     (SP)+,CPC
2161 006066  104012              1$:   ERROR   +12
2162 006070  000177  000022            JMP     @CPC
2163
2164 006074                      CERR4:
2165 006074  010137  001240            MOV     R1,$TMP3
2166 006100  010237  001242            MOV     R2,$TMP4
2167 006104  012637  006116            MOV     (SP)+,CPC
2168 006110  104013              1$:   ERROR   +13
2169 006112  000177  000000            JMP     @CPC
2170
2171 006116  000000              CPC:  .WORD   0
2172
2173 006120                      CDONE:
     006120  104413                    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?).
2174
2175
```

```
                                                .SBTTL  TEST # 4 - ILLEGAL FPP OP CODES AND STST TEST
                                        ;;*******************************************************************
                                        ;*TEST 4            ILLEGAL FPP OP CODES AND STST TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE FPP OPERATION CODES:
                                        ;*                          170003
                                        ;*                          170004
                                        ;*                            :
                                        ;*                          170010
                                        ;*                          170013
                                        ;*                          170014
                                        ;*                            :
                                        ;*                          170077
                                        ;*THESE ARE ILLEGAL INSTRUCTIONS AND (WITH INTERRUPTS ENABLED)
                                        ;*SHOULD CAUSE A TRAP TO 244.
                                        ;*ALSO TESTED HERE IS THE INSTRUCTION:
                                        ;*                  STST    R1
                                        ;*WHICH SHOULD PUT THE FEC CODE 2 IN R1, AFTER ANY OF THE ABOVE
                                        ;*OP CODES IS EXECUTED.
                                        ;*
                                        ;;*******************************************************************
006122  000004                          TST4:   SCOPE
006124  012737  006152  001110                  MOV     #D1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
006132  012705  170003                          MOV     #170003,R5              ;INITIAL OP CODE.
006136  012737  006342  000004                  MOV     #DERR2,ERRVECT
006144  012737  006246  000244                  MOV     #DERR1,FPVECT

006152  005000                          D1:     CLR     R0
006154  170100                                  LDFPS   R0                      ;CLEAR FPS.
006156  005002                                  CLR     R2
006160  010537  006176                          MOV     R5,D2                   ;SET UP THE ILLEGAL INSTRUCTION.
006164  010537  001244                          MOV     R5,$TMP5
006170  012737  006176  001236                  MOV     #D2,$TMP2
006176  000000                          D2:     .WORD   0
006200  170000                          D3:     CFCC
006202  005202                                  INC     R2
006204  005202                          D4:     INC     R2

006206  170201                                  STFPS   R1                      ;REPORT FAILURE. DID NOT TRAP.
006210  010137  001240                          MOV     R1,$TMP3
006214  104016                          1$:     ERROR   +16

006216  022705  170010                  D5:     CMP     #170010,R5              ;COMPUTE NEXT OP CODE
006222  001003                                  BNE     D6
006224  012705  170013                          MOV     #170013,R5
006230  000750                                  BR      D1

006232  022705  170077                  D6:     CMP     #170077,R5
006236  001001                                  BNE     D7
006240  000452                                  BR      DDONE
006242  005205                          D7:     INC     R5
006244  000742                                  BR      D1

006246  022716  006200                  DERR1:  CMP     #D3,(SP)                ;DID TRAP OCCUR ON TEST INSTRUCTION?
006252  001402                                  BEQ     1$
006254  000137  042534                          JMP     FPSPUR
```

```
2231 006260  022626                  1$:     CMP     (SP)+,(SP)+
2232 006262  170201                          STFPS   R1              ;GET THE FPS AND SEE IF IT IS
2233 006264  022701  100000                  CMP     #100000,R1      ;SET CORRECTLY.
2234 006270  001406                          BEQ     3$
2235
2236 006272  012737  100000  001240          MOV     #100000,$TMP3
2237 006300  010137  001242                  MOV     R1,$TMP4
2238 006304  104017                  2$:     ERROR   +17
2239
2240 006306  012704  000001          3$:     MOV     #1,R4
2241 006312  170304                  D8:     STST    R4              ;GET THE FEC CODE. NOTE THAT
2242                                                                  ;IF THE DESTINATION MODE IS
2243                                                                  ;IMPROPERLY DECODED AN ODD
2244                                                                  ;ADDRESS TRAP TO 4 SHOULD OCCUR.
2245 006314  022704  000002                  CMP     #2,R4           ;WAS FEC CORRECT?
2246 006320  001001                          BNE     D9
2247 006322  000735                          BR      D5
2248
2249 006324                          D9:                             ;REPORT STST FAILURE
2250 006324  012737  006312  001240          MOV     #D8,$TMP3
2251 006332  010437  001242                  MOV     R4,$TMP4
2252 006336  104020                  1$:     ERROR   +20
2253 006340  000726                          BR      D5
2254
2255 006342  022716  006314          DERR2:  CMP     #D8+2,(SP)      ;DID THE TRAP OCCUR ON THE
2256 006346  001402                          BEQ     D10             ;STST INSTRUCTION?
2257 006350  000137  042566                  JMP     CPSPUR
2258
2259 006354                          D10:
2260 006354  011637  001236                  MOV     (SP),$TMP2
2261 006360  022626                          CMP     (SP)+,(SP)+
2262 006362  104021                  1$:     ERROR   +21
2263 006364  000714                          BR      D5
2264
2265 006366                          DDONE:
     006366  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                     ;SEE IF THE USER HAS EXPRESSED
                                                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                     ;THE USER TYPED CONTROL G?).
2266
2267
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2275                                    .SBTTL  TEST # 5 - FID, INTERRUPT DISABLE, BIT TEST
                                        ;;*****************************************************************
                                        ;*TEST 5        FID, INTERRUPT DISABLE, BIT TEST
                                        ;*
                                        ;*THIS IS A TEST OF FPS BIT 14 (FID) OR FLOATING INTERRUPT DISABLE.
                                        ;*AN ILLEGAL INSTRUCTION IS EXECUTED WITH FID=1. NO INTERRUPT SHOULD
                                        ;*OCCUR.
                                        ;*
                                        ;;*****************************************************************
     006370  000004                     TST5:   SCOPE
2276 006372  012737  006406  001110             MOV     #E1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2277 006400  012737  006502  000244             MOV     #EERR2,FPVECT           ;SETUP FOR THE INTERRUPT.
2278
2279 006406  012700  040000             E1:     MOV     #40000,R0
2280 006412  170100                             LDFPS   R0                      ;SET FID.
2281 006414  012737  006422  001236             MOV     #E3,$TMP2
2282 006422                              E2:
2283 006422  170020                      E3:     .WORD   170020                  ;ILLEGAL FPP INSTRUCTION.
2284 006424  170000                      E4:     CFCC
2285
2286 006426  170201                             STFPS   R1                      ;SEE IF ERROR WAS DETECTED.
2287 006430  022701  140000                     CMP     #140000,R1
2288 006434  001005                             BNE     EERR0
2289
2290 006436  170304                             STST    R4                      ;SEE IF FEC=2
2291 006440  022704  000002                     CMP     #2,R4
2292 006444  001010                             BNE     EERR1
2293 006446  000431                             BR      EDONE
2294
2295 006450                              EERR0:                                  ;REPORT FPS INCORRECTLY SET.
2296 006450  010137  001240                     MOV     R1,$TMP3
2297 006454  012737  140000  001242             MOV     #140000,$TMP4
2298 006462  104022                      1$:     ERROR   +22
2299 006464  000422                             BR      EDONE
2300
2301 006466                              EERR1:                                  ;REPORT FEC NOT 2.
2302 006466  010537  001240                     MOV     R5,$TMP3
2303 006472  010437  001242                     MOV     R4,$TMP4
2304 006476  104023                      1$:     ERROR   +23
2305 006500  000414                             BR      EDONE
2306
2307 006502  021627  006424             EERR2:  CMP     (SP),#E4                ;DID THE ILLEGAL INSTRUCTION TRAP?
2308 006506  001402                             BEQ     1$
2309 006510  000137  042534                     JMP     FPSPUR
2310
2311 006514                              1$:
2312 006514  011637  001236                     MOV     (SP),$TMP2
2313 006520  022626                             CMP     (SP)+,(SP)+
2314 006522  170201                             STFPS   R1
2315 006524  010137  001240                     MOV     R1,$TMP3
2316 006530  104024                      2$:     ERROR   +24
2317
2318 006532                              EDONE:
     006532  104413                             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
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                                                        ;THE USER TYPED CONTROL G?).

2319
2320
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                                .SBTTL  TEST # 6 - LDD AND STD, WITH SRC AND DST MODE 1, TEST
                                ;;*****************************************************************
                                ;*TEST 6         LDD AND STD, WITH SRC AND DST MODE 1, TEST
                                ;*
                                ;*THIS IS A TEST OF BOTH THE INSTRUCTION:
                                ;*              LDD     (R0),AC0
                                ;*AND THE INSTRUCTION:
                                ;*              STD     AC0,(R0)
                                ;*MOST OF THE FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS. NOTE
                                ;*THAT THE INTEGRITY OF AC0 HAS NOT BEEN ASSURED. THIS MEANS THAT
                                ;*IN SOME CASES IT WILL BE IMPOSSIBLE TO ISOLATE CERTAIN DATA PATTERN
                                ;*FAILURES TO EITHER THE FLOWS OR THIS ACCUMULATOR.
                                ;*
                                ;;*****************************************************************
    006534  000004              TST6:   SCOPE
2334
2335 006536                     F1:
    006536  012737  006536  001110      MOV     #F1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2336 006544  012737  006614  001236      MOV     #F3,$TMP2
2337 006552  005000                      CLR     R0
2338 006554  170100                      LDFPS   R0
2339 006556  170011                      SETD
2340 006560  012701  010352              MOV     #FDAT10,R1              ;SET UP THE LOAD DATA.
2341 006564  012702  010416              MOV     #FXDAT0,R2
2342 006570  012703  000010              MOV     #10,R3
2343
2344 006574  012221              F2:     MOV     (R2)+,(R1)+
2345 006576  077302                      SOB     R3,F2
2346
2347 006600  012700  010362              MOV     #FDAT14,R0              ;SETUP R0 FOR THE LDD (R0),AC0.
2348 006604  012737  010036  000004      MOV     #FERR20,ERRVECT         ;IF THE SRC FLOWS FAIL THEN
2349                                                                    ;AN ODD ADDRESS MAY OCCUR.
2350 006612  005003                      CLR     R3
2351
2352 006614  172410              F3:     LDD     (R0),AC0
2353 006616  005203              F4:     INC     R3
2354 006620  005203                      INC     R3
2355
2356 006622  020027  010362              CMP     R0,#FDAT14              ;WAS R0 AFFECTED?
2357 006626  001402                      BEQ     F5
2358 006630  000137  007202              JMP     FERR1
2359
2360 006634  020327  000002      F5:     CMP     R3,#2                   ;SEE IF THE PC WAS ADVERSELY
2361 006640  001402                      BEQ     1$                      ;AFFECTED DURING THE INSTRUCTION.
2362 006642  000137  007300              JMP     FERR2
2363
2364 006646  012701  010352      1$:     MOV     #FDAT10,R1              ;MAKE SURE THE SOURCE DATA WAS
2365 006652  012702  010416              MOV     #FXDAT0,R2              ;NOT AFFECTED.
2366 006656  012703  000010              MOV     #10,R3
2367 006662  022122              2$:     CMP     (R1)+,(R2)+
2368 006664  001402                      BEQ     3$
2369 006666  000137  007144              JMP     FERR0
2370 006672  077305              3$:     SOB     R3,2$
2371
2372 006674  170201                      STFPS   R1                      ;MAKE SURE THE FPS IS CORRECT.
2373 006676  022701  000200              CMP     #200,R1
2374 006702  001402                      BEQ     F6
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2375 006704  000137  010016                    JMP     FERR11
2376
2377 006710                          F6:
     006710  012737  006716  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2378 006716  012737  006760  001236  1$:       MOV     #F10,$TMP2
2379
2380 006724  012703  177777                    MOV     #-1,R3
2381 006730  012704  000010                    MOV     #10,R4
2382 006734  012705  010374                    MOV     #FDAT00,R5              ;SET UP THE OUTPUT DATA BUFFER.
2383 006740  010325                  F7:       MOV     R3,(R5)+
2384 006742  077402                            SOB     R4,F7
2385
2386 006744  012700  010404                    MOV     #FDAT04,R0              ;SET UP R0 FOR DST MODE 1 REG 0.
2387 006750  012737  010204  000004            MOV     #FERR25,ERRVECT         ;IF THE DST FLOWS FAIL AN ODD
2388                                                                          ;ADDRESS COULD OCCUR.
2389 006756  005003                            CLR     R3
2390
2391 006760  174010                  F10:      STD     AC0,(R0)                ;TEST INSTRUCTION.
2392 006762  005203                  F11:      INC     R3
2393 006764  005203                            INC     R3
2394
2395 006766  020027  010404                    CMP     RC,#FDAT04              ;WAS R0 MODIFIED?
2396 006772  001402                            BEQ     F12
2397 006774  000137  007340                    JMP     FERR3
2398
2399 007000  020327  000002          F12:      CMP     R3,#2                   ;WAS THE PC AFFECTED CORRECTLY?
2400 007004  001402                            BEQ     F135
2401 007006  000137  007332                    JMP     FERR4
2402
2403 007012  012701  010374          F135:     MOV     #FDAT00,R1
2404 007016  012702  010416                    MOV     #FXDAT0,R2
2405
2406 007022  022122                            CMP     (R1)+,(R2)+             ;SEE IF THE DATA WAS OUTPUT
2407 007024  001402                            BEQ     F13                     ;TO THE TARGET AREA CORRECTLY.
2408 007026  000137  007436                    JMP     FERR5
2409
2410 007032  022122                  F13:      CMP     (R1)+,(R2)+
2411 007034  001402                            BEQ     F14
2412 007036  000137  007436                    JMP     FERR5
2413
2414 007042  022122                  F14:      CMP     (R1)+,(R2)+
2415 007044  001402                            BEQ     F15
2416 007046  000137  007436                    JMP     FERR5
2417
2418 007052  022122                  F15:      CMP     (R1)+,(R2)+
2419 007054  001402                            BEQ     F16
2420 007056  000137  007436                    JMP     FERR5
2421
2422 007062  022122                  F16:      CMP     (R1)+,(R2)+
2423 007064  001402                            BEQ     F17
2424 007066  000137  007762                    JMP     FERR10
2425
2426 007072  022122                  F17:      CMP     (R1)+,(R2)+
2427 007074  001402                            BEQ     F20
2428 007076  000137  007472                    JMP     FERR6
2429
2430 007102  022122                  F20:      CMP     (R1)+,(R2)+
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2431 007104  001402                        BEQ     F21
2432 007106  000137  007026                JMP     FERR7
2433
2434 007112  022122                F21:    CMP     (R1)+,(R2)+
2435 007114  001402                        BEQ     F22
2436 007116  000137  007762                JMP     FERR10
2437
2438 007122  005001                F22:    CLR     R1
2439 007124  170201                        STFPS   R1                      ;MAKE SURE FPS IS CORRECT.
2440 007126  022701  000200                CMP     #200,R1
2441 007132  001402                        BEQ     F23
2442 007134  000137  010016                JMP     FERR11
2443 007140  000137  010436          F23:  JMP     FDONE
2444
2445 007144                        FERR0:                                  ;SOURCE DATA AFFECTED BY
2446 007144  012737  010416  001240        MOV     #FXDAT0,$TMP3           ;THE LDD INSTRUCTION.
2447 007152  012737  010430  001242        MOV     #FXDAT0+12,$TMP4
2448 007160  012737  010352  001244        MOV     #FDATI0,$TMP5
2449 007166  012737  010364  001246        MOV     #FDATI0+12,$TMP6
2450 007174  104025                1$:     ERROR   +25
2451 007176  000137  010436                JMP     FDONE
2452
2453 007202  012737  010362  001242  FERR1: MOV     #FDATI4,$TMP4           ;FSRC FLOWS FAILURE.
2454 007210  010037  001240                MOV     R0,$TMP3
2455 007214  012737  000762  001244        MOV     #762,$TMP5
2456 007222  012737  000321  001250        MOV     #321,$TMP7
2457
2458 007230  022700  010352                CMP     #FDATI0,R0              ;FSRC MODE 4?
2459 007234  001004                        BNE     1$
2460 007236  012737  000324  001246        MOV     #324,$TMP6
2461 007244  000412                        BR      4$
2462
2463 007246  022700  010372          1$:   CMP     #FDATI4+10,R0           ;FSRC MODE 2?
2464 007252  001004                        BNE     2$
2465 007254  012737  000322  001246        MOV     #322,$TMP6
2466 007262  000403                        BR      4$
2467
2468 007264                        2$:
2469 007264  104027                3$:     ERROR   +27
2470 007266  000137  010436                JMP     FDONE
2471
2472 007272                        4$:
2473 007272  104026                5$:     ERROR   +26
2474 007274  000137  010436                JMP     FDONE
2475
2476 007300  012701  006616          FERR2: MOV     #F4,R1                  ;THE PC WAS INCORRECTLY AFFECTED
2477                                                                        ;DURING THE INSTRUCTION.
2478 007304  010137  001242          FER2:  MOV     R1,$TMP4
2479 007310  162701  000004                SUB     #4,R1
2480 007314  006303                        ASL     R3
2481 007316  060301                        ADD     R3,R1
2482 007320  010137  001240                MOV     R1,$TMP3
2483 007324  104030                1$:     ERROR   +30
2484 007326  000137  010436                JMP     FDONE
2485
2486 007332  012701  006762          FERR4: MOV     #F11,R1
2487 007336  000762                        BR      FER2
```

```
2488
2489 007340  012737  010404  001242  FERR3:  MOV     #FDAT04,$TMP4           ;FAILURE IN THE FDST FLOWS.
2490 007346  010037  001240                  MOV     R0,$TMP3
2491 007352  012737  000527  001244          MOV     #527,$TMP5
2492 007360  012737  000641  001250          MOV     #641,$TMP7
2493
2494 007366  022700  010374                  CMP     #FDAT00,R0              ;DST MODE 4?
2495 007372  001004                          BNE     1$
2496 007374  012737  000644  001246          MOV     #644,$TMP6
2497 007402  000412                          BR      4$
2498
2499 007404  022700  010414          1$:     CMP     #FDAT04+10,R0           ;DST MODE 2?
2500 007410  001004                          BNE     2$
2501 007412  012737  000642  001246          MOV     #642,$TMP6
2502 007420  000403                          BR      4$
2503
2504 007422                          2$:
2505 007422  104032                  3$:     ERROR   +32
2506 007424  000137  010436                  JMP     FDONE
2507
2508 007430                          4$:
2509 007430  104031                  5$:     ERROR   +31
2510 007432  000137  010436                  JMP     FDONE
2511
2512 007436                          FERR5:                                  ;FAILURE OF STD.
2513 007436  010037  001240                  MOV     R0,$TMP3
2514 007442  012737  010374  001242          MOV     #FDAT00,$TMP4
2515 007450  012737  010412  001244          MOV     #FDAT07,$TMP5
2516 007456  012737  010416  001246          MOV     #FXDAT0,$TMP6
2517 007464  104033                  1$:     ERROR   +33
2518 007466  000137  010436                  JMP     FDONE
2519
2520 007472  012701  010406          FERR6:  MOV     #FDAT05,R1              ;DID (BUT GR7) FAIL IN THE FDST
2521 007476  012702  177777                  MOV     #-1,R2                  ;FLOWS?
2522 007502  012703  000003                  MOV     #3,R3
2523 007506  020221                  1$:     CMP     R2,(R1)+
2524 007510  001017                          BNE     5$
2525 007512  077303                          SOB     R3,1$
2526
2527                                                                         ;REPORT FAILURE OF (BUT GR7) IN
2528 007514  010037  001240                  MOV     R0,$TMP3                ;THE FDST FLOWS.
2529 007520  012737  000412  001244          MOV     #412,$TMP5
2530 007526  012737  000147  001246          MOV     #147,$TMP6
2531 007534  012737  000145  001250          MOV     #145,$TMP7
2532 007542  104034                  2$:     ERROR   +34
2533 007544  000137  010436                  JMP     FDONE
2534
2535 007550  012701  010406          5$:     MOV     #FDAT05,R1              ;DID (BUT GR7) FAIL IN THE SRC FLOWS?
2536 007554  012703  000003                  MOV     #3,R3
2537 007560  005721                  6$:     TST     (R1)+
2538 007562  001402                          BEQ     7$
2539 007564  000137  007762                  JMP     FERR10
2540 007570  077305                  7$:     SOB     R3,6$
2541
2542                                                                         ;REPORT FAILURE OF (BUT GR7) IN
2543 007572  010037  001240                  MOV     R0,$TMP3                ;THE FSRC FLOWS.
2544 007576  012737  000207  001244          MOV     #207,$TMP5
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2545 007604  012737  000176  001246          MOV     #176,$TMP6
2546 007612  012737  000174  001250          MOV     #174,$TMP7
2547
2548 007620  104035                  10$:    ERROR   +35
2549 007622  000137  010436                  JMP     FDONE
2550
2551 007626  012701  010410          FERR7:  MOV     #FDAT06,R1          ;DID (BUT FD) FAIL IN THE FDST FLOWS?
2552 007632  012702  177777                  MOV     #-1,R2
2553 007636  012703  000002                  MOV     #2,R3
2554 007642  020221                  1$:     CMP     R2,(R1)+
2555 007644  001017                          BNE     5$
2556 007646  077303                          SOB     R3,1$
2557
2558                                                                     ;REPORT FAILURE OF (BUT FD) IN THE
2559 007650  010037  001240                  MOV     R0,$TMP3            ;FDST FLOWS.
2560 007654  012737  000707  001244          MOV     #707,$TMP5
2561 007662  012737  000244  001246          MOV     #244,$TMP6
2562 007670  012737  000245  001250          MOV     #245,$TMP7
2563 007676  104036                  2$:     ERROR   +36
2564 007700  000137  010436                  JMP     FDONE
2565
2566 007704  012701  010410          5$:     MOV     #FDAT06,R1          ;DID (BUT FD) FAIL IN THE FSRC FLOWS?
2567 007710  012703  000002                  MOV     #2,R3
2568 007714  005721                  6$:     TST     (R1)+
2569 007716  001402                          BEQ     7$
2570 007720  000137  007762                  JMP     FERR10
2571 007724  077305                  7$:     SOB     R3,6$
2572
2573                                                                     ;REPORT FAILURE OF (BUT FD) IN THE
2574 007726  010037  001240                  MOV     R0,$TMP3            ;FSRC FLOWS.
2575 007732  012737  000441  001244          MOV     #441,$TMP5
2576 007740  012737  000076  001246          MOV     #76,$TMP6
2577 007746  012737  000077  001250          MOV     #77,$TMP7
2578 007754  104037                  10$:    ERROR   +37
2579 007756  000137  010436                  JMP     FDONE
2580
2581 007762                          FERR10:                             ;REPORT DATA ERROR.
2582 007762  010037  001240                  MOV     R0,$TMP3
2583 007766  012737  010404  001242          MOV     #FDAT04,$TMP4
2584 007774  012737  010412  001244          MOV     #FDAT07,$TMP5
2585 010002  012737  010426  001246          MOV     #FXDAT4,$TMP6
2586 010010  104040                  1$:     ERROR   +40
2587 010012  000137  010436                  JMP     FDONE
2588
2589 010016                          FERR11:                             ;REPORT BAD FPS.
2590 010016  010137  001240                  MOV     R1,$TMP3
2591 010022  012737  000200  001242          MOV     #200,$TMP4
2592 010030  104041                  1$:     ERROR   +41
2593 010032  000137  010436                  JMP     FDONE
2594
2595 010036  012737  042737  001264  FERR20: MOV     #NULL,$TMP15        ;THE EXECUTION OF THE LDD
2596 010044  005037  001252                  CLR     $TMP10              ;CAUSED A TRAP TO 4, BECAUSE
2597 010050  011637  001236                  MOV     (SP),$TMP2          ;A FSRC FLOW FAILURE RESULTED
2598 010054  012737  010362  001240          MOV     #FDAT14,$TMP3       ;IN AN ODD ADDRESS.
2599 010062  012737  000321  001250          MOV     #321,$TMP7
2600 010070  012737  000762  001244          MOV     #762,$TMP5
2601
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```
2602 010076  021627  006620              CMP     (SP),#F4+2          ;SEE IF FSRC MODE 6 OR 7 WAS
2603 010102  001424                      BEQ     FERR21              ;EXECUTED.
2604
2605 010104  020027  010360              CMP     R0,#FDATI3          ;FSRC MODE 5?
2606 010110  001006                      BNE     2$
2607
2608                                                                 ;REPORT FSRC FLOW FAILURE TO
2609 010112  012737  000325  001246      MOV     #325,$TMP6          ;MODE 5.
2610 010120  022626                      CMP     (SP)+,(SP)+
2611 010122  104042              1$:     ERROR   +42
2612 010124  000544                      BR      FDONE
2613
2614 010126  020027  010364      2$:     CMP     R0,#FDATI5          ;FSRC MODE 3?
2615 010132  001402                      BEQ     3$
2616 010134  000137  042566              JMP     CPSPUR
2617
2618 010140                      3$:                                 ;REPORT FSRC     FLOW FAILURE TO
2619 010140  012737  000323  001246      MOV     #323,$TMP6          ;MODE 3.
2620 010146  022626                      CMP     (SP)+,(SP)+
2621 010150  104042              4$:     ERROR   +42
2622 010152  000531                      BR      FDONE
2623
2624 010154  022626              FERR21: CMP     (SP)+,(SP)+         ;REPORT FSRC FLOW FAILURE TO
2625                                                                 ;MODE 6 OR MODE 7.
2626 010156  012737  044503  001264      MOV     #MS16,$TMP15
2627 010164  012737  000326  001246      MOV     #326,$TMP6
2628 010172  012737  000327  001252      MOV     #327,$TMP10
2629 010200  104042              1$:     ERROR   +42
2630 010202  000515                      BR      FDONE
2631
2632 010204  012737  042737  001264  FERR25: MOV     #NULL,$TMP15        ;THE EXECUTION OF THE STD INSTRUCTION
2633 010212  005037  001252              CLR     $TMP10              ;TRAPPED TO 4, BECAUSE A FAILURE
2634 010216  012737  010404  001240      MOV     #FDAT04,$TMP3       ;IN THE FDST FLOWS RESULTED
2635 010224  011637  001236              MOV     (SP),$TMP2          ;IN AN ODD ADDRESS.
2636 010230  012737  000527  001244      MOV     #527,$TMP5
2637 010236  012737  000641  001250      MOV     #641,$TMP7
2638
2639 010244  021627  006762              CMP     (SP),#F10+2         ;FLOW FAILURE TO FDST MODE 6 OR 7?
2640 010250  001424                      BEQ     FERR26
2641
2642 010252  020027  010402              CMP     R0,#FDAT03          ;DID FDST FLOW FAIL TO MODE 5?
2643 010256  001006                      BNE     2$
2644
2645                                                                 ;REPORT FLOW FAILURE TO FDST
2646 010260  012737  000645  001246      MOV     #645,$TMP6          ;MODE 5.
2647 010266  022626                      CMP     (SP)+,(SP)+
2648 010270  104043              1$:     ERROR   +43
2649 010272  000461                      BR      FDONE
2650
2651 010274  020027  010406      2$:     CMP     R0,#FDAT05          ;DID FDST FLOW FAIL TO MODE 3?
2652 010300  001402                      BEQ     3$
2653 010302  000137  042566              JMP     CPSPUR
2654
2655 010306                      3$:                                 ;REPORT FDST FLOW FAILED TO MODE 3.
2656 010306  012737  000643  001246      MOV     #643,$TMP6
2657 010314  022626                      CMP     (SP)+,(SP)+
2658 010316  104043              4$:     ERROR   +43
```

TES' # 6 - LDD AND STD, WI'H SRC AND DST MODE 1, TEST

```
2659 010320  000446                          BR      FDONE
2660
2661 010322                          FERR26:                         ;REPORT FDST FLOW FAILURE TO MODE
2662 010322  012737  044503  001264          MOV     #MS16,$TMP15    ;6 OR MODE 7.
2663 010330  012737  000646  001246          MOV     #646,$TMP6
2664 010336  012737  000647  001252          MOV     #647,$TMP10
2665 010344  022626                          CMP     (SP)+,(SP)+
2666 010346  104043                  1$:     ERROR   +43
2667 010350  000432                          BR      FDONE
2668
2669 010352  177777                  FDATI0: -1
2670 010354  177777                  FDATI1: -1
2671 010356  177777                  FDATI2: -1
2672 010360  177777                  FDATI3: -1
2673 010362  177777                  FDATI4: -1
2674 010364  177777                  FDATI5: -1
2675 010366  177777                  FDATI6: -1
2676 010370  177777                  FDATI7: -1
2677 010372  177777                          -1
2678 010374  177777                  FDATO0: -1
2679 010376  177777                  FDATO1: -1
2680 010400  177777                  FDATO2: -1
2681 010402  177777                  FDATO3: -1
2682 010404  177777                  FDATO4: -1
2683 010406  177777                  FDATO5: -1
2684 010410  177777                  FDATO6: -1
2685 010412  177777                  FDATO7: -1
2686 010414  177777                          -1
2687 010416  177777                  FXDAT0: -1
2688 010420  177777                  FXDAT1: -1
2689 010422  177777                  FXDAT2: -1
2690 010424  177777                  FXDAT3: -1
2691 010426  052525                  FXDAT4: 052525
2692 010430  031463                  FXDAT5: 031463
2693 010432  007417                  FXDAT6: 007417
2694 010434  000477                  FXDAT7: 000477
2695
2696
2697 010436                          FDONE:
     010436  104413                          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?).
2698
2699
```

```
2705                                    .SBTTL  TEST # 7 - FSRC MODE 0 TEST
                                        ;;*****************************************************************
                                        ;;*TEST 7        FSRC MODE 0 TEST
                                        ;;*
                                        ;;*THIS IS A TEST OF FSRC MODE ZERO USING THE LDD AND LDF 'NSTRUCTIONS.
                                        ;;*
                                        ;;*****************************************************************
    010440  000004                      TST7:   SCOPE
2706 010442  012737  010450  001110            MOV     #I1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2707
2708 010450                             I1:
2709 010450  170011                            SETD                            ;SET FD.
2710 010452  012700  011300                    MOV     #IDATI0,R0
2711 010456  012701  011250                    MOV     #IPATI0,R1
2712 010462  012702  000004                    MOV     #4,R2
2713 010466  012120                     I2:    MOV     (R1)+,(R0)+             ;SET UP THE INPUT DATA BUFFER.
2714 010470  077202                            SOB     R2,I2
2715
2716 010472  012700  011300                    MOV     #IDATI0,R0              ;LOAD AC1
2717 010476  172510                            LDD     (R0),AC1
2718
2719 010500  012700  011260                    MOV     #IPAT20,R0              ;LOAD AC0
2720 010504  172410                            LDD     (R0),AC0
2721
2722 010506  012701  000001                    MOV     #1,R1                   ;IN CASE THE FSRC FLOWS FAIL
2723 010512  012737  011050  000004            MOV     #IERR0,ERRVECT          ;AN ODD ADDRESS TRAP TO 4 MAY OCCUR.
2724 010520  012737  010534  001236            MOV     #I3,$TMP2
2725 010526  012737  045163  001240            MOV     #MS35,$TMP3
2726 010534  172401                     I3:    LDD     AC1,AC0                 ;TEST INSTRUCTION.
2727 010536  000240                     I4:    NOP
2728 010540  000240                     I5:    NOP
2729
2730 010542  012700  011270                    MOV     #IDAT00,R0
2731 010546  174010                            STD     AC0,(R0)                ;GET AC0, THE RESULTS.
2732
2733 010550  012700  011270                    MOV     #IDAT00,R0              ;SEE IF DATA IS CORRECT.
2734 010554  012701  011300                    MOV     #IDATI0,R1
2735 010560  012702  000004                    MOV     #4,R2
2736 010564  022021                     I6:    CMP     (R0)+,(R1)+
2737 010566  001424                            BEQ     I105
2738
2739 010570  012700  011274                    MOV     #IDAT02,R0              ;SEE IF (BUT FD) FAILED.
2740 010574  012702  000002                    MO\     #2,R2
2741 010600  005720                     I7:    TST     (R0)+
2742 010602  001413                            BEQ     I10
2743
2744 010604  012700  011274                    MOV     #IDAT02,R0
2745 010610  012702  000002                    MOV     #2,R2
2746 010614  022720  177777             1$:    CMP     #-1,(R0)+
2747 010620  001402                            BEQ     2$
2748 010622  000137  011132                    JMP     IERR1
2749 010626  077206                     2$:    SOB     R2,1$
2750 010630  000401                            BR      I106
2751 010632  077216                     I10:   SOB     R2,I7
2752 010634  000137  011152             I106:  JMP     IERR2
2753
2754 010640  077227                     I105:  SOB     R2,I6
```

```
2755
2756                                    ;NOW TEST THE LOAD INSTRUCTION WITH FSRC MODE ZERO AND FD CLEAR.
2757
2758 010642                            I11:
     010642 012737 010650 001110               MOV     #I12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
2759 010650 012700 011250              I12:    MOV     #IPAT10,R0
2760 010654 012701 011300                      MOV     #IDAT10,R1
2761 010660 012702 000004                      MOV     #4,R2
2762 010664 022021                     I13:    MOV     (R0)+,(R1)+
2763 010666 077202                             SOB     R2,I13
2764
2765 010670 012700 011300                      MOV     #IDAT10,R0              ;SET UP AC1
2766 010674 172510                             LDD     (R0),AC1
2767
2768 010676 012700 011260                      MOV     #IPAT20,R0              ;SET UP AC0
2769 010702 172410                             LDD     (R0),AC0
2770
2771 010704 012701 000001                      MOV     #1,R1
2772 010710 012737 010726 001236               MOV     #I14,$TMP2
2773 010716 012737 045170 001240               MOV     #MS36,$TMP3
2774 010724 170001                             SETF                            ;CLEAR FD.
2775
2776 010726 172401                     I14:    LDF     AC1,AC0                 ;TEST INSTRUCTION.
2777 010730 000240                     I15:    NOP
2778 010732 000240                     I16:    NOP
2779
2780 010734 170200                             STFPS   R0                      ;SEE IF FPS IS STILL CLEAR.
2781 010736 022700 000004                      CMP     #4,R0
2782 010742 001402                             BEQ     I17
2783 010744 000137 011224                      JMP     IERR3
2784
2785 010750                            I17:                                    ;RESET TO DOUBLE MODE.
2786 010750 170011                             SETD
2787
2788 010752 012700 011270                      MOV     #IDAT00,R0
2789 010756 174010                             STD     AC0,(R0)                ;GET AC0
2790
2791 010760 012737 177777 011304               MOV     #-1,IDATI2
2792 010766 012737 177777 011306               MOV     #-1,IDATI3
2793 010774 012700 011270                      MOV     #IDAT00,R0
2794 011000 012701 011300                      MOV     #IDAT10,R1
2795 011004 012702 000004                      MOV     #4,R2
2796 011010 022021                     I20:    CMF     (R0)+,(R1)+             ;SEE IF AC0 WAS CORRECT.
2797 011012 001414                             BEQ     I23
2798
2799 011014 023737 011274 011254               CMP     IDAT02,IPAT12           ;DID (BUT FD) FAIL?
2800 011022 001402                             BEQ     I22
2801 011024 000137 011132              I21:    JMP     IERR1
2802 011030 023737 011276 011256       I22:    CMP     IDAT03,IPAT13
2803 011036 001372                             BNE     I21
2804 011040 000137 011200                      JMP     IERR4
2805
2806 011044 077217                     I23:    SOB     R2,I20
2807
2808 011046 000520                             BR      IDONE                   ;NO ERRORS.
2809
2810                                    ;IF AN ODD ADDRESS TRAP OCCURS COME HERE TO ANALYZE THE FSRC FAILURE.
```

```
2811 011050  022716  010536          IERR0:  CMP     #I4,(SP)                ;MAKE SURE THE TRAP OCCURRED
2812 011054  001413                          BEQ     1$                      ;ON THE INSTRUCTION BEING TESTED.
2813 011056  022716  010540                  CMP     #I5,(SP)
2814 011062  001410                          BEQ     1$
2815 011064  022716  010730                  CMP     #I15,(SP)
2816 011070  001405                          BEQ     1$
2817 011072  022716  010732                  CMP     #I16,(SP)
2818 011076  001402                          BEQ     1$
2819 011100  000137  042566                  JMP     CPSPUR
2820
2821 011104  011637  001236          1$:     MOV     (SP),$TMP2              ;REPORT FAILURE.
2822 011110  012737  000627  001240          MOV     #627,$TMP3
2823 011116  012737  000320  001242          MOV     #320,$TMP4
2824 011124  022626                          CMP     (SP)+,(SP)+
2825 011126  104047                  2$:     ERROR   +47
2826 011130  000467                          BR      IDONE
2827
2828                                 ;REPORT DATA ERROR.
2829 011132                          IERR1:
2830 011132  012737  011300  001242          MOV     #IDATI0,$TMP4
2831 011140  012737  011270  001244          MOV     #IDAT00,$TMP5
2832 011146  104051                  1$:     ERROR   +51
2833 011150  000457                          BR      IDONE
2834
2835                                 ;REPORT FAILURE OF (BUT FD)
2836 011152  012737  000153  001244  IERR2:  MOV     #153,$TMP5
2837 011160  012737  000434  001246          MOV     #434,$TMP6
2838 011166  012737  000435  001250          MOV     #435,$TMP7
2839 011174                          IERR25:
2840 011174  104050                  1$:     ERROR   +50
2841 011176  000444                          BR      IDONE
2842 011200  012737  000153  001244  IERR4:  MOV     #153,$TMP5
2843 011206  012737  000435  001246          MOV     #435,$TMP6
2844 011214  012737  000434  001250          MOV     #434,$TMP7
2845 011222  000764                          BR      IERR25
2846
2847                                 ;REPORT INCORRECT FPS AFTER LOAD INSTRUCTION.
2848 011224                          IERR3:
2849 011224  012737  010726  001236          MOV     #I14,$TMP2
2850 011232  010037  001240                  MOV     R0,$TMP3
2851 011236  012737  000004  001242          MOV     #4,$TMP4
2852 011244  104041                  1$:     ERROR   +41
2853 011246  000420                          BR      IDONE
2854
2855
2856 011250  000000                  IPAT10: 0
2857 011252  170360                  IPAT11: 170360
2858 011254  016161                  IPAT12: 016161
2859 011256  052525                  IPAT13: 052525
2860
2861 011260  177777                  IPAT20: -1
2862 011262  177777                  IPAT21: -1
2863 011264  177777                  IPAT22: -1
2864 011266  177777                  IPAT23: -1
2865
2866 011270  000000                  IDAT00: 0
2867 011272  000000                  IDAT01: 0
```

```
2868 011274  000000                IDATO2: 0
2869 011276  000000                IDATO3: 0
2870
2871 011300  000000                IDATI0: 0
2872 011302  000000                IDATI1: 0
2873 011304  000000                IDATI2: 0
2874 011306  000000                IDATI3: 0
2875
2876 011310                        IDONE:
     011310  104413                        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?).
2877
2883
```

```
                                .SBTTL  TEST # 10 - FDST MODE 0 TEST
                                ;;*****************************************************************
                                ;*TEST 10        FDST MODE 0 TEST
                                ;*
                                ;*THIS IS A TEST OF THE STORE INSTRUCTIONS, STD AND STF.  WITH FDST MODE 0.
                                ;*
                                ;;*****************************************************************
    011312  000004              TST10:  SCOPE
2885 011314                     T1:
    011314  012737  011322  001110      MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2886 011322  170011             1$:     SETD                    ;SET FD
2887 011324  012700  012066             MOV     #TPAT10,R0
2888 011330  012701  012116             MOV     #TDAT10,R1
2889 011334  012702  000004             MOV     #4,R2
2890 011340  012021             T2:     MOV     (R0)+,(R1)+     ;SET UP THE INPUT DATA BUFFER.
2891 011342  077202                     SOB     R2,T2
2892
2893 011344  012700  012116             MOV     #TDAT10,R0      ;LOAD AC0
2894 011350  172410                     LDD     (R0),AC0
2895
2896 011352  012700  012076             MOV     #TPAT20,R0      ;LOAD AC1
2897 011356  172510                     LDD     (R0),AC1
2898
2899 011360  012701  000001             MOV     #1,R1           ;IF THE (BUT FDST) FORK FAILS
2900 011364  012737  011674  000004     MOV     #TERR0,ERRVECT  ;AN ODD ADDRESS TRAP COULD RESULT.
2901 011372  012737  011406  001236     MOV     #T3,$TMP2
2902 011400  012737  045163  001240     MOV     #MS35,$TMP3
2903 011406  174001             T3:     STD     AC0,AC1
2904 011410  000240             T4:     NOP
2905 011412  000240             T5:     NOP
2906
2907 011414  012700  012106             MOV     #TDAT00,R0
2908 011420  174110                     STD     AC1,(R0)        ;GET THE DATA.
2909
2910 011422  012703  012106             MOV     #TDAT00,R3      ;SEE IF THE DATA IS CORRECT.
2911 011426  012704  012116             MOV     #TDAT10,R4
2912 011432  012705  000004             MOV     #4,R5
2913 011436  022324             T6:     CMP     (R3)+,(R4)+
2914 011440  001413                     BEQ     T105
2915
2916 011442  012703  012112             MOV     #TDAT02,R3      ;DID (BUT FD) FAIL?
2917 011446  012705  000002             MOV     #2,R5
2918 011452  005723             T7:     TST     (R3)+
2919 011454  001402                     BEQ     T10
2920 011456  000137  011756             JMP     TERR1
2921 011462  077505             T10:    SOB     R5,T7
2922 011464  000137  011776             JMP     TERR2
2923
2924 011470  077516             T105:   SOB     R5,T6
2925
2926                            ;NOW TEST THE STF AC0,AC1 INSTRUCTION.
2927
2928 011472                     T11:
    011472  012737  011500  001110      MOV     #T12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
2929
2930 011500  012700  012066     T12:    MOV     #TPAT10,R0      ;SET UP THE INPUT DATA BUFFER.
2931 011504  012701  012116             MOV     #TDAT10,R1
```

```
2932 011510  012702  000004            MOV     #4,R2
2933 011514  012021              T13:  MOV     (R0)+,(R1)+
2934 011516  077202                    SOB     R2,T13
2935
2936 011520  012700  012116            MOV     #TDATI0,R0              ;SET UP AC0
2937 011524  172410                    LDD     (R0),AC0
2938
2939 011526  012700  012076            MOV     #TPAT20,R0              ;SET UP AC1
2940 011532  172510                    LDD     (R0),AC1
2941
2942 011534  012701  000001            MOV     #1,R1
2943 011540  012737  011556  001236    MOV     #T14,$TMP2
2944 011546  012737  045170  001240    MOV     #MS36,$TMP3
2945 011554  170001                    SETF                            ;CLEAR FD
2946 011556  174001              T14:  STF     AC0,AC1
2947 011560  000240              T15:  NOP
2948 011562  000240              T16:  NOP
2949
2950 011564  005000                    CLR     R0
2951 011566  170200                    STFPS   R0                      ;SEE IF FPS IS CLEAR.
2952 011570  022700  000010            CMP     #10,R0
2953 011574  001401                    BEQ     T17
2954 011576  000521                    BR      TERR3
2955
2956 011600                       T17:
2957 011600  170011                    SETD                            ;SET FD.
2958
2959 011602  012700  012106            MOV     #TDAT00,R0
2960 011606  174110                    STD     AC1,(R0)                ;PICK UP AC1.
2961
2962 011610  012737  177777  012122    MOV     #-1,TDATI2
2963 011616  012737  177777  012124    MOV     #-1,TDATI3
2964 011624  012703  012106            MOV     #TDAT00,R3
2965 011630  012704  012116            MOV     #TDATI0,R4
2966 011634  012705  000004            MOV     #4,R5
2967 011640  022324              T20:  CMP     (R3)+,(R4)+             ;WAS THE DATA TRANSFERRED CORRECTLY?
2968 011642  001412                    BEQ     T23
2969
2970 011644  023737  012112  012072    CMP     TDAT02,TPAT12           ;DID (BUT FD) FAIL.
2971 011652  001401                    BEQ     T22
2972 011654  000440              T21:  BR      TERR1
2973 011656  023737  012114  012074  T22:  CMP     TDAT03,TPAT13
2974 011664  001373                    BNE     T21
2975 011666  000456                    BR      TERR4
2976
2977 011670  077515              T23:  SOB     R5,T20
2978 011672  000515                    BR      TDONE
2979
2980
2981                                ;TRAP HERE THROUGH VECTOR 4 IF AN ODD ADDRESS OCCURS.
2982 011674  022716  011410      TERR0:  CMP     #T4,(SP)                ;MAKE SURE THE TRAP WAS ON
2983 011700  001413                    BEQ     1$                      ;AN INSTRUCTION BEING TESTED.
2984 011702  022716  011412            CMP     #T5,(SP)
2985 011706  001410                    BEQ     1$
2986 011710  022716  011560            CMP     #T15,(SP)
2987 011714  001405                    BEQ     1$
2988 011716  022716  011562            CMP     #T16,(SP)
```

```
011722  001402                                          BEQ     1$
011724  000137  042566                                  JMP     CPSPUR

011730  011637  001236                          1$:     MOV     (SP),$TMP2
011734  022626                                          CMP     (SP)+,(SP)+
011736  012737  000527  001240                          MOV     #527,$TMP3
011744  012737  000640  001242                          MOV     #640,$TMP4
011752  104121                                  2$:     ERROR   +121
011754  000464                                          BR      TDONE


                                                ;REPORT DATA FAILURE.
011756                                          TERR1:
011756  012737  012116  001242                          MOV     #TDATI0,$TMP4
011764  012737  012106  001244                          MOV     #TDAT00,$TMP5
011772  104123                                  1$:     ERROR   +123
011774  000454                                          BR      TDONE


                                                ;REPORT FAILURE OF (BUT FD).
011776  012737  000160  001246                  TERR2:  MOV     #160,$TMP6
012004  012737  000161  001250                          MOV     #161,$TMP7
012012  012737  000640  001244                  TERR25: MOV     #640,$TMP5
012020  104122                                  1$:     ERROR   +122
012022  000441                                          BR      TDONE
012024  012737  000161  001246                  TERR4:  MOV     #161,$TMP6
012032  012737  000160  001250                          MOV     #160,$TMP7
012040  000764                                          BR      TERR25


                                                ;REPORT INCORRECT FPS AFTER STORE INSTRUCTION.
012042                                          TERR3:
012042  012737  011560  001236                          MOV     #T15,$TMP2
012050  010037  001240                                  MOV     R0,$TMP3
012054  012737  000010  001242                          MOV     #10,$TMP4
012062  104041                                  1$:     ERROR   +41
012064  000420                                          BR      TDONE

012066  000000                                  TPAT10: 0
012070  170360                                  TPAT11: 170360
012072  016161                                  TPAT12: 016161
012074  052525                                  TPAT13: 052525

012076  177777                                  TPAT20: -1
012100  177777                                  TPAT21: -1
012102  177777                                  TPAT22: -1
012104  177777                                  TPAT23: -1

012106  000000                                  TDAT00: 0
012110  000000                                  TDAT01: 0
012112  000000                                  TDAT02: 0
012114  000000                                  TDAT03: 0

012116  000000                                  TDATI0: 0
012120  000000                                  TDATI1: 0
012122  000000                                  TDATI2: 0
012124  000000                                  TDATI3: 0

012126                                          TDONE:
012126  104413                                          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?).
```

```
3180                    .SBTTL  TEST # 11 - ACCUMULATORS DATA PATTERNS TEST
                        ;*****************************************************************
                        ;*TEST 11        ACCUMULATORS DATA PATTERNS TEST
                        ;*
                        ;*THIS IS A TEST OF THE FLOATING POINT PROCESSOR ACCUMULATORS.
                        ;*EACH ACCUMULATOR IS TESTED IN TWO WAYS:
                        ;*       1 TEST PATTERN GENERATED BY FLOATING A ONE ACROSS
                        ;*         A FIELD OF ZEROES.
                        ;*       2 TEST PATTERN GENERATED BY FLOATING A ZERO ACROSS
                        ;*         A FIELD OF ONES.
                        ;*EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.
                        ;*
                        ;*NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR'
                        ;*OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING
                        ;*STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13)
                        ;*OFF, THEN THE USER WILL RECIEVE EACH INDIVIDUAL ERROR MESSAGE PLUS
                        ;*AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OUT
                        ;*WILL INHIBIT ERROR SUMMARY PRINT OUT, EXCEPT IN THE CASE DESCRIBED BELOW.
                        ;*TO GET JUST THE ERROR SUMMARY WITH NO INDIVIDUAL ERROR REPORTS,
                        ;*SET SWITCH REGISTER BIT13 AND SWITCH REGISTER BIT7 BOTH ON.
                        ;*
                        ;*
                        ;*THE FOLLOWING PROCEDURE IS PRESENTED TO AID THE TROUBLE
                        ;*SHOOTER IN SITUATIONS WHERE AM2901 CHIP ISOLATION IS ATTEMPTED.
                        ;*
                        ;*WARNING: THIS PROCEDURE ASSUMES THAT THE FAULT IS IN ONE OF THE
                        ;*AM2901 CHIPS. THIS ASSUMPTION IS NOT NECESSARILY VALID IN ALL
                        ;*SITUATIONS. IT REMAINS TO BE SEEN WHAT NUMBER OF FAILURES CAN
                        ;*PROBABLILISTICALLY ASSOCIATED WITH THEM. NOTE ALSO THAT THIS
                        ;*INFORMATION SHOULD NOT BE TAKEN AS ABSOLUTE, THAT IS
                        ;*THIS INFORMATION IS THE AUTHOR'S SUGGESTION FOR ACHIEVING ISOLATION
                        ;*WHEN CHIP LEVEL REPAIR IS NECESSARY.
                        ;*
                        ;*WHEN THIS TEST HAS FINISHED RUNNING, IF ERRORS HAVE OCCURRED,
                        ;*AN ERROR SUMMARY WILL BE TYPED. THUS SUMMARY WILL CONSIST OF TWO
                        ;*IMPORTANT QUANTITIES:
                        ;*       A.      FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'AND' ('*')
                        ;*               OF THE FAILING DATA PATTERNS.
                        ;*       B.      FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'OR' ('+')
                        ;*               OF THE FAILING DATA PATTERNS.
                        ;*
                        ;*A BIT STUCK HIGH IN THE HARDWARE WILL SHOW UP AS A 0 IN THAT
                        ;*BIT POSITION OF THE 'OR' OF THE FAILING DATA PATTERNS.
                        ;*
                        ;*A BIT STUCK LOW IN THE HARDWARE WILL SHOW UP AS A 1 IN THAT BIT
                        ;*POSITION OF THE 'AND' OF THE FAILING DATA PATTERNS.
                        ;*
                        ;*THUS IF A FAILURE OCCURS:
                        ;*       A.      STUCK HIGHS WILL SHOW AS 0'S IN THE 'OR' PATTERN.
                        ;*       B.      STUCK LOWS WILL SHOW AS 1'S IN THE 'AND' PATTERN.
                        ;*IF THE FAILURE IS INTERMITENT THEN THIS PROCEDURE WILL STILL APPLY. .
                        ;*IF THE FAILURE MOVES FROM ONE BIT TO ANOTHER, OR FROM ONE
                        ;*GROUP OF BITS TO ANOTHER GROUP OF BITS THEN THE FAULT WILL
                        ;*PROBABLY NOT SHOW UP IN THE 'AND' OR THE 'OR' PATTERNS; IN THIS
                        ;*CASE THE 'AND' PATTERN WILL BE ALL 0'S AND THE 'OR' PATTERN WILL
                        ;*BE ALL 1'S. WHEN THIS OCCURS SOME OTHER METHOD OF REPAIR MUST
                        ;*BE FOUND (SUCH AS INSPECTION OF EACH INDIVIDUAL ERROR REPORT
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;*RATHER THAN USING THE SUMMARY).
;*
;*MAP THE FOLLOWING NOTATION ONTO EACH BIT POSITION IN THE 'AND'
;*AND THE 'OR' PATTERNS WHICH ARE TYPED IN THE ERROR SUMMARY.
;*
;*A15,A14,...A1,A0  B15,B14,...B1,B0  C15,C14,...C1,C0  D15,D14,...D1,D0
;*
;*IN THIS NOTATION A15 THROUGH A0 IS THE FIRST OF THE FOUR 16 BIT
;*OCTAL NUMBERS TYPED, B15 THROUGH B0 IS THE SECOND, ETC.
;*
;*THIS TABLE SHOWS THE CORRESPONDING AM2901 CHIP ('E' NUMBER)
;*WHICH IS RESPONSIBLE FOR EACH BIT POSITION USING THE ABOVE
;*NOTATION. NOTE THAT ECO'S TO THE HARDWARE MIGHT MAKE THIS
;*TABLE OBSOLETE IF IT IS NOT UPDATED.  NOTE ALSO THAT THERE ARE
;*FOUR BITS FOR EACH AM2901 CHIP:
;*
;*      BITS                              AM2901 CHIP NUMBER
;*      ----                              ------------------
;*
;*      A15,A14,A13,A12                   E37
;*      A11,A10,A9,A8                     E45
;*      A7,A6,A5,A4                       E34
;*      A3,A2,A1,A0                       E42
;*
;*      B15,B14,B13,B12                   E33
;*      B11,B10,B9,B8                     E41
;*      B7,B6,B5,B4                       E36
;*      B3,B2,B1,B0                       E44
;*
;*      C15,C14,C13,C12                   E35
;*      C11,C10,C9,C8                     E43
;*      C7,C6,C5,C4                       E38
;*      C3,C2,C1,C0                       E46
;*
;*      D15,D14,D13,D12                   E39
;*      D11,D10,D9,D8                     E47
;*      D7,D6,D5,D4                       E40
;*      D3,D2,D1,D0                       E48
;*
;*NOW FIVE IMPORTANT CASES WHICH WILL ARISE WHEN A FAULTY
;*AM2901 IS PRESENT CAN BE DFSCRIBED:
;*
;*1.)   IF ONLY ONE BIT OF THE 64 BITS IS INCORRECT THE CHIP INDICATED
;*      IN THE ABOVE TABLE IS MOST PROBABLY AT FAULT. BUT IF THAT
;*      CHIP IS REPLACED AND THE ERROR PERSISTS THEN SUPPOSE THAT
;*      BIT IS,
;*              LN              WHERE 'L' IS A, B, C OR D
;*                              AND 'N' IS 15, 14, ... OR 0
;*      THEN IN GENERAL ANY OF THE FOUR CHIPS RESPONSIBLE FOR
;*      AN, BN, CN OR DN COULD BE AT FAULT, WITH LN BEING MOST PROBABLE.
;*      FOR EXAMPLE IF BIT C12 IS FAULTY, THEN CHIP E79
;*      IS THE MOST PROBABLE SOURCE OF THE ERROR. IF REPAIRING
;*      THAT CHIP DOES NOT REMOVE THE FAULT THEN TRY EACH OF THE
;*      CHIPS ASSOCIATED WITH BITS A12, B12 AND D12 SHOULD BE TRIED
;*      WITH EQUAL PROBABILITY OF THE FAULT BEING
;*      IN ANY ONE OF THESE OTHER THREE CHIPS, TRY CHIPS E61, E86 AND E78.
;*2.)   IF THERE ARE FOUR CONSECUTIVE BITS IN ERROR, FOLLOWING THE
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                                        ;*      PATTERN:
                                        ;*              LN, LN+1, LN+2 AND LN+3         WHERE 'L' IS A, B, C
                                        ;*                                              OR D.
                                        ;*                                              AND N=0,4,8 OR 12
                                        ;*      THEN THE ABOVE TABLE SHOULD DIRECTLY IDENTIFY THE
                                        ;*      FAILING CHIP.
                                        ;*
                                        ;*3.)   IF FOUR BITS ARE DROPPED WHICH FIT THE PATTERN:
                                        ;*              AN, BN, CN AND DN       WHERE N=15,14,... OR 0
                                        ;*      THEN ANY ONE OF THE FOUR CHIPS ASSOCIATED WITH EACH OF
                                        ;*      THE BITS AN, BN, CN AND DN COULD BE AT FAULT WITH
                                        ;*      EQUAL PROBABILITY.
                                        ;*
                                        ;*4.)   IF 16 BITS ARE IN ERROR, FITTING THE PATTERN:
                                        ;*              AN, AN+1, AN+2, AN+3    WHERE N=0,4,8 OR 12
                                        ;*              BN, BN+1, BN+2, BN+3
                                        ;*              CN, CN+1, CN+2, CN+3
                                        ;*                      AND
                                        ;*              DN, DN+1, DN+2, AN+3
                                        ;*      THEN ANY ONE OF THE FOUR CHIPS ASSOCIATED
                                        ;*      WITH THESE BITS COULD BE AT FAULT WITH EQUAL PROBABILITY.
                                        ;*
                                        ;*5.)   IF THE FAILING BIT PATTERNS DISPLAYED IN THE 'AND' AND THE 'OR'
                                        ;*      DATA TYPED IN THE SUMMARY DOES NOT CONFORM EXPLICITELY TO
                                        ;*      ANY OF THE ABOVE PATTERNS, THEN THE TROUBLE SHOOTER MUST
                                        ;*      INTUITIVELY TRY TO FIND WHICH OF THE ABOVE CASES (1 THROUGH 4)
                                        ;*      IS A 'BEST FIT' OF THE SYMPTOMS.
                                        ;*
                                        ;**************************************************************
012130  000004                        TST11:  SCOPE
3181 012132  170011                             SETD                            ;SET FD.
3182                                    ;TEST ACCUMULATOR 0 WITH FLOATING ONE
012134  012737  044535  001244                  MOV     #MNUM0,$TMP5
012142  012737  012176  001236                  MOV     #G1,$TMP2
012150  012700  015136                          MOV     #GPAT00,R0
012154  012701  015176                          MOV     #GDAT00,R1
012160  012737  012176  001110                  MOV     #G1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012166  004737  014270                          JSR     PC,GSETUP               ;LOAD TEST PATTERN.
012172  012703  000102                          MOV     #102,R3
012176  172410                        G1:     LDD     (R0),AC0
012200  174000                                STD     AC0,AC0
012202  172400                                LDD     AC0,AC0         ;STORE THE TEST PATTERN.
012204  174011                                STD     AC0,(R1)
012206  004737  014366                          JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
012212  005737  015132                          TST     GFLAG1
012216  001004                                  BNE     G2
012220  005137  015132                          COM     GFLAG1
012224  000261                                  SEC
012226  000401                                  BR      G3
012230  000241                        G2:     CLC
012232  006160  000006                G3:     ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
012236  006160  000004                        ROL     4(R0)
012242  006160  000002                        ROL     2(R0)
012246  006110                                  ROL     (R0)
012250  004737  014346                          JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
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      012254  077330                          SOB     R3,G1
      012256  004737  014500                  JSR     PC,GSUM                   ;TYPE ERROR SUMMARY.
3183                                   ;TEST ACCUMULATOR 0 WITH FLOATING ZERO
      012262  012737  044535  001244          MOV     #MNUM0,$TMP5
      012270  012737  012324  001236          MOV     #G4,$TMP2
      012276  012700  015146                  MOV     #GPAT10,R0
      012302  012701  015176                  MOV     #GDAT00,R1
      012306  012737  012324  001110          MOV     #G4,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      012314  004737  014270                  JSR     PC,GSETUP                 ;LOAD TEST PATTERN.
      012320  012703  000102                  MOV     #102,R3
      012324  172410                  G4:     LDD     (R0),AC0
      012326  174000                          STD     AC0,AC0
      012330  172400                          LDD     AC0,AC0         ;STORE THE TEST PATTERN.
      012332  174011                          STD     AC0,(R1)
      012334  004737  014366                  JSR     PC,GCMP                   ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
      012340  005737  015132                  TST     GFLAG1
      012344  001004                          BNE     G5
      012346  005137  015132                  COM     GFLAG1
      012352  000241                          CLC
      012354  000401                          BR      G6
      012356  000261                  G5:     SEC
      012360  006160  000006          G6:     ROL     6(R0)                     ;GENERATE THE NEXT TEST PATTERN.
      012364  006160  000004                  ROL     4(R0)
      012370  006160  000002                  ROL     2(R0)
      012374  006110                          ROL     (R0)
      012376  004737  014346                  JSR     PC,GRESET                 ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
      012402  077330                          SOB     R3,G4
      012404  004737  014500                  JSR     PC,GSUM                   ;TYPE ERROR SUMMARY.
3184                                   ;TEST ACCUMULATOR 1 WITH FLOATING ONE
      012410  012737  044543  001244          MOV     #MNUM1,$TMP5
      012416  012737  012452  001236          MOV     #G7,$TMP2
      012424  012700  015136                  MOV     #GPAT00,R0
      012430  012701  015176                  MOV     #GDAT00,R1
      012434  012737  012452  001110          MOV     #G7,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      012442  004737  014270                  JSR     PC,GSETUP                 ;LOAD TEST PATTERN.
      012446  012703  000102                  MOV     #102,R3
      012452  172410                  G7:     LDD     (R0),AC0
      012454  174001                          STD     AC0,AC1
      012456  172401                          LDD     AC1,AC0         ;STORE THE TEST PATTERN.
      012460  174011                          STD     AC0,(R1)
      012462  004737  014366                  JSR     PC,GCMP                   ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
      012466  005737  015132                  TST     GFLAG1
      012472  001004                          BNE     G10
      012474  005137  015132                  COM     GFLAG1
      012500  000261                          SEC
      012502  000401                          BR      G11
      012504  000241                  G10:    CLC
      012506  006160  000006          G11:    ROL     6(R0)                     ;GENERATE THE NEXT TEST PATTERN.
      012512  006160  000004                  ROL     4(R0)
      012516  006160  000002                  ROL     2(R0)
      012522  006110                          ROL     (R0)
      012524  004737  014346                  JSR     PC,GRESET                 ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
      012530  077330                          SOB     R3,G7
```

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     012532  004737  014500                    JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
3185                        ;TEST ACCUMULATOR 1 WITH FLOATING ZERO
     012536  012737  044543  001244            MOV     #MNUM1,$TMP5
     012544  012737  012600  001236            MOV     #G12,$TMP2
     012552  012700  015146                    MOV     #GPAT10,R0
     012556  012701  015176                    MOV     #GDAT00,R1
     012562  012737  012600  001110            MOV     #G12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
     012570  004737  014270                    JSR     PC,GSETUP               ;LOAD TEST PATTERN.
     012574  012703  000102                    MOV     #102,R3
     012600  172410                  G12:      LDD     (R0),AC0
     012602  174001                            STD     AC0,AC1
     012604  172401                            LDD     AC1,AC0         ;STORE THE TEST PATTERN.
     012606  174011                            STD     AC0,(R1)
     012610  004737  014366                    JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                               ;THAT WHICH WAS WRITTEN.
     012614  005737  015132                    TST     GFLAG1
     012620  001004                            BNE     G13
     012622  005137  015132                    COM     GFLAG1
     012626  000241                            CLC
     012630  000401                            BR      G14
     012632  000261                  G13:      SEC
     012634  006160  000006            G14:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
     012640  006160  000004                    ROL     4(R0)
     012644  006160  000002                    ROL     2(R0)
     012650  006110                            ROL     (R0)
     012652  004737  014346                    JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                               ;BUFFER.
     012656  077330                            SOB     R3,G12
     012660  004737  014500                    JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
3186                        ;TEST ACCUMULATOR 2 WITH FLOATING ONE
     012664  012737  044550  001244            MOV     #MNUM2,$TMP5
     012672  012737  012726  001236            MOV     #G15,$TMP2
     012700  012700  015136                    MOV     #GPAT00,R0
     012704  012701  015176                    MOV     #GDAT00,R1
     012710  012737  012726  001110            MOV     #G15,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
     012716  004737  014270                    JSR     PC,GSETUP               ;LOAD TEST PATTERN.
     012722  012703  000102                    MOV     #102,R3
     012726  172410                  G15:      LDD     (R0),AC0
     012730  174002                            STD     AC0,AC2
     012732  172402                            LDD     AC2,AC0         ;STORE THE TEST PATTERN.
     012734  174011                            STD     AC0,(R1)
     012736  004737  014366                    JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                               ;THAT WHICH WAS WRITTEN.
     012742  005737  015132                    TST     GFLAG1
     012746  001004                            BNE     G16
     012750  005137  015132                    COM     GFLAG1
     012754  000261                            SEC
     012756  000401                            BR      G17
     012760  000241                  G16:      CLC
     012762  006160  000006            G17:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
     012766  006160  000004                    ROL     4(R0)
     012772  006160  000002                    ROL     2(R0)
     012776  006110                            ROL     (R0)
     013000  004737  014346                    JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                               ;BUFFER.
     013004  077330                            SOB     R3,G15
     013006  004737  014500                    JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
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3187                                            ;TEST ACCUMULATOR 2 WITH FLOATING ZERO
     013012  012737  044550  001244                  MOV     #MNUM2,$TMP5
     013020  012737  013054  001236                  MOV     #G20,$TMP2
     013026  012700  015146                          MOV     #GPAT10,R0
     013032  012701  015176                          MOV     #GDAT00,R1
     013036  012737  013054  001110                  MOV     #G20,$LPERR        ;SET UP THE LOOP ON ERROR ADDRESS.
     013044  004737  014270                          JSR     PC,GSETUP                  ;LOAD TEST PATTERN.
     013050  012703  000102                          MOV     #102,R3
     013054  172410                          G20:    LDD     (R0),AC0
     013056  174002                                  STD     AC0,AC2
     013060  172402                                  LDD     AC2,AC0            ;STORE THE TEST PATTERN.
     013062  174011                                  STD     AC0,(R1)
     013064  004737  014366                          JSR     PC,GCMP                    ;COMPARE THE DATA READ WITH
                                                                                        ;THAT WHICH WAS WRITTEN.
     013070  005737  015132                          TST     GFLAG1
     013074  001004                                  BNE     G21
     013076  005137  015132                          COM     GFLAG1
     013102  000241                                  CLC
     013104  000401                                  BR      G22
     013106  000261                          G21:    SEC
     013110  006160  000006                  G22:    ROL     6(R0)                      ;GENERATE THE NEXT TEST PATTERN.
     013114  006160  000004                          ROL     4(R0)
     013120  006160  000002                          ROL     2(R0)
     013124  006110                                  ROL     (R0)
     013126  004737  014346                          JSR     PC,GRESET                  ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                        ;BUFFER.
     013132  077330                                  SOB     R3,G20
     013134  004737  014500                          JSR     PC,GSUM                    ;TYPE ERROR SUMMARY.
3188                                            ;TEST ACCUMULATOR 3 WITH FLOATING ONE
     013140  012737  044555  001244                  MOV     #MNUM3,$TMP5
     013146  012737  013202  001236                  MOV     #G23,$TMP2
     013154  012700  015136                          MOV     #GPAT00,R0
     013160  012701  015176                          MOV     #GDAT00,R1
     013164  012737  013202  001110                  MOV     #G23,$LPERR        ;SET UP THE LOOP ON ERROR ADDRESS.
     013172  004737  014270                          JSR     PC,GSETUP                  ;LOAD TEST PATTERN.
     013176  012703  000102                          MOV     #102,R3
     013202  172410                          G23:    LDD     (R0),AC0
     013204  174003                                  STD     AC0,AC3
     013206  172403                                  LDD     AC3,AC0            ;STORE THE TEST PATTERN.
     013210  174011                                  STD     AC0,(R1)
     013212  004737  014366                          JSR     PC,GCMP                    ;COMPARE THE DATA READ WITH
                                                                                        ;THAT WHICH WAS WRITTEN.
     013216  005737  015132                          TST     GFLAG1
     013222  001004                                  BNE     G24
     013224  005137  015132                          COM     GFLAG1
     013230  000261                                  SEC
     013232  000401                                  BR      G25
     013234  000241                          G24:    CLC
     013236  006160  000006                  G25:    ROL     6(R0)                      ;GENERATE THE NEXT TEST PATTERN.
     013242  006160  000004                          ROL     4(R0)
     013246  006160  000002                          ROL     2(R0)
     013252  006110                                  ROL     (R0)
     013254  004737  014346                          JSR     PC,GRESET                  ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                        ;BUFFER.
     013260  077330                                  SOB     R3,G23
     013262  004737  014500                          JSR     PC,GSUM                    ;TYPE ERROR SUMMARY.
3189                                            ;TEST ACCUMULATOR 3 WITH FLOATING ZERO
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013266  012737  044555  001244          MOV     #MNUM3,$TMP5
013274  012737  013330  001236          MOV     #G26,$TMP2
013302  012700  015146                  MOV     #GPAT10,R0
013306  012701  015176                  MOV     #GDAT00,R1
013312  012737  013330  001110          MOV     #G26,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013320  004737  014270                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013324  012703  000102                  MOV     #102,R3
013330  172410                  G26:    LDD     (R0),AC0
013332  174003                          STD     AC0,AC3
013334  172403                          LDD     AC3,AC0         ;STORE THE TEST PATTERN.
013336  174011                          STD     AC0,(R1)
013340  004737  014366                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                ;THAT WHICH WAS WRITTEN.
013344  005737  015132                  TST     GFLAG1
013350  001004                          BNE     G27
013352  005137  015132                  COM     GFLAG1
013356  000241                          CLC
013360  000401                          BR      G30
013362  000261                  G27:    SEC
013364  006160  000006          G30:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013370  006160  000004                  ROL     4(R0)
013374  006160  000002                  ROL     2(R0)
013400  006110                          ROL     (R0)
013402  004737  014346                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                ;BUFFER.
013406  077330                          SOB     R3,G26
013410  004737  014500                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
3190                            ;TEST ACCUMULATOR 4 WITH FLOATING ONE
013414  012737  044564  001244          MOV     #MNUM4,$TMP5
013422  012737  013456  001236          MOV     #G31,$TMP2
013430  012700  015136                  MOV     #GPAT00,R0
013434  012701  015176                  MOV     #GDAT00,R1
013440  012737  013456  001110          MOV     #G31,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013446  004737  014270                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013452  012703  000102                  MOV     #102,R3
013456  172410                  G31:    LDD     (R0),AC0
013460  174004                          STD     AC0,AC4
013462  172404                          LDD     AC4,AC0         ;STORE THE TEST PATTERN.
013464  174011                          STD     AC0,(R1)
013466  004737  014366                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                ;THAT WHICH WAS WRITTEN.
013472  005737  015132                  TST     GFLAG1
013476  001004                          BNE     G32
013500  005137  015132                  COM     GFLAG1
013504  000261                          SEC
013506  000401                          BR      G33
013510  000241                  G32:    CLC
013512  006160  000006          G33:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013516  006160  000004                  ROL     4(R0)
013522  006160  000002                  ROL     2(R0)
013526  006110                          ROL     (R0)
013530  004737  014346                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                ;BUFFER.
013534  077330                          SOB     R3,G31
013536  004737  014500                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
3191                            ;TEST ACCUMULATOR 4 WITH FLOATING ZERO
013542  012737  044564  001244          MOV     #MNUM4,$TMP5
```

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     013550  012737  013604  001236            MOV    #G34,$TMP2
     013556  012700  015146                    MOV    #GPAT10,R0
     013562  012701  015176                    MOV    #GDAT00,R1
     013566  012737  013604  001110            MOV    #G34,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
     013574  004737  014270                    JSR    PC,GSETUP                 ;LOAD TEST PATTERN.
     013600  012703  000102                    MOV    #102,R3
     013604  172410                    G34:    LDD    (R0),AC0
     013606  174004                            STD    AC0,AC4
     013610  172404                            LDD    AC4,AC0          ;STORE THE TEST PATTERN.
     013612  174011                            STD    AC0,(R1)
     013614  004737  014366                    JSR    PC,GCMP                   ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
     013620  005737  015132                    TST    GFLAG1
     013624  001004                            BNE    G35
     013626  005137  015132                    COM    GFLAG1
     013632  000241                            CLC
     013634  000401                            BR     G36
     013636  000261                    G35:    SEC
     013640  006160  000006            G36:    ROL    6(R0)                     ;GENERATE THE NEXT TEST PATTERN.
     013644  006160  000004                    ROL    4(RC
     013650  006160  000002                    ROL    2(R0)
     013654  006110                            ROL    (R0)
     013656  004737  014346                    JSR    PC,GRESET                 ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
     013662  077330                            SOB    R3,G34
     013664  004737  014500                    JSR    PC,GSUM                   ;TYPE ERROR SUMMARY.
3192                                   ;TEST ACCUMULATOR 5 WITH FLOATING ONE
     013670  012737  044572  001244            MOV    #MNUM5,$TMP5
     013676  012737  013732  001236            MOV    #G37,$TMP2
     013704  012700  015136                    MOV    #GPAT00,R0
     013710  012701  015176                    MOV    #GDAT00,R1
     013714  012737  013732  001110            MOV    #G37,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
     013722  004737  014270                    JSR    PC,GSETUP                 ;LOAD TEST PATTERN.
     013726  012703  000102                    MOV    #102,R3
     013732  172410                    G37:    LDD    (R0),AC0
     013734  174005                            STD    AC0,AC5
     013736  172405                            LDD    AC5,AC0          ;STORE THE TEST PATTERN.
     013740  174011                            STD    AC0,(R1)
     013742  004737  014366                    JSR    PC,GCMP                   ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
     013746  005737  015132                    TST    GFLAG1
     013752  001004                            BNE    G40
     013754  005137  015132                    COM    GFLAG1
     013760  000261                            SEC
     013762  000401                            BR     G41
     013764  000241                    G40:    CLC
     013766  006160  000006            G41:    ROL    6(R0)                     ;GENERATE THE NEXT TEST PATTERN.
     013772  006160  000004                    ROL    4(R0)
     013776  006160  000002                    ROL    2(R0)
     014002  006110                            ROL    (R0)
     014004  004737  014346                    JSR    PC,GRESET                 ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
     014010  077330                            SOB    R3,G37
     014012  004737  014500                    JSR    PC,GSUM                   ;TYPE ERROR SUMMARY.
3193                                   ;TEST ACCUMULATOR 5 WITH FLOATING ZERO
     014016  012737  044572  001244            MOV    #MNUM5,$TMP5
     014024  012737  014060  001236            MOV    #G42,$TMP2
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014032  012700  015146                    MOV     #GPAT10,R0
014036  012701  015176                    MOV     #GDAT00,R1
014042  012737  014060  001110            MOV     #G42,$LPERR        ;SET UP THE LOOP ON ERROR ADDRESS.
014050  004737  014270                    JSR     PC,GSETUP                 ;LOAD TEST PATTERN.
014054  012703  000102                    MOV     #102,R3
014060  172410                    G42:    LDD     (R0),AC0
014062  174005                            STD     AC0,AC5
014064  172405                            LDD     AC5,AC0            ;STORE THE TEST PATTERN.
014066  174011                            STD     AC0,(R1)
014070  004737  014366                    JSR     PC,GCMP                   ;COMPARE THE DATA READ WITH
                                                                            ;THAT WHICH WAS WRITTEN.
014074  005737  015132                    TST     GFLAG1
014100  001004                            BNE     G43
014102  005137  015132                    COM     GFLAG1
014106  000241                            CLC
014110  000401                            BR      G44
014112  000261                    G43:    SEC
014114  006160  000006            G44:    ROL     6(R0)                     ;GENERATE THE NEXT TEST PATTERN.
014120  006160  000004                    ROL     4(R0)
014124  006160  000002                    ROL     2(R0)
014130  006110                            ROL     (R0)
014132  004737  014346                    JSR     PC,GRESET                 ;RESET DEFAULT PATTERN IN OUTPUT
                                                                            ;BUFFER.
014136  077330                            SOB     R3,G42
014140  004737  014500                    JSR     PC,GSUM                   ;TYPE ERROR SUMMARY.

014144  000137  015210                    JMP     GDONE
                                  ;**************IMPORTANT******************
                                  ;*      IN CASE OF AN ECO OR CHIP NUMBER CHANGE, CHANGE THE 'CHPNUM' ASCII
                                  ;*      STRING AT THE APPROPRIATE LOCATIONS.
                                  ;;*******************************************************************
                                  ;                A15 A11 A07 A03 B15 B11 B07 B03 C15 C11 C07 C03 D15 D11 D07 D03
                                  ;                 :   :   :   :   :   :   :   :   :   :   :   :   :   :   :   :
                                  ;                A12 A08 A04 A00 B12 B08 B04 B00 C12 C08 C04 C00 D12 D08 D04 D00
014150     105     063     067    CHPNUM: .ASCII  ?E37 E45 E34 E42 E33 E41 E36 E44 E35 E43 E38 E46 E39 E47 E40 E48?
                                          .EVEN
014250  170000  007400  000360    BITSTS: .WORD   170000,7400,360,17,7777,170377,177417,177760
                                  ;USE THIS ROUTINE TO INITIALIZE ALL THE DATA BUFFERS.
014270  012705  015132            GSETUP: MOV     #GFLAG1,R5
014274  012704  000026                    MOV     #26,R4
014300  005025                    1$:     CLR     (R5)+
014302  077402                            SOB     R4,1$

014304  012705  015146                    MOV     #GPAT10,R5
014310  012704  000010                    MOV     #10,R4
014314  005125                    2$:     COM     (R5)+
014316  077402                            SOB     R4,2$

014320  020037  015136            GS1:    CMP     R0,GPAT00
014324  001401                            BEQ     3$
014326  000207                            RTS     PC

014330  012705  015176            3$:     MOV     #GDAT00,R5
014334  012704  000004                    MOV     #4,R4
014340  005125                    4$:     COM     (R5)+
014342  077402                            SOB     R4,4$
014344  000207                            RTS     PC
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014346  012705  015176          GRESET: MOV     #GDAT00,R5
014352  012704  000004                  MOV     #4,R4
014356  005025                  1$:     CLR     (R5)+
014360  077402                          SOB     R4,1$
014362  000137  014320                  JMP     GS1

                                ;SEE IF THE DATA WRITTEN MATCHES THE DATA READ.
014366  012705  015176          GCMP:   MOV     #GDAT00,R5
014372  012704  000004                  MOV     #4,R4
014376  010002                          MOV     R0,R2
014400  022225                  1$:     CMP     (R2)+,(R5)+
014402  001402                          BEQ     2$
014404  000137  014414                  JMP     GERR1
014410  077405                  2$:     SOB     R4,1$
014412  000207                          RTS     PC

                                ;COME HERE TO REPORT AND RECORD ERRORS.
014414  012637  015206          GERR1:  MOV     (SP)+,GADR              ;SAVE THE RETURN ADDRESS.
014420  010037  001240                  MOV     R0,1240                 ;COMPUTE 'OR' OF BAD DATA.
014424  012705  015156                  MOV     #GAND0,R5
014430  012704  000004                  MOV     #4,R4
014434  051065  000010          1$:     BIS     (R0),10(R5)
014440  012002                          MOV     (R0)+,R2
014442  005102                          COM     R2
014444  040225                          BIC     R2,(R5)+
014446  077406                          SOB     R4,1$
014450  013700  001240                  MOV     1240,R0
014454  005237  015134                  INC     GFLAG2                  ;INCREMENT ERROR COUNT.
014460  010037  001240                  MOV     R0,$TMP3
014464  012737  015176  001242          MOV     #GDAT00,$TMP4
014472  104044                  3$:     ERROR   +44
014474  000177  000506                  JMP     @GADR

                                ;SEE IF ANY ERRORS HAVE OCCURRED AND WHETHER OR NOT AN ERROR SUMMARY
                                ;SHOULD BE TYPED.
014500  005737  015134          GSUM:   TST     GFLAG2          ;ANY ERRORS?
014504  001410                          BEQ     100$            ;BRANCH IF NOT
014506  032777  020000  164424          BIT     #SW13,@SWR      ;INHIBIT ERROR PRINT OUT?
014514  001405                          BEQ     1$              ;BRANCH IF NOT INHIBITED
014516  032777  000200  164414          BIT     #SW7,@SWR       ;PRINT SUMMARY?
014524  001001                          BNE     1$              ;BRANCH IF NOT
014526  000207                  100$:   RTS     PC              ;EXIT - NO ERRORS TO REPORT
014530  013737  015134  001246  1$:     MOV     GFLAG2,$TMP6    ;YES PRINT SUMMARY.
014536  012737  015156  001240          MOV     #GAND0,$TMP3
014544  012737  015166  001242          MOV     #GOR0,$TMP4
014552  012637  015206                  MOV     (SP)+,GADR      ;SAVE RETURN ADDRESS FOR POSSIBLE LOOPING
014556  012737  014572  001116          MOV     #2$,$ERRPC
014564  112737  000045  001114          MOVB    #45,$ITEMB
014572  004737  042010          2$:     JSR     PC,ERTYPE
014576  010046                          MOV     R0,-(SP)        ;SAVE R0
014600  010146                          MOV     R1,-(SP)        ;SAVE R1
014602  010246                          MOV     R2,-(SP)        ;SAVE R2
014604  012700  014150                  MOV     #CHPNUM,R0      ;MOVE ADDRESS OF CHIP NUMBER ASCII'S TO R0
014610  012702  015156                  MOV     #GAND0,R2       ;MOVE ADDRESS OF 'AND' DATA TO R2
014614  112737  000077  015124          MOVB    #'?,11$         ;MOVE ASCII '?' TO NEXT 3 LOCATIONS
014622  112737  000077  015125          MOVB    #'?,11$+1
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014630  112737  000077  015126          MOVB    #'?,11$+2
014636  104401  015124                  TYPE    ,11$                ;TYPE ERROR MESSAGE BELOW
014642  012701  014250          3$:     MOV     #BITSTS,R1          ;MOVE ADDRESS OF BIT TESTING TO R1
014646  032112                  4$:     BIT     (R1)+,(R2)          ;SEE IF ANY BITS IN THE GROUP WERE SET
014650  001413                          BEQ     5$                  ;BRANCH AROUND CHIP # PRINT IF NOT
014652  116037  000000  015124          MOVB    0(R0),11$+0         ;MOVE 1ST ASCII DIGIT TO LOCATION
014660  116037  000001  015125          MOVB    1(R0),11$+1         ;MOVE 2ND ASCII DIGIT TO LOCATION
014666  116037  000002  015126          MOVB    2(R0),11$+2         ;MOVE 3RD ASCII DIGIT TO LOCATION
014674  104401  015124                  TYPE    ,11$                ;TYPE THE CHIP NUMBER
014700  062700  000004          5$:     ADD     #4,R0               ;MOVE ASCII POINTER TO NEXT CHIP NUMBER
014704  022701  014260                  CMP     #BITSTS+10,R1       ;SEE IF WE ARE DONE CHECKING THE 'AND' SETS
014710  001356                          BNE     4$                  ;BRANCH BACK IF NOT
014712  062702  000002                  ADD     #2,R2               ;MAP TO NEXT 'AND' LOCATION
014716  022702  015166                  CMP     #GAND0+10,R2        ;SEE IF ALL 'AND' LOCATIONS HAVE BEEN CHECKED
014722  001347                          BNE     3$                  ;BRANCH BACK IF NOT
014724  012700  014150                  MOV     #CHPNUM,R0          ;RESET CHIP NUMBER ASCII POINTER IN R0
014730  012702  015166                  MOV     #GOR0,R2            ;MOVE 'OR' STARTING ADDRESS TO R2
014734  011246                  6$:     MOV     (R2),-(SP)          ;PUT 'OR' DATA ON STACK
014736  046116  000010                  BIC     10(R1),(SP)         ;CLEAR BITS NOT UNDER TEST
014742  022126                          CMP     (R1)+,(SP)+         ;SEE IF ANY BITS WERE FOUND CLEAR
014744  001413                          BEQ     7$                  ;BRANCH AROUND CHIP # PRINTING IF OK
014746  116037  000000  015124          MOVB    0(R0),11$           ;MOVE 1ST ASCII DIGIT TO LOCATION
014754  116037  000001  015125          MOVB    1(R0),11$+1         ;MOVE 2ND ASCII DIGIT TO LOCATION
014762  116037  000002  015126          MOVB    2(R0),11$+2         ;MOVE 3RD ASCII DIGIT TO LOCATION
014770  104401  015124                  TYPE    ,11$                ;TYPE THE CHIP NUMBER
014774  062700  000004          7$:     ADD     #4,R0               ;POINT R0 TO NEXT ASCII CHIP REPRESENTATION
015000  022701  014260                  CMP     #BITSTS+10,R1       ;SEE IF WE ARE DONE CHECKING THE 'AND' SETS
015004  001353                          BNE     6$                  ;BRANCH BACK IF NOT
015006  012701  014250                  MOV     #BITSTS,R1          ;RESET BIT TEST CHECK WORDS ADDRESS TO R1
015012  062702  000002                  ADD     #2,R2               ;MAP TO NEXT 'AND' LOCATION
015016  022702  015166                  CMP     #GAND0+10,R2        ;SEE IF ALL 'AND' LOCATIONS HAVE BEEN CHECKED
015022  001344                          BNE     6$                  ;BRANCH BACK IF NOT
015024  122737  000077  015124          CMPB    #'?,11$             ;SEE IF ANY CHIP NUMBER HAS BEEN LOADED
015032  001002                          BNE     8$                  ;BRANCH TO RETURN JUMP IF SO
015034  104401  015124                  TYPE    ,11$                ;TYPE THE QUESTION MARKS - COULDN'T ISOLATE TO A CHIP
015040  104401  001313          8$:     TYPE    ,$CRLF              ;TYPE A <CRLF>
015044  012602                          MOV     (SP)+,R2            ;RESTORE R2
015046  012601                          MOV     (SP)+,R1            ;RESTORE R1
015050  012600                          MOV     (SP)+,R0            ;RESTORE R0
015052  000177  000130                  JMP     @GADR
015056  000207                  9$:     RTS     PC

015060     200     103     110  10$:    .ASCIZ  <CRLF>'CHIP NUMBERS TO INITIALLY LOOK AT'<CRLF>
015124     077     077     077  11$:    .ASCIZ  '???  '

015132  000000                  GFLAG1: .WORD   0
015134  000000                  GFLAG2: .WORD   0
015136  000000                  GPAT00: .WORD   0
015140  000000                  GPAT01: .WORD   0
015142  000000                  GPAT02: .WORD   0
015144  000000                  GPAT03: .WORD   0
015146  177777                  GPAT10: .WORD   -1
015150  177777                  GPAT11: .WORD   -1
015152  177777                  GPAT12: .WORD   -1
015154  177777                  GPAT13: .WORD   -1
015156  177777                  GAND0:  .WORD   -1
015160  177777                  GAND1:  .WORD   -1
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3340 015162  177777          GAND2:  .WORD   -1
3341 015164  177777          GAND3:  .WORD   -1
3342 015166  000000          GOR0:   .WORD   0
3343 015170  000000          GOR1:   .WORD   0
3344 015172  000000          GOR2:   .WORD   0
3345 015174  000000          GOR3.   .WORD   0
3346 015176  000000          GDAT00: .WORD   0
3347 015200  000000          GDAT01: .WORD   0
3348 015202  000000          GDAT02: .WORD   0
3349 015204  000000          GDAT03: .WORD   0
3350 015206  000000          GADR:   .WORD   0
3351 015210                  GDONE:
     015210  104413                  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?).
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3358                                    .SBTTL  TEST # 12 - FPP ACCUMULATORS DUAL ADDRESS TEST
                                        ;;*****************************************************************
                                        ;*TEST 12       FPP ACCUMULATORS DUAL ADDRESS TEST
                                        ;*
                                        ;*THIS TEST PERFORMS A DUAL ADDRESSING TEST ON THE FLOATING ACCUMULATORS.
                                        ;*NOTE THAT ACCUMULATOR ZERO IS USED TO ACCESS ALL THE OTHERS.
                                        ;*
                                        ;;*****************************************************************
     015212  000004                     TST12:  SCOPE
3359 015214  012737  015222  001110             MOV     #H1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3360
3361 015222  005037  015746             H1:     CLR     HFLAG
3362 015226  012700  015750                     MOV     #HA1W,R0                ;INITIALIZE THE LOAD BUFFER DATA.
3363 015232  012701  016070                     MOV     #HDAT1,R1
3364 015236  012703  000024                     MOV     #24,R3
3365 015242  012120                     H2:     MOV     (R1)+,(R0)+
3366 015244  077302                             SOB     R3,H2
3367
3368 015246  004737  015674                     JSR     PC,HCLR                 ;CLEAR THE OUTPUT DATA BUFFER.
3369
3370 015252  170011                     H3:     SETD
3371                                    ;LOAD ACCUMULATOR 1
     015254  012700  015750                     MOV     #HA1W,R0
     015260  172410                             LDD     (R0),AC0
     015262  174001                             STD     AC0,AC1
3372                                    ;LOAD ACCUMULATOR 2
     015264  012700  015760                     MOV     #HA2W,R0
     015270  172410                             LDD     (R0),AC0
     015272  174002                             STD     AC0,AC2
3373                                    ;LOAD ACCUMULATOR 3
     015274  012700  015770                     MOV     #HA3W,R0
     015300  172410                             LDD     (R0),AC0
     015302  174003                             STD     AC0,AC3
3374                                    ;LOAD ACCUMULATOR 4
     015304  012700  016000                     MOV     #HA4W,R0
     015310  172410                             LDD     (R0),AC0
     015312  174004                             STD     AC0,AC4
3375                                    ;LOAD ACCUMULATOR 5
     015314  012700  016010                     MOV     #HA5W,R0
     015320  172410                             LDD     (R0),AC0
     015322  174005                             STD     AC0,AC5
3376
3377 015324  004737  015560             H4:     JSR     PC,HSTD                 ;GO READ ALL ACCUMULATORS BACK.
3378
3379 015330  004737  015636                     JSR     PC,HCMP                 ;SEE IF DATA IS CORRECT.
3380
3381                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 1,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ;THE DATA.
     015334  012700  015750                     MOV     #HA1W,R0
     015340  012702  000004                     MOV     #4,R2
     015344  010001                             MOV     R0,R1
     015346  005121                     H5:     COM     (R1)+
     015350  172410                             LDD     (R0),AC0
     015352  174001                             STD     AC0,AC1
     015354  004737  015560                     JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
     015360  004737  015636                     JSR     PC,HCMP         ;CHECK THE DATA.
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                015536  077210                  SOB     R2,H5
3382                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 2,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ;THE DATA.
                015366  012700  015760          MOV     #HA2W,R0
                015372  012702  000004          MOV     #4,R2
                015376  010001                  MOV     R0,R1
                015400  005121          H6:     COM     (R1)+
                015402  172410                  LDD     (R0),AC0
                015404  174002                  STD     AC0,AC2
                015406  004737  015560          JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
                015412  004737  015636          JSR     PC,HCMP         ;CHECK THE DATA.
                015416  077210                  SOB     R2,H6
3383                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 3,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ,THE DATA.
                015420  012700  015770          MOV     #HA3W,R0
                015424  012702  000004          MOV     #4,R2
                015430  010001                  MOV     R0,R1
                015432  005121          H7:     COM     (R1)+
                015434  172410                  LDD     (R0),AC0
                015436  174003                  STD     AC0,AC3
                015440  004737  015560          JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
                015444  004737  015636          JSR     PC,HCMP         ;CHECK THE DATA.
                015450  077210                  SOB     R2,H7
3384                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 4,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ;THE DATA.
                015452  012700  016000          MOV     #HA4W,R0
                015456  012702  000004          MOV     #4,R2
                015462  010001                  MOV     R0,R1
                015464  005121          H10:    COM     (R1)+
                015466  172410                  LDD     (R0),AC0
                015470  174004                  STD     AC0,AC4
                015472  004737  015560          JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
                015476  004737  015636          JSR     PC,HCMP         ;CHECK THE DATA.
                015502  077210                  SOB     R2,H10
3385                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 5,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ;THE DATA.
                015504  012700  016010          MOV     #HA5W,R0
                015510  012702  000004          MOV     #4,R2
                015514  010001                  MOV     R0,R1
                015516  005121          H11:    COM     (R1)+
                015520  172410                  LDD     (R0),AC0
                015522  174005                  STD     AC0,AC5
                015524  004737  015560          JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
                015530  004737  015636          JSR     PC,HCMP         ;CHECK THE DATA.
                015534  077210                  SOB     R2,H11
3386
3387 015536  005737  015746                  TST     HFLAG
3388 015542  001402                          BEQ     H12
3389 015544  000137  016140                  JMP     HDONE
3390
3391 015550  005137  015746          H12:    COM     HFLAG
3392 015554  000137  015252                  JMP     H3
3393
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3394                                    ;STORE ALL ACCUMULATORS IN THE OUTPUT BUFFERS.
3395 015560  004737  015674             HSTD:   JSR     PC,HCLR                         ;CLEAR ALL OUTPUT BUFFERS.
3396                                    ;STORE ACCUMULATOR 1
     015564  012704  016020                     MOV     #HA1R,R4
     015570  172401                             LDD     AC1,AC0
     015572  174014                             STD     AC0,(R4)
3397                                    ;STORE ACCUMULATOR 2
     015574  012704  016030                     MOV     #HA2R,R4
     015600  172402                             LDD     AC2,AC0
     015602  174014                             STD     AC0,(R4)
3398                                    ;STORE ACCUMULATOR 3
     015604  012704  016040                     MOV     #HA3R,R4
     015610  172403                             LDD     AC3,AC0
     015612  174014                             STD     AC0,(R4)
3399                                    ;STORE ACCUMULATOR 4
     015614  012704  016050                     MOV     #HA4R,R4
     015620  172404                             LDD     AC4,AC0
     015622  174014                             STD     AC0,(R4)
3400                                    ;STORE ACCUMULATOR 5
     015624  012704  016060                     MOV     #HA5R,R4
     015630  172405                             LDD     AC5,AC0
     015632  174014                             STD     AC0,(R4)
3401 015634  000207                             RTS     PC
3402
3403                                    ;COMPARE DATA LOADED WITH DATA READ.
3404 015636  012637  015744             HCMP:   MOV     (SP)+,HADR                      ;SAVE RETURN ADDRESS.
3405 015642  012703  015750                     MOV     #HA1W,R3
3406 015646  012704  016020                     MOV     #HA1R,R4
3407 015652  012705  000024                     MOV     #24,R5
3408 015656  022324                     HCMP1:  CMP     (R3)+,(R4)+
3409 015660  001402                             BEQ     HCMP2
3410 015662  000137  015712                     JMP     HERROR
3411 015666  077505                     HCMP2:  SOB     R5,HCMP1
3412 015670  000177  000050                     JMP     @HADR
3413
3414                                    ;CLEAR THE DATA OUTPUT BUFFER.
3415 015674  012704  016020             HCLR:   MOV     #HA1R,R4
3416 015700  012705  000024                     MOV     #24,R5
3417 015704  005024                     HCLR1:  CLR     (R4)+
3418 015706  077502                             SOB     R5,HCLR1
3419 015710  000207                             RTS     PC
3420
3421                                    ;REPORT ERROR.
3422 015712                             HERROR:
3423 015712  012703  015750                     MOV     #HA1W,R3
3424 015716  012704  001236                     MOV     #$TMP2,R4
3425 015722  012705  000012                     MOV     #12,R5
3426 015726  010324                     1$:     MOV     R3,(R4)+
3427 015730  062703  000010                     ADD     #10,R3
3428 015734  077504                             SOB     R5,1$
3429 015736  104046                     2$:     ERROR   +46
3430 015740  000137  016140                     JMP     HDONE
3431
3432
3433 015744  000000                     HADR:   .WORD   0
3434 015746  000000                     HFLAG:  .WORD   0
3435
```

```
3436 015750  000000  000000  000000  HA1W:   .WORD   0,0,0,0
3437 015760  000000  000000  000000  HA2W:   .WORD   0,0,0,0
3438 015770  000000  000000  000000  HA3W:   .WORD   0,0,0,0
3439 016000  000000  000000  000000  HA4W:   .WORD   0,0,0,0
3440 016010  000000  000000  000000  HA5W:   .WORD   0,0,0,0
3441
3442 016020  000000  000000  000000  HA1R:   .WORD   0,0,0,0
3443 016030  000000  000000  000000  HA2R:   .WORD   0,0,0,0
3444 016040  000000  000000  000000  HA3R:   .WORD   0,0,0,0
3445 016050  000000  000000  000000  HA4R:   .WORD   0,0,0,0
3446 016060  000000  000000  000000  HA5R:   .WORD   0,0,0,0
3447
3448 016070  073567  073567  073567  HDAT1:  .WORD   73567,73567,73567,73567
3449 016100  063146  063146  063146  HDAT2:  .WORD   63146,63146,63146,63146
3450 016110  010421  010421  010421  HDAT3:  .WORD   10421,10421,10421,10421
3451 016120  031463  031463  031463  HDAT4:  .WORD   31463,31463,31463,31463
3452 016130  042104  042104  042104  HDAT5:  .WORD   42104,42104,42104,42104
3453 016140                          HDONE:
     016140  104413                          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?).
3454
3455
```

```
                                    .SBTTL  TEST # 13 - FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
                                    ;;*****************************************************************
                                    ;*TEST 13        FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST
                                    ;*
                                    ;*THIS IS A TEST OF FSRC MODE 0 WITH ACCUMULATORS 6 AND 7  USE OF
                                    ;*EITHER OF THESE NON-EXISTENT ACCUMULATORS SHOULD RESUL  IN A TRAP TO 244
                                    ;*WITH FEC=2 (ILLEGAL FPP INSTRUCTION).
                                    ;*
                                    ;;*****************************************************************
 016142 000004                      TST13:  SCOPE
 016144                             S1:
 016144 012737 016152 001110                MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 016152 170011                      1$:     SETD                            ;SET FD
 016154 012700 016664                       MOV     #SPAT10,R0              ;LOAD AC0
 016160 172410                              LDD     (R0),AC0

 016162 012737 016364 000244                MOV     #SERR0,FPVECT           ;USE OF THE NON-EXISTENT AC-
                                                                            ;CUMULATOR SHOULD RESULT IN
                                                                            ;A TRAP TO 244.
 016170 012700 000001                       MOV     #1,R0                   ;A FAILURE IN THE FSRC FLOWS
                                                                            ;WILL RESULT IN AN ODD ADDRESS
 016174 012737 016574 000004                MOV     #SERR1,ERRVECT          ;TRAP TO 4.
 016202 005003                              CLR     R3

 016204 172407                      S2:     LDD     AC7,AC0
 016206 170000                      S3:     CFCC
 016210 005203                              INC     R3
 016212 005203                      S4:     INC     R3

 016214 012701 016674                       MOV     #SDAT00,R1              ;NO TRAP OCCURRED!!
 016220 174011                              STD     AC0,(R1)                ;SEE IF AC0 WAS MODIFIED.

 016222 012701 016674                       MOV     #SDAT00,R1
 016226 012702 016664                       MOV     #SPAT10,R2
 016232 012703 000004                       MOV     #4,R3
 016236 022122                      S5:     CMP     (R1)+,(R2)+
 016240 001402                              BEQ     S6
 016242 000137 016524                       JMP     SERR2
 016246 077305                      S6:     SOB     R3,S5

 016250 000137 016550                       JMP     SERR3

                                    ;NOW TEST AC6.
 016254                             S7:
 016254 012737 016262 001110                MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 016262 170011                      1$:     SETD

 016264 012700 016664                       MOV     #SPAT10,R0              ;LOAD AC0
 016270 172410                              LDD     (R0),AC0

 016272 012737 016442 000244                MOV     #SERR4,FPVECT
 016300 012700 000001                       MOV     #1,R0
 016304 012737 016626 000004                MOV     #SERR5,ERRVECT
 016312 005003                              CLR     R3

 016314 172406                      S8:     LDD     AC6,AC0
 016316 170000                      S9:     CFCC
```

```
3509 016320  005203                        INC     R3
3510 016322  005203                S10.    INC     R3
3511
3512 016324  012701  016674                MOV     #SDAT00,R1
3513 016330  174011                        STD     AC0,(R1)              ;NO TRAP! GET ACC
3514
3515 016332  012701  016674                MOV     #SDAT00,R1            ;WAS AC0 MODIFIED.
3516 016336  012702  016664                MOV     #SPAT00,R2
3517 016342  012703  000004                MOV     #4,R3
3518 016346  022122                S11:    CMP     (R1)+,(R2)+
3519 016350  001402                        BEQ     S12
3520 016352  000137  016536                JMP     SERR6
3521 016356  077305                S12:    SOB     R3,S11
3522 016360  000137  016562                JMP     SERR7
3523
3524                               ;TRAPPED TO 244.
3525 016364  021627  016206        SERR0:  CMP     (SP),#S3              ;PC OF TRAP CORRECT?
3526 016370  001402                        BEQ     1$
3527 016372  000137  042534                JMP     FPSPUR
3528
3529 016376  012737  016254  016660  1$:   MOV     #S7,SADR
3530
3531 016404  011637  001236        SERR10: MOV     (SP),$TMP2
3532 016410  022626                        CMP     (SP)+,(SP)+
3533 016412  005004                        CLR     R4
3534 016414  170204                        STFPS   R4                    ;IS FPS CORRECT?
3535 016416  022704  100200                CMP     #100200,R4
3536 016422  001020                        BNE     SERR15
3537
3538 016424  005004                        CLR     R4
3539 016426  170304                        STST    R4                    ;IS FEC CORRECT?
3540 016430  022704  000002                CMP     #2,R4
3541 016434  001023                        BNE     SERR20
3542 016436  000177  000216                JMP     @SADR
3543
3544 016442  021627  016316        SERR4:  CMP     (SP),#S9
3545 016446  001402                        BEQ     1$
3546 016450  000137  042534                JMP     FPSPUR
3547 016454  012737  016704  016660  1$:   MOV     #SDONE,SADR
3548 016462  000750                        BR      SERR10
3549
3550                               ;REPORT FPS FAILURE:
3551 016464  012737  100200  001242  SERR15: MOV   #100200,$TMP4
3552 016472  010437  001240                MOV     R4,$TMP3
3553 016476  104117                1$:     ERROR   +117
3554 016500  000177  000154                JMP     @SADR
3555
3556                               ;REPORT FEC BAD:
3557 016504  012737  000002  001242  SERR20: MOV   #2,$TMP4
3558 016512  010437  001240                MOV     R4,$TMP3
3559 016516  104120                1$:     ERROR   +120
3560 016520  000177  000134                JMP     @SADR
3561
3562
3563                               ;AC0 WAS MODIFIED. (BUT FSRC) FORK FAILED.
3564 016524  012737  016204  001236  SERR2:  MOV     #S2,$TMP2
3565 016532  104112                1$:     ERROR   +112
```

```
016534  000463                             BR      SDONE
016536  012737  016314  001236   SERR6:    MOV     #S8,$TMP2
016544  104114                   1$:       ERROR   +114
016546  000456                             BR      SDONE

016550  012737  016204  001236   SERR3:    MOV     #S2,$TMP2
016556  104111                   1$:       ERROR   +111
016560  000451                             BR      SDONE
016562  012737  016314  001236   SERR7:    MOV     #S8,$TMP2
016570  104113                   1$:       ERROR   +113
016572  000444                             BR      SDONE

                                 ;FAILURE OF (BUT FSRC) CAUSED AN ODD ADDRESS TRAP TO 4.
016574  021627  016206           SERR1:    CMP     (SP),#S3              ;DID TRAP OCCUR ON TESTED INSTRUCTION?
016600  001405                             BEQ     1$
016602  021627  016212                     CMP     (SP),#S4
016606  001402                             BEQ     1$
016610  000137  042566                     JMP     CPSPUR

016614  011637  001236           1$:       MOV     (SP),$TMP2
016620  022626                             CMP     (SP)+,(SP)+
016622  104115                   2$:       ERROR   +115
016624  000427                             BR      SDONE

016626  021627  016314           SERR5:    CMP     (SP),#S8              ;DID TRAP OCCUR ON TEST INSTRUCTION?
016632  001405                             BEQ     1$
016634  021627  016316                     CMP     (SP),#S9
016640  001402                             BEQ     1$
016642  000137  042566                     JMP     CPSPUR

016646  011637  001236           1$:       MOV     (SP),$TMP2
016652  022626                             CMP     (SP)+,(SP)+
016654  104116                   2$:       ERROR   +116
016656  000412                             BR      SDONE

016660  000000                   SADR:     0
016662  177777                             -1
016664  010421                   SPAT10:   .WORD   10421
016666  021042                   SPAT11:   .WORD   21042
016670  031463                   SPAT12:   .WORD   31463
016672  042104                   SPAT13:   .WORD   42104

016674  000000                   SDAT00:   .WORD   0
016676  000000                   SDAT01:   .WORD   0
016700  000000                   SDAT02:   .WORD   0
016702  000000                   SDAT03:   .WORD   0

016704                           SDONE:
016704  104413                             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?).
```

```
3621                                    .SBTTL  TEST # 14 - FSRC MODE 2 TEST
                                        ;;*****************************************************************
                                        ;*TEST 14       FSRC MODE 2 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 2, AUTO
                                        ;* INCREMENT MODE.
                                        ;*
                                        ;;*****************************************************************
     006706  000004                     TST14:  SCOPE
3622 016710  012737  016716  001110             MOV     #J1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3623
3624 016716                             J1:
3625 016716  170011                             SETD                    ;SET DOUBLE MODE
3626
3627 016720  012700  017174                     MOV     #JDAT0,R0
3628 016724  172410                             LDD     (R0),AC0        ;LOAD AC0
3629
3630 016726  012700  017154                     MOV     #JDATI0,R0
3631 016732  005003                             CLR     R3
3632 016734  012737  017024  000004             MOV     #JERR0,ERRVECT
3633
3634 016742  172420                     J2      LDD     (R0)+,AC0       ;TEST INSTRUCTION
3635 016744  005203                     J3:     INC     R3
3636 016746  005203                     J4:     INC     R3
3637
3638 016750  012701  017164                     MOV     #JDAT00,R1
3639 016754  174011                             STD     AC0,(R1)        ;PICK UP RESULTS
3640
3641 016756  020027  017144                     CMP     R0,#JBUF0       ;WAS AN AUTO
3642 016762  001001                             BNE     1$              ;DECREMENT EXECUTED?
3643 016764  000442                             BR      JERR1
3644
3645 016766  012702  017154             1$:     MOV     #JDATI0,R2      ;IS DATA CORRECT?
3646 016772  012703  017164                     MOV     #JDAT00,R3
3647 016776  012704  000004                     MOV     #4,R4
3648 017002  022223                     J5:     CMP     (R2)+,(R3)+
3649 017004  001401                             BEQ     J6
3650 017006  000443                             BR      JERR2
3651 017010  077404                     J6:     SOB     R4,J5
3652
3653 017012  022700  017164                     CMP     #JDATI0+10,R0   ;WAS R0 INCREM.
3654 017016  001401                             BEQ     J7              ;BY 10 (OCTAL)
3655 017020  000424                             BR      JERR1
3656
3657 017022  000470                     J7:     BR      JDONE
3658
3659                                    ;IF A TRAP THROUGH 4 OCCURS COME HERE
3660
3661 017024  021627  016744             JERR0:  CMP     (SP),#J3        ;SEE IF THE TRAP
3662 017030  001405                             BEQ     J10             ;OCCURRED ON THE
3663 017032  021627  016746                     CMP     (SP),#J4        ;TESTED INSTRUCTION
3664 017036  001402                             BEQ     J10
3665 017040  000137  042566                     JMP     CPSPUR
3666
3667 017044  012737  000762  001240     J10:    MOV     #762,$TMP3      ;REPORT FSRC FLOW
3668 017052  012737  000322  001242             MOV     #322,$TMP4      ;FAILURE
3669 017060  011637  001236                     MOV     (SP),$TMP2
```

```
     017064  022626                         CMP     (SP)+,(SP)+
     017066  104052                 1$:     ERROR   +52
     017070  000445                         BR      JDONE

     017072                         JERR1:                          ;REPORT, R0 NOT
     017072  012737  016742  001236         MOV     #J2,$TMP2       ;CORRECTLY AFFECTED
     017100  010037  001240                 MOV     R0,$TMP3
     017104  012737  017164  001242         MOV     #JDATI0+10,$TMP4
     017112  104053                 1$:     ERROR   +53
     017114  000433                         BR      JDONE

                                    ;REPORT DATA FAILURE

     017116                         JERR2:
     017116  012737  016742  001236         MOV     #J2,$TMP2
     017124  012737  017154  001240         MOV     #JDATI0,$TMP3
     017132  012737  017164  001242         MOV     #JDATO0,$TMP4
     017140  104054                 1$:     ERROR   +54
     017142  000420                         BR      JDONE

     017144  010421                 JBUF0:  .WORD   010421
     017146  021042                 JBUF1:  .WORD   021042
     017150  042104                 JBUF2:  .WORD   042104
     017152  031463                 JBUF3:  .WORD   031463

     017154  052525                 JDATI0: .WORD   052525
     017156  114631                 JDATI1: .WORD   114631
     017160  063146                 JDATI2: .WORD   063146
     017162  073567                 JDATI3: .WORD   073567

     017164  000000                 JDATO0: .WORD   0
     017166  000000                 JDATO1: .WORD   0
     017170  000000                 JDATO2: .WORD   0
     017172  000000                 JDATO3: .WORD   0

     017174  177777                 JDAT0:  .WORD   -1
     017176  177777                 JDAT1:  .WORD   -1
     017200  177777                 JDAT2:  .WORD   -1
     017202  177777                 JDAT3:  .WORD   -1


     017204                         JDONE:
     017204  104413                         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?).
```

```
                                          .SBTTL  TEST # 15 - FSRC MODE 4 TEST
                                          ;;**************************************************************
                                          ;;*TEST 15        FSRC MODE 4 TEST
                                          ;;*
                                          ;;* THIS IS A TEST OF FSRC MODE 4, AUTO
                                          ;;* DECREMENT MODE.
                                          ;;*
                                          ;;**************************************************************
 017206  000004                           TST15:  SCOPE
 017210  012737  017216  001110                   MOV     #K1,$LPERR        ;SET UP THE LOOP ON ERROR ADDRESS.

 017216                                   K1:
 017216  170011                                   SETD                      ;SET DOUBLE MODE

 017220  012700  017472                           MOV     #KPAT0,R0
 017224  172410                                   LDD     (R0),AC0          ;LOAD A DEFAULT
                                                                            ;PATTERN INTO AC0
 017226  012700  017452                           MOV     #KBUF0,R0
 017232  005003                                   CLR     R3
 017234  012737  017324  000004                   MOV     #KERR0,ERRVECT

 017242  172440                           K2:     LDD     -(R0),AC0         ;TEST INSTRUCTION
 017244  005203                           K3:     INC     R3
 017246  005203                           K4:     INC     R3

 017250  012701  017462                           MOV     #KDAT00,R1
 017254  174011                                   STD     AC0,(R1)          ;PICK UP THE RESULT

 017256  020027  017462                           CMP     R0,#KBUF0+10      ;WAS AN AUTO
 017262  001001                                   BNE     1$                ;INCREMENT EXECUTED
 017264  000441                                   BR      KERR1

 017266  012702  017442                   1$:     MOV     #KDAT10,R2        ;IS DATA CORRECT?
 017272  012703  017462                           MOV     #KDAT00,R3
 017276  012704  000004                           MOV     #4,R4
 017302  022223                           K5:     CMP     (R2)+,(R3)+
 017304  001401                                   BEQ     K6
 017306  000442                                   BR      KERR2
 017310  077404                           K6:     SOB     R4,K5

 017312  022700  017442                           CMP     #KBUF0-10,R0      ;WAS R0 DECREMENTED
 017316  001401                                   BEQ     K7                ;PROPERLY?
 017320  000423                                   BR      KERR1

 017322  000467                           K7:     BR      KDONE

                                          ;TRAP TO HERE ON AN ODD ADDRESS ERROR

 017324  021627  017244                   KERR0:  CMP     (SP),#K3          ;SEE IF THE ERROR
 017330  001405                                   BEQ     K10               ;OCCURRED AT THE
 017332  021627  017246                           CMP     (SP),#K4          ;INSTRUCTION TESTED.
 017336  001402                                   BEQ     K10
 017340  000137  042566                           JMP     CPSPUR

 017344  012737  000762  001240           K10:    MOV     #762,$TMP3        ;REPORT FAILURE IN
 017352  012737  000324  001242                   MOV     #324,$TMP4        ;FSRC FLOWS
 017360  011637  001236                           MOV     (SP),$TMP2
```

```
017364  104055                       1$:     ERROR   +55
017366  000445                               BR      KDONE

017370                               KERR1:                          ;REPORT, R0
017370  012737  017242  001236               MOV     #K2,$TMP2       ;INCORRECTLY AFFECTED.
017376  010037  001240                       MOV     R0,$TMP3
017402  012737  017442  001242               MOV     #KDATI0,$TMP4
017410  104056                       1$:     ERROR   +56
017412  000433                               BR      KDONE

                                     ;REPORT DATA FAILURE

017414                               KERR2:
017414  012737  017242  001236               MOV     #K2,$TMP2
017422  012737  017442  001240               MOV     #KDATI0,$TMP3
017430  012737  017462  001242               MOV     #KDAT00,$TMP4
017436  104057                       1$:     ERROR   +57
017440  000420                               BR      KDONE

017442  052525                       KDATI0: .WORD   052525
017444  114631                       KDATI1: .WORD   114631
017446  063140                       KDATI2: .WORD   063140
017450  073567                       KDATI3: .WORD   073567

017452  010421                       KBUF0:  .WORD   010421
017454  031463                       KBUF1:  .WORD   031463
017456  042104                       KBUF2:  .WORD   042104
017460  021042                       KBUF3:  .WORD   021042

017462  000000                       KDAT00: .WORD   0
017464  000000                       KDAT01: .WORD   0
017466  000000                       KDAT02: .WORD
017470  000000                       KDAT03: .WORD   0

017472  177777                       KPAT0:  .WORD   -1
017474  177777                       KPAT1:  .WORD   -1
017476  177777                       KPAT2:  .WORD   -1
017500  177777                       DPAT3:  .WORD   -1

017502                               KDONE:
017502  104413                               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?).
```

```
                                        .SBTTL  TEST # 16 - FSRC MODE 2, WITH FD=0, TEST
                                ;;*************************************************************
                                ;*TEST 16        FSRC MODE 2, WITH FD=0, TEST
                                ;*
                                ;* THIS IS A TEST OF FSRC MODE 2 WITH
                                ;* FD=0.   (AUTO INCREMENT)
                                ;*
                                ;;*************************************************************
 017504  000004                 TST16:  SCOPE
 017506  012737  017514  001110         MOV     #L1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.

 017514                         L1:
 017514  170011                         SETD                    ;SET DOUBLE MODE

 017516  012700  017764                 MOV     #LPAT10,R0
 017522  172410                         LDD     (R0),AC0        ;LOAD AC0

 017524  012700  020006                 MOV     #LDATI0,R0      ;SET UP THE INPUT
 017530  012701  017774                 MOV     #LPAT20,R1      ;DATA
 017534  012702  000004                 MOV     #4,R2

 017540  012120                 1$:     MOV     (R1)+,(R0)+
 017542  077202                         SOB     R2,1$

 017544  012700  020006                 MOV     #LDATI0,R0
 017550  005003                         CLR     R3
 017552  170001                         SETF                    ;CLEAR FD.

 017554  172420                 L2:     LDF     (R0)+,AC0
 017556  005203                 L3:     INC     R3

 017560                         L4:
 017560  170011                         SETD                    ;SET FD

 017562  012701  020020                 MOV     #LDAT00,R1
 017566  174011                         STD     AC0,(R1)        ;PICK UP RESULTS

 017570  020027  020012                 CMP     R0,#LDATI2      ;WAS R0 INCREMENTED
 017574  001401                         BEQ     1$              ;CORRECTLY BY 4
 017576  000421                         BR      LERR1

 017600  012737  177777  020012 1$:     MOV     #-1,LDATI2
 017606  012737  177777  020014         MOV     #-1,LDATI3
 017614  012702  020006                 MOV     #LDATI0,R2      ;IS DATA CORRECT
 017620  012703  020020                 MOV     #LDAT00,R3
 017624  012704  000004                 MOV     #4,R4

 017630  022223                 L5:     CMP     (R2)+,(R3)+
 017632  001401                         BEQ     L6
 017634  000427                         BR      LERR2
 017636  077404                 L6:     SOB     R4,L5

 017640  000473                         BR      LDONE

 017642                         LERR1:                          ;REPORT FAILURE
 017642  012737  017554  001236         MOV     #L2,$TMP2       ;R0 NOT INCREMENTED
 017650  010037  001240                 MOV     R0,$TMP3        ;BY 4
```

```
3866 017654  012737  020012  001242          MOV     #LDATI2,$TMP4
3867 017662  104060                  '$:     ERROR   +60
3868 017664  000461                          BR      LDONE
3869
3870 017666                          LERR3:                          ;REPORT DATA FAILURE.
3871 017666  012737  017554  001236          MOV     #L2,$TMP2
3872 017674  012737  020006  001240          MOV     #LDATI0,$TMP3
3873 017702  012737  020020  001242          MOV     #LDAT00,$TMP4
3874 017710  104061                  1$:     ERROR   +61
3875 017712  000446                          BR      LDONE
3876
3877 017714  012702  017774          LERR2:  MOV     #LPAT20,R2      ;DID (BUT FD)
3878 017720  012703  020020                  MOV     #LDAT00,R3      ;FAIL.
3879 017724  012704  000004                  MOV     #4,R4
3880 017730  022223                  1$:     CMP     (R2)+,(R3)+
3881 017732  001355                          BNE     LERR3
3882 017734  077403                          SOB     R4,1$
3883 017736  012737  017554  001236          MOV     #L2,$TMP2
3884 017744  012737  020006  001240          MOV     #LDATI0,$TMP3
3885 017752  012737  020022  001242          MOV     #LDAT01,$TMP4
3886 017760  104062                  2$:     ERROR   +62
3887 017762  000422                          BR      LDONE
3888
3889 017764  177777                  LPAT10: .WORD   -1
3890 017766  177777                  LPAT11: .WORD   -1
3891 017770  177777                  LPAT12: .WORD   -1
3892 017772  177777                  LPAT13: .WORD   -1
3893
3894 017774  052525                  LPAT20: .WORD   052525
3895 017776  114631                  LPAT21: .WORD   114631
3896 020000  063142                  LPAT22: .WORD   063142
3897 020002  073567  000001          LPAT23: .WORD   073567,1
3898 020006  000000                  LDATI0: .WORD   0
3899 020010  000000                  LDATI1: .WORD   0
3900 020012  000000                  LDATI2: .WORD   0
3901 020014  000000  000001          LDATI3: .WORD   0,1
3902 020020  000000                  LDAT00: .WORD   0
3903 020022  000000                  LDAT01: .WORD   0
3904 020024  000000                  LDAT02: .WORD   0
3905 020026  000000                  LDAT03: .WORD   0
3906
3907 020030                          LDONE:
     020030  104413                          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?).
3908
3916
```

```
3917                                    .SBTTL  TEST # 17 - FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
                                        ;;*****************************************************************
                                        ;*TEST 17       FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 2
                                        ;* USING GR7 (THE PC).  THIS IS IMMEDIATE
                                        ;* MODE.
                                        ;*
                                        ;;*****************************************************************
     020032  000004                     TST17:  SCOPE
3918
3919 020034                             M1:
3920 020034  170011                             SETD
3921
3922 020036  012700  020330                     MOV     #MPAT10,R0
3923 020042  172410                             LDD     (R0),AC0        ;LOAD BACKROUND
3924                                                                     ;PATTERN INTO AC0.
3925 020044  005004                             CLR     R4
3926 020046  012737  020270  000004             MOV     #MERR3,ERRVECT
3927
3928 020054  172427  000000             M15:    LDD     #0,AC0          ;TEST INSTRUCTION
3929         020056                             .=.-2
3930 020056  005204                             .WORD   5204
3931 020060  005204                     M2:     INC     R4              ;NOTE THAT
3932 020062  005204                     M3:     INC     R4              ;005204=INC R4
3933 020064  005204                     M4:     INC     R4
3934
3935 020066  020427  000003                     CMP     R4,#3           ;SEE IF THE PC
3936 020072  001401                             BEQ     1$              ;WAS INCREMENTED
3937 020074  000443                             BR      MERR0           ;BY 2 DURING THE
3938                                                                     ;INSTRUCTION.  IF
3939                                                                     ;NOT THEN A BAD
3940                                                                     ;CONSTANT WAS GENERATED
3941 020076  012700  020350             1$:     MOV     #MDAT00,R0
3942 020102  174010                             STD     AC0,(R0)        ;GET THE DATA
3943
3944 020104  012700  020350                     MOV     #MDAT00,R0
3945 020110  022720  005204                     CMP     #5204,(R0)+     ;IS THE DATA CORRECT?
3946 020114  001401                             BEQ     M5
3947 020116  000451                             BR      MERR1
3948 020120  012701  000003             M5:     MOV     #3,R1
3949 020124  005720                     M6:     TST     (R0)+
3950 020126  001002                             BNE     M7
3951 020130  077103                             SOB     R1,M6
3952 020132  000512                             BR      MDONE
3953
3954 020134  012700  020350             M7:     MOV     #MDAT00,R0      ;DID (BUT GRM) FAIL?
3955 020140  012701  000004                     MOV     #4,R1
3956 020144  022720  005204             M8:     CMP     #5204,(R0)+
3957 020150  001401                             BEQ     M9
3958 020152  000433                             BR      MERR1
3959 020154  077105                     M9:     SOB     R1,M8
3960
3961 020156                             MERR2:                          ;REPORT FAILURE
3962 020156  012737  020054  001236             MOV     #M15,$TMP2      ;OF (BUT GR7)
3963 020164  012737  020340  001240             MOV     #MPAT20,$TMP3
3964 020172  012737  020350  001242             MOV     #MDAT00,$TMP4
```

```
020200  104063                    1$:     ERROR   +63
020202  000466                            BR      MDONE

020204  012705  020060            MERR0:  MOV     #M2,R5          ;REPORT FAILURE
020210  010537  001242                    MOV     R5,$TMP4        ;PC INCREMENTED
020214  162704  000003                    SUB     #3,R4
020220  006304                            ASL     R4
020222  160405                            SUB     R4,R5
020224  010537  001240                    MOV     R5,$TMP3
020230  012737  020054  001236            MOV     #M15,$TMP2
020236  104064                    1$:     ERROR   +64
020240  000447                            BR      MDONE

020242                            MERR1:                          ;REPORT DATA
020242  012737  020054  001236            MOV     #M15,$TMP2      ;FAILURE
020250  012737  020350  001240            MOV     #MDAT00,$TMP3
020256  012737  020340  001242            MOV     #MPAT20,$TMP4
020264  104066                    1$:     ERROR   +66
020266  000434                            BR      MDONE
                                  ;TRAP TO HERE THROUGH 4.
020270  032716  000001            MERR3:  BIT     #1,(SP)         ;SEE IF THE
020274  001002                            BNE     1$              ;TRAP TO 4 OCCURRED
020276  000137  042566                    JMP     CPSPUR          ;BECAUSE OF AN
                                                                  ;ODD ADDRESS
020302  011637  001240            1$:     MOV     (SP),$TMP3      ;IF YES REPORT
020306  012737  020060  001242            MOV     #M2,$TMP4       ;BAD CONSTANT
020314  012737  020054  001236            MOV     #M15,$TMP2      ;GENERATED
020322  022626                            CMP     (SP)+,(SP)+
020324  104065                    2$:     ERROR   +65
020326  000414                            BR      MDONE

020330  177777                    MPAT10: .WORD   -1
020332  177777                    MPAT11: .WORD   -1
020334  177777                    MPAT12: .WORD   -1
020336  177777                    MPAT13: .WORD   -1

020340  005204                    MPAT20: .WORD   5204
020342  005204                    MPAT21: .WORD   5204
020344  005204                    MPAT22: .WORD   5204
020346  005204                    MPAT23: .WORD   5204

020350  000000                    MDAT00: .WORD   0
020352  000000                    MDAT01: .WORD   0
020354  000000                    MDAT02: .WORD   0
020356  000000                    MDAT03: .WORD   0

020360                            MDONE:
020360  104413                            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?).
```

```
4020                                    .SBTTL  TEST # 20 - FSRC MODE 3 TEST
                                        ;;*****************************************************************
                                        ;;*TEST 20       FSRC MODE 3 TEST
                                        ;;*
                                        ;;* THIS IS A TEST OF FSRC MODE 3, AUTO INCREMENT
                                        ;;* DEFERRED
                                        ;;*
                                        ;;*****************************************************************
    020362  000004                      TST20:  SCOPE
4021
4022 020364                             N1:
4023 020364  170011                             SETD                    ;SET FD MODE
4024
4025 020366  012700  021046                     MOV     #NPAT10,R0
4026 020372  172410                             LDD     (R0),AC0        ;LOAD AC0 WITH A DEFAULT
4027                                                                     ;PATTERN
4028 020374  012700  021034                     MOV     #NPAT20,R0
4029 020400  005003                             CLR     R3
4030 020402  012737  020556  000004             MOV     #NERR0,ERRVECT  ;IF A FAILURE OCCURS
4031                                                                     ;IN THE FSRC FLOWS AN
4032                                                                     ;ODD TRAP TO 4 COULD OCCUR
4033 020410  172430                     N2:     LDD     @(R0)+,AC0      ;TEST INSTRUCTION.
4034 020412  005203                     N3:     INC     R3
4035 020414  005203                     N4:     INC     R3
4036
4037 020416  012701  021014                     MOV     #NDAT00,R1
4038 020422  174011                             STD     AC0,(R1)        ;GET THE DATA
4039
4040 020424  020027  021036                     CMP     R0,#NPAT20+2    ;WAS R0 INCREMENTED
4041 020430  001437                             BEQ     N12             ;BY 2?
4042
4043 020432  020027  021044             N5:     CMP     R0,#NPAT20+10   ;FSRC MODE 2?
4044 020436  001001                             BNE     N6
4045 020440  000506                             BR      NERR1
4046
4047 020442  020027  021024             N6:     CMP     R0,#NPAT20-10   ;FSRC MODE 4?
4048 020446  001001                             BNE     N7
4049 020450  000520                             BR      NERR2
4050
4051 020452  020027  021034             N7:     CMP     R0,#NPAT20
4052 020456  001023                             BNE     N11
4053
4054 020460  012702  021014                     MOV     #NDAT00,R2      ;FSRC MODE 0?
4055 020464  012703  000004                     MOV     #4,R3
4056 020470  022227  177777             N8:     CMP     (R2)+,#-1
4057 020474  001002                             BNE     N9
4058 020476  077304                             SOB     R3,N8
4059 020500  000510                             BR      NERR3
4060
4061 020502  012702  021014             N9:     MOV     #NDAT00,R2      ;FSRC MODE 1
4062 020506  012703  021034                     MOV     #NPAT20,R3
4063 020512  012704  000004                     MOV     #4,R4
4064 020516  022223                     N10:    CMP     (R2)+,(R3)+
4065 020520  001002                             BNE     N11
4066 020522  077403                             SOB     R4,N10
4067 020524  000502                             BR      NERR4
4068
```

```
020526  000505                    N11:    BR      NERR5

020530  012702  021014            N12:    MOV     #NDAT00,R2        ;DATA CORRECT?
020534  012703  021056                    MOV     #NDAT10,R3
020540  012704  000004                    MOV     #4,R4
020544  022223                    N13:    CMP     (R2)+,(R3)+
020546  001002                            BNE     N14
020550  077403                            SOB     R4,N13
020552  000545                            BR      NDONE

020554  000504                    N14:    BR      NERR6

                                  ;IF AN ODD ADDRESS TRAP OCCURS COME HERE
                                  ;TO SEE IF THE FAILURE WAS IN THE FSRC
                                  ;FLOWS

020556  022716  020414            NERR0:  CMP     #N4,(SP)          ;FSRC MODE 6 OR 7?
020562  001412                            BEQ     NERR10
020564  022716  020412                    CMP     #N3,(SP)
020570  001402                            BEQ     1$
020572  000137  042566                    JMP     CPSPUR
020576  020027  021032            1$:     CMP     R0,#NPAT20-2      ;FSRC MODE 5?
020602  001407                            BEQ     NERR11
020604  000137  042566                    JMP     CPSPUR

020610                            NERR10:                           ;WENT TO FSRC
020610  011637  001236                    MOV     (SP),$TMP2        ;MODE 6 OR 7.
020614  022626                            CMP     (SP)+,(SP)+
020616  104067                    1$:     ERROR   +67
020620  000522                            BR      NDONE

020622  011637  001236            NERR11: MOV     (SP),$TMP2        ;WENT TO FSRC
020626  022626                            CMP     (SP)+,(SP)+       ;MODE 5.
020630  012737  000627  001244            MOV     #627,$TMP5
020636  012737  000323  001250            MOV     #323,$TMP7
020644  012737  000325  001246            MOV     #325,$TMP6
020652  104070                    1$:     ERROR   +70
020654  000504                            BR      NDONE
020656  012737  000322  001246    NERR1:  MOV     #322,$TMP6        ;FSRC MODE 2.
020664  012737  000627  001244    NERR20: MOV     #627,$TMP5
020672  012737  000323  001250            MOV     #323,$TMP7
020700  012737  020410  001236            MOV     #N2,$TMP2
020706  104071                    1$:     ERROR   +71
020710  000466                            BR      NDONE
020712  012737  000324  001246    NERR2:  MOV     #324,$TMP6        ;FSRC MODE 4
020720  000761                            BR      NERR20
020722  012737  000320  001246    NERR3:  MOV     #320,$TMP6        ;FSRC MODE 0
020730  000755                            BR      NERR20
020732  012737  000321  001246    NERR4:  MOV     #321,$TMP6        ;FSRC MODE 1
020740  000751                            BR      NERR20

020742  010037  001240            NERR5:  MOV     R0,$TMP3          ;R0 NOT
020746  012737  021036  001242            MOV     #NPAT20+2,$TMP4   ;INCREMENTED
020754  012737  020410  001236            MOV     #N2,$TMP2         ;PROPERLY.
020762  104072                    1$:     ERROR   +72
020764  000440                            BR      NDONE
```

```
4126 020766                            NERR6:                          ;DATA FAILURE.
4127 020766  012737  020410  001236             MOV     #N2,$TMP2
4128 020774  012737  021014  001240             MOV     #NDAT00,$TMP3
4129 021002  012737  021056  001242             MOV     #NDATI0,$TMP4
4130 021010  104073                    1$:      ERROR   +73
4131 021012  000425                             BR      NDONE
4132
4133 021014  000000                    NDAT00: .WORD   0
4134 021016  000000                    NDAT01: .WORD   0
4135 021020  000000                    NDAT02: .WORD   0
4136 021022  000000  052525  052525    NDAT03: .WORD   0,52525,52525,52525,52525
4137 021034  021056                    NPAT20: .WORD   NDATI0
4138 021036  070707                    NPAT21: .WORD   070707
4139 021040  070707                    NPAT22: .WORD   070707
4140 021042  070707  000001            NPAT23: .WORD   070707,1
4141 021046  177777                    NPAT10: .WORD   -1
4142 021050  177777                    NPAT11: .WORD   -1
4143 021052  177777                    NPAT12: .WORD   -1
4144 021054  177777                    NPAT13: .WORD   -1
4145
4146 021056  010421                    NDATI0: .WORD   010421
4147 021060  021042                    NDATI1: .WORD   021042
4148 021062  031463                    NDATI2: .WORD   031463
4149 021064  042104                    NDATI3: .WORD   042104
4150
4151 021066                            NDONE:
     021066  104413                             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?).
4152
4159
```

```
4160                                    .SBTTL  TEST # 21 - FSRC MODE 5 TEST
                                        ;;*****************************************************************
                                        ;*TEST 21       FSRC MODE 5 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 5, AUTO DECREMENT
                                        ;* DEFERRED.
                                        ;*
                                        ;;*****************************************************************
     021070  000004                     TST21:  SCOPE
4161
4162 021072                             01:
4163 021072  170011                             SETD                    ;SET FD MODE
4164
4165 021074  012700  021552                     MOV     #OPAT10,R0
4166 021100  172410                             LDD     (R0),AC0        ;LOAD AC0 WITH A
4167                                                                     ;DEFAULT PATTERN.
4168 021102  012700  021540                     MOV     #OPAT21,R0
4169 021106  005003                             CLR     R3
4170 021110  012737  021262  000004             MOV     #OERR0,ERRVEC   ;IF A FAILURE
4171                                                                     ;OCCURS IN THE FSRC
4172                                                                     ;FLOWS AN ODD ADDR.
4173                                                                     ;TRAP TO 4 MAY OCCUR.
4174 021116  172450                     02:     LDD     @-(R0),AC0      ;TEST INSTRUCTION
4175 021120  005203                     03:     INC     R3
4176 021122  005203                     04:     INC     R3
4177
4178 021124  012701  021520                     MOV     #ODAT00,R1
4179 021130  174011                             STD     AC0,(R1)        ;GET THE DATA
4180
4181 021132  020027  021536                     CMP     R0,#OPAT20      ;WAS R0 DECREMENTED
4182 021136  001436                             BEQ     012             ;BY 2?
4183
4184 021140  020027  021550             05:     CMP     R0,#OPAT21+10   ;FSRC MODE 2
4185 021144  001001                             BNE     06
4186 021146  000505                             BR      OERR1
4187
4188 021150  020027  021530             06:     CMP     R0,#OPAT21-10   ;FSRC MODE 4?
4189 021154  001001                             BNE     07
4190 021156  000517                             BR      OERR2
4191
4192 021160  020027  021540             07:     CMP     R0,#OPAT21
4193
4194 021164  012702  021522                     MOV     #ODAT01,R2      ;FSRC MODE 0?
4195 021170  012703  000004                     MOV     #4,R3
4196 021174  022227  177777             08:     CMP     (R2)+,#-1
4197 021200  001002                             BNE     09
4198 021202  077304                             SOB     R3,08
4199 021204  000510                             BR      OERR3
4200
4201 021206  012702  021520             09:     MOV     #ODAT00,R2      ;FSRC MODE 1?
4202 021212  012703  021540                     MOV     #OPAT21,R3
4203 021216  012704  000004                     MOV     #4,R4
4204 021222  022223                     010:    CMP     (R2)+,(R3)+
4205 021224  001002                             BNE     011
4206 021226  077403                             SOB     R4,010
4207 021230  000502                             BR      OERR4
4208
```

```
021232  000505                          011:    BR      OERR5

021234  012702  021520                  012:    MOV     #ODAT00,R2      ;DATA CORRECT?
021240  012703  021562                          MOV     #ODAT10,R3
021244  012704  000004                          MOV     #4,R4
021250  022223                          013:    CMP     (R2)+,(R3)+
021252  001002                                  BNE     014
021254  077403                                  SOB     R4,013
021256  000545                                  BR      ODONE

021260  000504                          014:    BR      OERR6

                                        ;IF AN ODD ADDRESS TRAP OCCURS COME
                                        ;HERE TO SEE IF THE FAILURE WAS IN THE
                                        ;FSRC FLOWS:

021262  022716  021122                  OERR0:  CMP     #04,(SP)        ;FSRC MODE 6 OR 7?
021266  001412                                  BEQ     OERR10
021270  022716  021120                          CMP     #03,(SP)
021274  001402                                  BEQ     1$
021276  000137  042566                          JMP     CPSPUR
021302  020027  021542                  1$:     CMP     R0,#OPAT21+2    ;FSRC MODE 3?
021306  001425                                  BEQ     OERR1
021310  000137  042566                          JMP     CPSPUR

021314                                  OERR10:                         ;WENT TO FSRC
021314  011637  001236                          MOV     (SP),$TMP2      ;MODE 6 OR 7
021320  022626                                  CMP     (SP)+,(SP)+
021322  104074                          1$:     ERROR   +74
021324  000522                                  BR      ODONE

021326  011637  001240                  OERR11: MOV     (SP),$TMP3      ;WENT TO FSRC MODE
021332  022626                                  CMP     (SP)+,(SP)+     ;3
021334  012737  000627  001244                  MOV     #627,$TMP5
021342  012737  000325  001250                  MOV     #325,$TMP7
021350  012737  000323  001246                  MOV     #323,$TMP6
021356  104075                          1$:     ERROR   +75
021360  000504                                  BR      ODONE

021362  012737  000322  001246          OERR1:  MOV     #322,$TMP6      ;FSRC MODE2
021370  012737  000627  001242          OERR20: MOV     #627,$TMP4
021376  012737  000325  001250                  MOV     #325,$TMP7
021404  012737  021116  001236                  MOV     #02,$TMP2
021412  104076                          1$:     ERROR   +76
021414  000466                                  BR      ODONE
021416  012737  000324  001246          OERR2:  MOV     #324,$TMP6      ;FSRC MODE 4
021424  000761                                  BR      OERR20
021426  012737  000320  001246          OERR3:  MOV     #320,$TMP6      ;FSRC MODE 0
021434  000755                                  BR      OERR20
021436  012737  000321  001246          OERR4:  MOV     #321,$TMP6      ;FSRC MODE 1
021444  000751                                  BR      OERR20

021446  010037  001240                  OERR5:  MOV     R0,$TMP3        ;R0 NOT DECREMENTED
021452  012737  021536  001242                  MOV     #OPAT20,$TMP4   ;PROPERLY
021460  012737  021122  001236                  MOV     #04,$TMP2
021466  104077                          1$:     ERROR   +77
021470  000440                                  BR      ODONE
```

```
     021472                                OERR6:                                  ;DATA FAILURE
     021472  012737  021116  001236                MOV     #02,$TMP2
     021500  012737  021520  001240                MOV     #ODATO0,$TMP3
     021506  012737  021562  001242                MOV     #ODATI0,$TMP4
     021514  104100                        1$:     ERROR   +100
     021516  000425                                BR      ODONE

     021520  000000                        ODAT00: .WORD   0
     021522  000000                        ODAT01: .WORD   0
     021524  000000                        ODAT02: .WORD   0
     021526  000000  052525  052525        ODAT03: .WORD   0,52525,52525,52 25
     021536  021562                        OPAT20: .WORD   ODATI0
     021540  070707                        OPAT21: .WORD   070707
     021542  070707                        OPAT22: .WORD   070707
     021544  070707                        OPAT23: .WORD   070707
     021546  070707  000001                OPAT24: .WORD   070707,1
     021552  177777                        OPAT10: .WORD   -1
     021554  177777                        OPAT11: .WORD   -1
     021556  177777                        OPAT12: .WORD   -1
     021560  177777                        OPAT13: .WORD   -1

     021562  073567                        ODATI0: .WORD   73567
     021564  004210                        ODATI1: .WORD   004210
     021566  114631                        ODATI2: .WORD   114631
     021570  125252                        ODATI3: .WORD   125252

     021572                                ODONE:
     021572  104413                                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?).
```

```
4301                                    .SBTTL  TEST # 22 - FSRC MODE 6 TEST
                                        ;;*****************************************************************
                                        ;*TEST 22       FSRC MODE 6 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 6, INDEX MODE
                                        ;*
                                        ;;*****************************************************************
     021574  000004                     TST22:  SCOPE
4302
4303 021576                             P1:
4304 021576  170011                             SETD                    ;SET FD MODE
4305
4306 021600  012700  022216                     MOV     #PPAT10,R0
4307 021604  172410                             LDD     (R0),AC0        ;LOAD A DEFAULT PATTERN
4308                                                                     ;INTO AC0
4309 021606  012737  021714  000004             MOV     #PERR0,ERRVECT  ;IF THE (BUT FSRC) FORQ
4310                                                                     ;FAILS AN ODD ADDRESS TRAP
4311 021614  012700  021765                     MOV     #PDAT10-241,R0  ;COULD OCCUR.
4312
4313 021620  172460  000241             P2:     LDD     241(R0),AC0
4314         021622                     P3=P2+2
4315
4316 021624  012701  022236             P4:     MOV     #PDAT00,R1
4317 021630  174011                             STD     AC0,(R1)        ;GET THE DATA
4318 021632  012703  000004                     MOV     #4,R3
4319 021636  012702  022226                     MOV     #PDAT10,R2
4320 021642  012701  022236                     MOV     #PDAT00,R1
4321 021646  022221                     P5:     CMP     (R2)+,(R1)+     ;CHECK THE DATA
4322 021650  001007                             BNE     P6
4323 021652  077303                             SOB     R3,P5
4324 021654  022700  021765                     CMP     #PDAT10-241,R0  ;R0 CORRECT?
4325 021660  001401                             BEQ     1$
4326 021662  000512                             BR      PERR21
4327 021664  000137  022246             1$:     JMP     PDONE
4328
4329 021670  012701  022236             P6:     MOV     #PDAT00,R1
4330 021674  012703  000004                     MOV     #4,R3
4331 021700  022721  177777             P7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
4332 021704  001401                             BEQ     P8
4333 021706  000512                             BR      PERR1
4334 021710  077305                     P8:     SOB     R3,P7
4335 021712  000523                             BR      PERR2
4336                                    ;TRAP TO HERE ON AN ODD ADDRESS
4337 021714  021627  021622             PERR0:  CMP     (SP),#P3
4338 021720  001411                             BEQ     PERR11
4339 021722  021627  021624                     CMP     (SP),#P4        ;WAS IT FSRC MODE 7?
4340 021726  001402                             BEQ     PERR10
4341 021730  000137  042566                     JMP     CPSPUR
4342
4343 021734  012737  000327  001246     PERR10: MOV     #327,$TMP6
4344 021742  000443                             BR      PERR17
4345 021744  022700  021765             PERR11: CMP     #PDAT10-241,R0  ;WAS IT FSRC MODE 1
4346 021750  001004                             BNE     PERR12
4347 021752  012737  000321  001246             MOV     #321,$TMP6
4348 021760  000434                             BR      PERR17
4349 021762  022700  021775             PERR12: CMP     #PDAT10-241+10,R0       ;WAS IT FSRC MODE 2
4350 021766  001004                             BNE     PERR13
```

```
                        ;TEST # 22 - FSRC MODE 6 TEST

 4351 021770 012737 000322 001246          MOV     #322,$TMP6
 4352 021776 000425                        BR      PERR17
 4353 022000 022700 021767          PERR13: CMP     #PDATI0-241+2,R0        ;WAS IT FSRC MODE 3
 4354 022004 001004                        BNE     PERR14
 4355 022006 012737 000323 001246          MOV     #323,$TMP6
 4356 022014 000416                        BR      PERR17
 4357 022016 022700 021755          PERR14: CMP     #PDATI0-241-10,R0       ;WAS IT FSRC MODE 4
 4358 022022 001004                        BNE     PERR15
 4359 022024 012737 000324 001246          MOV     #324,$TMP6
 4360 022032 000407                        BR      PERR17
 4361 022034 022700 021763          PERR15: CMP     #PDATI0-241-2,R0        ;WAS IT FSRC MODE 5
 4362 022040 001401                        BEQ     PERR16
 4363 022042 000416                        BR      PERR20
 4364 022044 012737 000325 001246  PERR16: MOV     #325,$TMP6
 4365
 4366 022052 012737 000627 001244  PERR17: MOV     #627,$TMP5              ;REPORT FSRC
 4367 022060 012737 000326 001250          MOV     #326,$TMP7              ;FLOWS FAILURE.
 4368 022066 011637 001236                 MOV     (SP),$TMP2
 4369 022072 022626                        CMP     (SP)+,(SP)+
 4370 022074 104101                 1$:    ERROR   +101
 4371 022076 000463                        BR      PDONE
 4372
 4373 022100 011637 001236          PERR20: MOV     (SP),$TMP2              ;REPORT R0 AFFECTED
 4374 022104 022626                        CMP     (SP)+,(SP)+
 4375 022106 000403                        BR      PERR22
 4376 022110 012737 021620 001236  PERR21: MOV     #P2,$TMP2
 4377 022116                       PERR22:
 4378 022116 010037 001240                 MOV     R0,$TMP3
 4379 022122 012737 021765 001242          MOV     #PDATI0-241,$TMP4
 4380 022130 104102                 1$:    ERROR   +102
 4381 022132 000445                        BR      PDONE
 4382
 4383 022134                       PERR1:                                  ;DATA FAILURE.
 4384 022134 012737 021620 001236          MOV     #P2,$TMP2
 4385 022142 012737 022226 001240          MOV     #PDATI0,$TMP3
 4386 022150 012737 022236 001242          MOV     #PDATO0,$TMP4
 4387 022156 104104                 1$:    ERROR   +104
 4388 022160 000432                        BR      PDONE
 4389
 4390 022162                       PERR2:                                  ;FSRC FAILURE TO
 4391 022162 012737 021620 001236          MOV     #P2,$TMP2               ;MODE 0
 4392 022170 012737 000627 001244          MOV     #627,$TMP5
 4393 022176 012737 000326 001250          MOV     #326,$TMP7
 4394 022204 012737 000320 001246          MOV     #320,$TMP6
 4395 022212 104103                 1$:    ERROR   +103
 4396 022214 000414                        BR      PDONE
 4397
 4398 022216 177777                PPATI0: .WORD   -1
 4399 022220 177777                PPATI1: .WORD   -1
 4400 022222 177777                PPATI2: .WORD   -1
 4401 022224 177777                PPATI3: .WORD   -1
 4402
 4403 022226 010421                PDATI0: .WORD   010421
 4404 022230 031463                PDATI1: .WORD   031463
 4405 022232 052525                PDATI2: .WORD   052525
 4406 022234 073567                PDATI3: .WORD   073567
 4407
```

```
4408 022236  000000          PDAT00: .WORD   0
4409 022240  000000          PDAT01: .WORD   0
4410 022242  000000          PDAT02: .WORD   0
4411 022244  000000          PDAT03: .WORD   0
4412
4413 022246                  PDONE:
     022246  104413                  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?).
4414
4420
```

```
4422                                    .SBTTL  TEST # 23 - FSRC MODE 7 TEST
                                        ;;*****************************************************
                                        ;*TEST 23       FSRC MODE 7 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 7, INDEX
                                        ;* DEFERRED MODE.
                                        ;*
                                        ;;*****************************************************
     022250  000004                     TST23:  SCOPE
4423
4424 022252                             Q1:
4425 022252  170011                             SETD
4426
4427 022254  012700  022706                     MOV     #QPAT10,R0
4428 022260  172410                             LDD     (R0),AC0        ;LOAD A DEFAULT
4429                                                                     ;PATTERN INTO AC0
4430 022262  012737  022414  000004             MOV     #QERR0,ERRVECT  ;IF THE (BUT FSRC)
4431                                                                     ;FORK FAILS AN
4432                                                                     ;ODD ADR TRAP COULD
4433                                                                     ;OCCUR
4434 022270  012700  022455                     MOV     #QPAT20-241,R0
4435
4436 022274  172470  000241             Q2:     LDD     @241(R0),AC0
4437         022276                     Q3=Q2+2
4438
4439 022300  012701  022726             Q4:     MOV     #QDAT00,R1
4440 022304  174011                             STD     AC0,(R1)        ;GET THE DATA
4441
4442 022306  012703  000004                     MOV     #4,R3
4443 022312  012704  022726                     MOV     #QDAT00,R4
4444 022316  012705  022736                     MOV     #QDAT10,R5
4445 022322  022425                     Q5:     CMP     (R4)+,(R5)+     ;CHECK THE DATA
4446 022324  001007                             BNE     Q6
4447 022326  077303                             SOB     R3,Q5
4448
4449 022330  022700  022455                     CMP     #QPAT20-241,R0  ;CHECK R0.
4450 022334  001401                             BEQ     1$
4451 022336  000514                             BR      QERR21
4452 022340  000137  022746             1$:     JMP     QDONE
4453
4454 022344  012701  022726             Q6:     MOV     #QDAT00,R1
4455 022350  012703  000004                     MOV     #4,R3
4456 022354  022721  177777             Q7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
4457 022360  001002                             BNE     Q8
4458 022362  077304                             SOB     R3,Q7
4459 022364  000513                             BR      QERR2
4460
4461 022366  012701  022716             Q8:     MOV     #QPAT20,R1
4462 022372  012702  022726                     MOV     #QDAT00,R2
4463 022376  012703  000004                     MOV     #4,R3
4464 022402  022122                     Q9:     CMP     (R1)+,(R2)+     ;WAS IT FSRC 6
4465 022404  001401                             BEQ     Q10             ;OR DATA FAILURE
4466 022406  000524                             BR      QERR1
4467 022410  077304                     Q10:    SOB     R3,Q9
4468 022412  000504                             BR      QERR3
4469
4470                                    ;TRAP TO HERE ON AN ODD ADR FAILURE
```

```
4471
4472 022414  021627  021622          QERR0:  CMP     (SP),#P3
4473 022420  000137  042566                  JMP     CPSPUR
4474
4475 022424  022700  022455          QERR11: CMP     #QPAT20-241,R0  ;WAS IT FSRC
4476 022430  001004                          BNE     QERR12          ;MODE 1?
4477 022432  012737  000321  001246          MOV     #321,$TMP6
4478 022440  000434                          BR      QERR17
4479 022442  022700  022465          QERR12: CMP     #QPAT20-241+10,R0       ;WAS IT FSRC
4480 022446  001004                          BNE     QERR13          ;MODE 2?
4481 022450  012737  000322  001246          MOV     #322,$TMP6
4482 022456  000425                          BR      QERR17
4483 022460  022700  022457          QERR13: CMP     #QPAT20-241+2,R0        ;WAS IT FSRC
4484 022464  001004                          BNE     QERR14          ;MODE 3?
4485 022466  012737  000323  001246          MOV     #323,$TMP6
4486 022474  000416                          BR      QERR17
4487 022476  022700  022445          QERR14: CMP     #QPAT20-241-10,R0       ;WAS IT FSRC
4488 022502  001004                          BNE     QERR15          ;MODE 4
4489 022504  012737  000324  001246          MOV     #324,$TMP6
4490 022512  000407                          BR      QERR17
4491
4492 022514  022700  022453          QERR15: CMP     #QPAT20-241-2,R0        ;WAS IT FSRC
4493 022520  001401                          BEQ     QERR16          ;MODE 5
4494 022522  000416                          BR      QERR20
4495
4496 022524  012737  000325  001246  QERR16: MOV     #325,$TMP6
4497
4498 022532  012737  000627  001244  QERR17: MOV     #627,$TMP5      ;REPORT FSRC FAILURE
4499 022540  012737  000327  001250          MOV     #327,$TMP7
4500 022546  011637  001236                  MOV     (SP),$TMP2
4501 022552  022626                          CMP     (SP)+,(SP)+
4502 022554  104105                  1$:     ERROR   +105
4503 022556  000473                          BR      QDONE
4504
4505 022560  011637  001236          QERR20: MOV     (SP),$TMP2      ;REPORT R0 AFFECTED.
4506 022564  022626                          CMP     (SP)+,(SP)+
4507 022566  000403                          BR      QERR22
4508 022570  012737  022274  001236  QERR21: MOV     #Q2,$TMP2
4509 022576                          QERR22:
4510 022576  010037  001240                  MOV     R0,$TMP3
4511 022602  012737  022455  001242          MOV     #QPAT20-241,$TMP4
4512 022610  104106                  1$:     ERROR   +106
4513 022612  000455                          BR      QDONE
4514
4515 022614  012737  000320  001246  QERR2:  MOV     #320,$TMP6      ;WENT TO FSRC
4516 022622  000403                          BR      QERR4           ;MODE 0
4517 022624  012737  000326  001246  QERR3:  MOV     #326,$TMP6      ;WENT TO FSRC
4518                                                                  ;MODE 6
4519 022632  012737  000627  001244  QERR4:  MOV     #627,$TMP5
4520 022640  012737  000327  001250          MOV     #327,$TMP7
4521 022646  012737  022274  001236          MOV     #Q2,$TMP2
4522 022654  104107                  1$:     ERROR   +107
4523 022656  000433                          BR      QDONE
4524
4525 022660                          QERR1:                          ;DATA FAILURE
4526 022660  012737  022274  001236          MOV     #Q2,$TMP2
4527 022666  012737  022736  001240          MOV     #QDATI0,$TMP3
```

```
4528 022674  012737  022726  001242          MOV     #QDAT00,$TMP4
4529 022702  104110                  1$:     ERROR   +110
4530 022704  000420                          BR      QDONE
4531
4532 022706  177777                  QPAT10: .WORD   -1
4533 022710  177777                  QPAT11: .WORD   -1
4534 022712  177777                  QPAT12: .WORD   -1
4535 022714  177777                  QPAT13: .WORD   -1
4536
4537 022716  022736                  QPAT20: .WORD   QDAT10
4538 022720  052525                  QPAT21: .WORD   52525
4539 022722  052525                  QPAT22: .WORD   52525
4540 022724  052525                  QPAT23: .WORD   52525
4541
4542 022726  000000                  QDAT00: .WORD   0
4543 022730  000000                  QDAT01: .WORD   0
4544 022732  000000                  QDAT02: .WORD   0
4545 022734  000000                  QDAT03: .WORD   0
4546
4547 022736  073567                  QDAT10: .WORD   073567
4548 022740  052525                  QDAT11: .WORD   052525
4549 022742  031463                  QDAT12: .WORD   031463
4550 022744  010421                  QDAT13: .WORD   010421
4551
4552 022746                           QDONE:
     022746  104413                          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?).
4553
```

```
                                            .SBTTL  TEST # 24 - (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
                                            ;;****************************************************************
                                            ;;*TEST 24        (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST
                                            ;;*
                                            ;;* THIS IS A TEST OF THE (BUT EZBT Y8) FORK, THE
                                            ;;* (BUT ENBT) FORK AND (BUT FIUV) FORK IN THE
                                            ;;* LOAD INSTRUCTION FLOWS.
                                            ;;* EACH OF THE PATTERNS:
                                            ;;*                 0
                                            ;;*                 +NUM
                                            ;;*                 -NUM
                                            ;;*                 -0
                                            ;;* IS LOADED TWICE, ONCE WITH AC>0 THEN
                                            ;;* WITH AC=0.  AFTER EACH LOAD THE FPS IS
                                            ;;* CHECK TO INSURE THAT CONTROL WAS PASSED
                                            ;;* THROUGH WITH THE FORKS PROPERLY.
                                            ;;*
                                            ;;****************************************************************
022750  000004                              TST24:  SCOPE
022752  005037  024074                              CLR     UFLAG
022756  012700  024024                              MOV     #UPAT00,R0      ;SET UP AC#0 DATA.
022762  012701  000004                              MOV     #4,R1
022766  012720  177777                      U0:     MOV     #-1,(R0)+
022772  077103                                      SOB     R1,U0

022774  012737  000033  024076                      MOV     #033,UTMP1
023002  012737  000023  024100                      MOV     #023,UTMP2
023010  012737  023554  000244                      MOV     #UERR0,FPVECT   ;IN CASE (BUT FIUV FAILS)
023016                                      U1:
023016  012737  023024  001110                      MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
023024  012700  000200                      1$:     MOV     #200,R0
023030  170100                                      LDFPS   R0
023032  012700  024024                              MOV     #UPAT00,R0      ;LOAD AC0
023036  172410                                      LDD     (R0),AC0
023040  013737  024076  024102                      MOV     UTMP1,UROM1
023046  012737  000001  024104                      MOV     #001,UROM2
023054  012737  000254  024106                      MOV     #254,UROM3

023062  012700  024034                              MOV     #UPAT10,R0      ;LOAD 0 INTO AC0
023066  172410                              U2:     LDD     (R0),AC0
023070  010037  001252                              MOV     R0,$TMP10
023074  012737  023066  001236                      MOV     #U2,$TMP2

023102  012704  000204                              MOV     #204,R4         ;SEE IF FPS IS CORRECT
023106  170205                                      STFPS   R5

023110  020405                                      CMP     R4,R5
023112  001402                                      BEQ     U3
023114  000137  023600                              JMP     UERR1

023120                                      U3:
023120  012737  023126  001110                      MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
023126  012700  000200                      1$:     MOV     #200,R0
023132  170100                                      LDFPS   R0

023134  012700  024024                              MOV     #UPAT00,R0      ;LOAD AC0
023140  172410                                      LDD     (R0),AC0
```

```
4607 023142  013737  024100  024102          MOV     UTMP2,UROM1
4608 023150  012737  000003  024104          MOV     #003,UROM2
4609 023156  012737  000054  024106          MOV     #054,UROM3
4610
4611 023164  012700  024044                  MOV     #UPAT20,R0      ;LOAD A POSITIVE NUMBER
4612                                                                 ;INTO AC0
4613 023170  172410                  U4:     LDD     (R0),AC0
4614 023172  010037  001252                  MOV     R0,$TMP10
4615 023176  012737  023170  001236          MOV     #U4,$TMP2
4616 023204  012704  000200                  MOV     #200,R4         ;FPS CORRECT?
4617 023210  170205                         STFPS   R5
4618 023212  020405                         CMP     R4,R5
4619 023214  001402                         BEQ     U5
4620 023216  000137  023664                  JMP     UERR2
4621 023222                          U5:
     023222  012737  023230  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4622 023230  012700  000200          1$:     MOV     #200,R0
4623 023234  170100                         LDFPS   R0
4624 023236  012700  024024                  MOV     #UPAT00,R0      ;LOAD AC0
4625 023242  172410                         LDD     (R0),AC0
4626 023244  013737  024100  024102          MOV     UTMP2,UROM1
4627 023252  012737  000403  024104          MOV     #403,UROM2
4628 023260  012737  000056  024106          MOV     #056,UROM3
4629 023266  012700  024054                  MOV     #UPAT30,R0      ;LOAD A NEGATIUE
4630                                                                 ;NUMBER INTO AL0
4631 023272  172410                  U6:     LDD     (R0),AC0
4632 023274  010037  001252                  MOV     R0,$TMP10
4633 023300  012737  023272  001236          MOV     #U6,$TMP2
4634 023306  012704  000210                  MOV     #210,R4         ;FPS CORRECT
4635 023312  170205                         STFPS   R5
4636 023314  020405                         CMP     R4,R5
4637 023316  001402                         BEQ     U7
4638 023320  000137  023664                  JMP     UERR2
4639 023324                          U7:
     023324  012737  023332  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4640 023332  012700  000200          1$:     MOV     #200,R0
4641 023336  170100                         LDFPS   R0
4642 023340  012700  024024                  MOV     #UPAT00,R0      ;LOAD AC0
4643 023344  172410                         LDD     (R0),AC0
4644 023346  013737  024076  024102          MOV     UTMP1,UROM1
4645 023354  012737  000401  024104          MOV     #401,UROM2
4646 023362  012737  000256  024106          MOV     #256,UROM3
4647 023370  012700  024064                  MOV     #UPAT40,R0      ;LOAD -0 INTO AC0
4648 023374  172410                  U10:    LDD     (R0),AC0
4649 023376  000240                  U11:    NOP                     ;TRAP FROM HERE IF
4650 023400  010037  001252                  MOV     R0,$TMP10
4651 023404  012737  023374  001236          MOV     #U10,$TMP2      ;(BUT FIUV) FAULS!
4652 023412  012704  000214                  MOV     #214,R4         ;SEE IF FPS IS CORRECT.
4653 023416  170205                         STFPS   R5
4654 023420  020405                         CMP     R4,R5
4655 023422  001402                         BEQ     U12
4656 023424  000137  023600                  JMP     UERR1
4657 023430  005737  024074          U12:    TST     UFLAG           ;SEE IF ALL THE PATTERNS
4658 023434  001021                         BNE     U14             ;HAVE BEEN TEST WITH
4659                                                                 ;BOTH AC NOT EQUAL TO 0 AND AC=0
4660 023436  012700  024024                  MOV     #UPAT00,R0      ;IF NOT GO BACK AND
4661 023442  012701  000004                  MOV     #4,R1           ;CHECK THEM WITH AC=0
```

```
023446  005020                   U13:    CLR     (R0)+
023450  077102                           SOB     R1,U13
023452  012737  177777  024074           MOV     #-1,UFLAG
023460  012737  000233  024076           MOV     #233,UTMP1
023466  012737  000223  024100           MOV     #223,UTMP2
023474  000137  023016                   JMP     U1
023500                           U14:
023500  012737  023506  001110           MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
                                 ;NOW SEE IF A TRAP CAN BE FORCED BY SETTING FIUV AND LOADING -0
023506  012737  023750  000244   1$:     MOV     #UERR3,FPVECT
023514  012700  004200                   MOV     #4200,R0        ;SET FD AND FIUV
023520  170100                           LDFPS   R0
023522  012700  024024                   MOV     #UPAT00,R0      ;SET UP AC0
023526  172410                           LDD     (R0),AC0
023530  012700  024064                   MOV     #UPAT40,R0      ;LOAD -0
023534  172410                   U15:    LDD     (R0),AC0        ;SHOULD TRAP TO 244
023536  170000                   U16:    CFCC
023540  000240                           NOP
023542  012737  023534  001236           MOV     #U15,$TMP2      ;REPORT ERROR.
                                                                 ;DIDN'T TRAP
023550  104127                   1$:     ERROR   +127            ;(BUT FIUV) FAILED.
023552  000556                           BR      UDONE

                                 ;TRAPPED TO 244.  DID (BUT FIUV) FAIL?
023554  021627  023376           UERR0:  CMP     (SP),#U11
023560  001402                           BEQ     1$
023562  000137  042534                   JMP     FPSPUR
023566  011637  001236           1$:     MOV     (SP),$TMP2
023572  022626                           CMP     (SP)+,(SP)+
023574  104126                   2$:     ERROR   +126
023576  000544                           BR      UDONE

                                 ;COME HERE TO ANALYZE FPS ERRORS

023600  032705  000004           UERR1:  BIT     #4,R5
023604  001432                           BEQ     UERR20
023606  012737  000443  001244   UERR10: MOV     #443,$TMP5
023614  013703  024106                   MOV     UROM3,R3
023620  010337  001250                   MOV     R3,$TMP7
023624  032703  000200                   BIT     #200,R3
023630  001403                           BEQ     1$
023632  042703  000200                   BIC     #200,R3
023636  000402                           BR      2$
023640  052703  000200           1$:     BIS     #200,R3
023644  010337  001246           2$:     MOV     R3,$TMP6
023650  010537  001240           UERR11: MOV     R5,$TMP3
023654  010437  001242                   MOV     R4,$TMP4
023660  104124                   1$:     ERROR   +124
023662  000512                           BR      UDONE
023664  032705  000004           UERR2:  BIT     #4,R5
023670  001746                           BEQ     UERR10
023672  013737  024102  001244   UERR20: MOV     UROM1,$TMP5
023700  013703  024104                   MOV     UROM2,R3
023704  010337  001250                   MOV     R3,$TMP7
023710  032703  000400                   BIT     #400,R3
023714  001403                           BEQ     1$
023716  042703  000400                   BIC     #400,R3
```

```
023722  000402                                   BR      2$
023724  052703  000400                   1$:     BIS     #400,R3
023730  010337  001246                   2$:     MOV     R3,$TMP6
023734  010537  001240                   UERR21: MOV     R5,$TMP3
023740  010437  001242                           MOV     R4,$TMP4
023744  104125                           1$:     ERROR   +125
023746  000460                                   BR      UDONE

                                         ;INTERRUPT HERE WHEN FIUV SET AND ATTEMPTED TO LOAD-0
023750  021627  023536                   UERR3:  CMP     (SP),#U16
023754  001402                                   BEQ     1$
023756  000137  042534                           JMP     FPSPUR
023762  022626                           1$:     CMP     (SP)+,(SP)+
023764  005000                                   CLR     R0
023766  170300                                   STST    R0              ;GET FEC.
023770  022700  000014                           CMP     #14,R0          ;CORRECT
023774  001001                                   BNE     UERR4
023776  000444                                   BR      UDONE
024000  012737  023534  001236           UERR4:  MOV     #U15,$TMP2
024006  012737  000012  001242                   MOV     #12,$TMP4
024014  010037  001240                           MOV     R0,$TMP3
024020  104130                           1$:     ERROR   +130
024022  000432                                   BR      UDONE
024024  000000                           UPAT00: .WORD   0
024026  000000                           UPAT01: .WORD   0
024030  000000                           UPAT02: .WORD   0
024032  000000                           UPAT03: .WORD   0

024034  000000                           UPAT10: .WORD   0               ;0
024036  000000                           UPAT11: .WORD   0
024040  000000                           UPAT12: .WORD   0
024042  000000                           UPAT13: .WORD   0

024044  010421                           UPAT20: .WORD   010421          ;POS NUM
024046  114631                           UPAT21: .WORD   114631
024050  125252                           UPAT22: .WORD   125252
024052  177777                           UPAT23: .WORD   177777

024054  114631                           UPAT30: .WORD   114631          ;NEG NUM
024056  135673                           UPAT31: .WORD   135673
024060  146314                           UPAT32: .WORD   146314
024062  167356                           UPAT33: .WORD   167356

024064  100000                           UPAT40: .WORD   100000          ;NEG ZERO
024066  000000                           UPAT41: .WORD   0
024070  000000                           UPAT42: .WORD   0
024072  000000                           UPAT43: .WORD   0

024074  000000                           UFLAG:  .WORD   0
024076  000000                           UTMP1:  .WORD   0
024100  000000                           UTMP2:  .WORD   0
024102  000000                           UROM1:  .WORD   0
024104  000000                           UROM2:  .WORD   0
024106  000000                           UROM3:  .WORD   0
024110                                   UDONE:
```

```
                                        .SBTTL  TEST # 25 - ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
                                        ;;*****************************************************************
                                        ;*TEST 25       ADDF,ADDD,SUBF AND 'UBD WITH FSRC=AC=0 TEST

                                        ;*
                                        ;* THIS IS A TEST OF ADD AND SUB WITH FSRC=AC=0
                                        ;*

                                        ;;*****************************************************************
 024110 000004                          TST25:  SCOPE
 024112                                 W1:
 024112 012737  024120  001110                  MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 024120 012700  000200                  1$:     MOV     #200,R0
 024124 170100                                  LDFPS   R0              ;SET DOUBLE MODE
 024126 012700  024664                          MOV     #WPAT00,R0      ;LOAD AC0=:
 024132 172410                                  LDD     (R0),AC0
 024134 012737  024146  001236                  MOV     #W2,$TMP2
 024142 012700  024664                          MOV     #WPAT00,R0
 024146 172010                          W2:     ADDD    (R0),AC0        ;TEST INSTRUCTION.
 024150 170205                                  STFPS   R5              ;GET FPS
 024152 170011                                  SETD                    ;SET DOUBLE MODE
 024154 012700  024664                          MOV     #WPAT00,R0
 024160 174010                                  STD     AC0,(R0)        ;GET THE RESULT
 024162 012701  024664                          MOV     #WPAT00,R1
 024166 012702  000004                          MOV     #4,R2
 024172 022021                          W3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT
 024174 001405                                  BEQ     W4
                                                                        ;NO
 024176 004737  024632                          JSR     PC,WSETUP
 024202 104133                          1$:     ERROR   +133
 024204 000137  024704                          JMP     WDONE
 024210 077210                          W4:     SOB     R2,W3
 024212 022705  000204                          CMP     #204,R5         ;IS FPS CORRECT
 024216 001410                                  BEQ     W5
                                                                        ;NO
 024220 012737  000204  001242                  MOV     #204,$TMP4
 024226 010537  001240                          MOV     R5,$TMP3
 024232 104137                          1$:     ERROR   +137
 024234 000137  024704                          JMP     WDONE
 024240                                 W5:
 024240 012737  024246  001110                  MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 024246 012700  000200                  1$:     MOV     #200,R0
 024252 170100                                  LDFPS   R0              ;SET DOUBLE MODE
 024254 012700  024664                          MOV     #WPAT00,R0      ;LOAD AC0=0
 024260 172410                                  LDD     (R0),AC0
 024262 012737  024300  001236                  MOV     #W6,$TMP2
 024270 005000                                  CLR     R0
 024272 170100                                  LDFPS   R0              ;GO TO FLOATING MODE
 024274 012700  024664                          MOV     #WPAT00,R0
 024300 172010                          W6:     ADDF    (R0),AC0        ;TEST INSTRUCTION
 024302 170205                                  STFPS   R5              ;GET FPS
 024304 170011                                  SETD                    ;RESET TO DOUBLE MODE
 024306 012700  024664                          MOV     #WPAT00,R0
 024312 174010                                  STD     AC0,(R0)        ;GET THE RESULT
 024314 012701  024664                          MOV     #WPAT00,R1
 024320 012702  000004                          MOV     #4,R2
 024324 022021                          W7:     CMP     (R0)+,(R1)+     ;WAS THE RESULT
```

```
024326  001402                      BEQ     W10             ;NO. REPORT FAILURE.
024330  104134              1$:     ERROR   +134
024332  000564                      BR      WDONE
024334  077205              W10:    SOB     R2,W7
024336  022705  000004              CMP     #4,R5           ;WAS FPS CORRECT
024342  001407                      BEQ     W11
                                                            ;INCORRECT FPS.
024344  012737  000004  001242      MOV     #4,$TMP4
024352  010537  001240              MOV     R5,$TMP3
024356  104140              1$:     ERROR   +140
024360  000551                      BR      WDONE
024362                      W11:
024362  012737  024370  001110      MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
024370  012700  000200      1$:     MOV     #200,R0
024374  170100                      LDFPS   R0              ;SET DOUBLE MODE
024376  012700  024664              MOV     #WPAT00,R0      ;LOAD AC0=0
024402  172410                      LDD     (R0),AC0
024404  012737  024416  001236      MOV     #W12,$TMP2
024412  012700  024664              MOV     #WPAT00,R0
024416  173010              W12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
024420  170205                      STFPS   R5              ;GET FPS
024422  170011                      SETD                    ;SET DOUBLE MODE
024424  012700  024664              MOV     #WPAT00,R0
024430  174010                      STD     AC0,(R0)        ;GET THE RESULT
024432  012701  024664              MOV     #WPAT00,R1
024436  012702  000004              MOV     #4,R2
024442  022021              W13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
024444  001404                      BEQ     W14
                                                            ;NO.
024446  004737  024632              JSR     PC,WSETUP
024452  104135              1$:     ERROR   +135
024454  000513                      BR      WDONE
024456  077207              W14:    SOB     R2,W13
024460  022705  000204              CMP     #204,R5         ;IS FPS CORRECT?
024464  001407                      BEQ     W15
                                                            ;NO.
024466  012737  000204  001242      MOV     #204,$TMP4
024474  010537  001240              MOV     R5,$TMP3
024500  104141              1$:     ERROR   +141
024502  000500                      BR      WDONE
024504                      W15:
024504  012737  024512  001110      MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
024512  012700  000200      1$:     MO\     #200,R0
024516  170100                      LDFPS   R0              ;SET DOUBLE MODE
024520  012700  024664              MOV     #WPAT00,R0      ;LOAD AC0=0
024524  172410                      LDD     (R0),AC0
024526  012737  024544  001236      MOV     #W16,$TMP2
024534  005000                      CLR     R0
024536  170100                      LDFPS   R0              ;ENTER FLOATING MODE.
024540  012700  024664              MOV     #WPAT00,R0
024544  173010              W16:    SUBF    (R0),AC0        ;TEST INSTRUCTION.
024546  170205                      STFPS   R5              ;GET FPS
024550  170011                      SETD                    ;RESET TO DOUBLE MODE
024552  012700  024664              MOV     #WPAT00,R0      ;GET THE RESULT.
024556  174010                      STD     AC0,(R0)
024560  012701  024664              MOV     #WPAT00,R1
024564  012702  000004              MOV     #4,R2
```

```
024570  022021                   W17:    CMP     (R0)+,(R1)+      ;IS RESULT CORRECT?
024572  001404                           BEQ     W20
                                                                  ;NO.
024574  004737  024632                   JSR     PC,WSETUP
024600  104136                   1$:     ERROR   +136
024602  000440                           BR      WDONE
024604  077207                   W20:    SOB     R2,W17
024606  022705  000004                   CMP     #4,R5            ;IS FPS CORRECT?
024612  001434                           BEQ     WDONE
                                                                  ;NO
024614  012737  000004  001242           MOV     #4,$TMP4
024622  010537  001240                   MOV     R5,$TMP3
024626  104142                   1$:     ERROR   +142
024630  000425                           BR      WDONE

                                 ;SET UP FOR ERROR CALL

024632  012737  024664  001240   WSETUP: MOV     #WPAT00,$TMP3
024640  012737  024664  001242           MOV     #WPAT00,$TMP4
024646  012737  024664  001246           MOV     #WPAT00,$TMP6
024654  012737  024664  001244           MOV     #WPAT00,$TMP5
024662  000207                           RTS     PC
024664  000000                   WPAT00: .WORD   0
024666  000000                   WPAT01: .WORD   0
024670  000000                   WPAT02: .WORD   0
024672  000000                   WPAT03: .WORD   0

024674  000000                   WDAP00: .WORD   0
024676  000000                   WDAT01: .WORD   0
024700  000000                   WDAT02: .WORD   0
024702  000000                   WDAT03: .WORD   0

024704                           WDONE:
024704  104413                           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?).
```

```
                                           .SBTTL  TEST # 26 - ADDD AND SUB WITH FSRC=0
                                           ;;**********************************************************
                                           ;*TEST 26         ADDD AND SUB WITH FSRC=0
                                           ;*
                                           ;* THIS IS A TEST OF ADD AND SUB WITH FSRC-0.
                                           ;*
                                           ;;**********************************************************
     024706   000004                       TST26:  SCOPE
     024710                                X1:
     024710   012737  024716  001110               MOV     #1$,$LPERR       ;SET UP THE LOOP ON ERROR ADDRESS.
     024716   012700  000200               1$:     MOV     #200,R0
     024722   170100                               LDFPS   R0               ;SET DOUBLE MODE
     024724   012700  025470                       MOV     #XPAT00,R0       ;SET AC0 TO POSITIVE
     024730   010037  025456                       MOV     R0,XTMP          ;NUMBER #0
     024734   172410                               LDD     (R0),AC0
     024736   012737  024750  001236               MOV     #X2,$TMP2
     024744   012700  025500                       MOV     #XPAT10,R0       ;FSRC=0
     024750   172010                       X2:     ADDD    (R0),AC0         ;TEST INSTRUCTION
     024752   170205                               STFPS   R5
     024754   170011                               SETD
     024756   012700  025460                       MOV     #XDAT00,R0       ;GET RESULT.
     024762   174010                               STD     AC0,(R0)
     024764   012701  025470                       MOV     #XPAT00,R1
     024770   012702  000004                       MOV     #4,R2
     024774   022021                       X3:     CMP     (R0)+,(R1)+      ;IS RESULT CORRECT?
     024776   001401                               BEQ     X4
     025000   000561                               BR      XERR1
     025002   077204                       X4:     SOB     R2,X3
     025004   012704  000200                       MOV     #200,R4
     025010   020405                               CMP     R4,R5            ;IS FPS CORRECT?
     025012   001402                               BEQ     X5
     025014   000137  025426                       JMP     XERR2
     025020                                X5:
     025020   012737  025026  001110               MOV     #1$,$LPERR       ;SET UP THE LOOP ON ERROR ADDRESS.
     025026   012700  000200               1$:     MOV     #200,R0
     025032   170100                               LDFPS   R0               ;SET DOUBLE MODE
     025034   012700  025510                       MOV     #XPAT20,R0       ;SET AC0 TO
     025040   010037  025456                       MOV     R0,XTMP          ;NEGATIVE NUMBER
     025044   172410                               LDD     (R0),AC0
     025046   012737  025060  001236               MOV     #X6,$TMP2
     025054   012700  025500                       MOV     #XPAT10,R0       ;FSRC=0
     025060   172010                       X6:     ADDD    (R0),AC0         ;TEST INSTRUCTION
     025062   170205                               STFPS   R5
     025064   170011                               SETD
     025066   012700  025460                       MOV     #XDAT00,R0       ;GET RESULT
     025072   174010                               STD     AC0,(R0)
     025074   012701  025510                       MOV     #XPAT20,R1
     025100   012702  000004                       MOV     #4,R2
     025104   022021                       X7:     CMP     (R0)+,(R1)+      ;IS RESULT CORRECT?
     025106   001401                               BEQ     X10
     025110   000515                               BR      XERR1
     025112   077204                       X10:    SOB     R2,X7
     025114   012704  000210                       MOV     #210,R4
     025120   020405                               CMP     R4,R5            ;IS FPS CORRECT?
     025122   001401                               BEQ     X11
     025124   000540                               BR      XERR2
```

```
 025126                             X11:
 025126  012737  025134  001110              MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 025134  012700  000200             1$:      MOV     #200,R0
 025140  170100                              LDFPS   R0              ;SET DOUBLE MODE
 025142  012700  025470                      MOV     #XPAT00,R0      ;SET AC0 TO NON-ZERO
 025146  010037  025456                      MOV     R0,XTMP         ;POSITIVE NUMBER
 025152  172410                              LDD     (R0),AC0
 025154  012737  025166  001236              MOV     #X12,$TMP2
 025162  012700  025500                      MOV     #XPAT10,R0      ;FSRC=0
 025166  173010                     X12:     SUBD    (R0),AC0        ;TEST INSTRUCTION
 025170  170205                              STFPS   R5
 025172  170011                              SETD
 025174  012700  025460                      MOV     #XDAT00,R0      ;GET RESULT
 025200  174010                              STD     AC0,(R0)
 025202  012701  025470                      MOV     #XPAT00,R1
 025206  012702  000004                      MOV     #4,R2
 025212  022021                     X13:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 025214  001401                              BEQ     X14
 025216  000465                              BR      XERR3
 025220  077204                     X14:     SOB     R2,X13
 025222  012704  000200                      MOV     #200,R4         ;IS FPS CORRECT?
 025226  020405                              CMP     R4,R5
 025230  001401                              BEQ     X15
 025232  000503                              BR      XERR4
 025234                             X15:
 025234  012737  025242  001110              MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 025242  012700  000200             1$:      MOV     #200,R0
 025246  170100                              LDFPS   R0              ;SET DOUBLE MODE
 025250  012700  025510                      MOV     #XPAT20,R0      ;SET AC0=A NEGATIVE
 025254  010037  025456                      MOV     R0,XTMP         ;NUMBER
 025260  172410                              LDD     (R0),AC0
 025262  012737  025274  001236              MOV     #X16,$TMP2
 025270  012700  025500                      MOV     #XPAT10,R0      ;FSRC=0
 025274  173010                     X16:     SUBD    (R0),AC0        ;TEST INSTRUCTION.
 025276  170205                              STFPS   R5
 025300  170011                              SETD
 025302  012700  025460                      MOV     #XDAT00,R0      ;GET RESULT
 025306  174010                              STD     AC0,(R0)
 025310  012701  025510                      MOV     #XPAT20,R1
 025314  012702  000004                      MOV     #4,R2
 025320  022021                     X17:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
 025322  001401                              BEQ     X20
 025324  000422                              BR      XERR3
 025326  077204                     X20:     SOB     R2,X17
 025330  012704  000210                      MOV     #210,R4         ;IS FPS CORRECT?
 025334  020405                              CMP     R4,R5
 025336  001401                              BEQ     X21
 025340  000440                              BR      XERR4
 025342  000466                     X21:     BR      XDONE

                                    ;REPORT DATA ERRORS

 025344  012737  025500  001240     XERR1:   MOV     #XPAT10,$TMP3
 025352  013737  025456  001242              MOV     XTMP,$TMP4
 025360  012737  025460  001244              MOV     #XDAT00,$TMP5
 025366  104143                     1$:      ERROR   +143
 025370  000453                              BR      XDONE
```

```
025372  012737  025500  001240  XERR3:  MOV     #XPAT10,$TMP3
025400  013737  025456  001242          MOV     XTMP,$TMP4
025406  012737  025460  001244          MOV     #XDAT00,$TMP5
025414  013737  025456  001246          MOV     XTMP,$TMP6
025422  104144                  1$:     ERROR   +144
025424  000435                          BR      XDONE

                                ;REPORT FPS ERRORS

025426                          XERR2:
025426  010537  001240                  MOV     R5,$TMP3
025432  010437  001242                  MOV     R4,$TMP4
025436  104145                  1$:     ERROR   +145
025440  000427                          BR      XDONE
025442                          XERR4:
025442  010537  001240                  MOV     R5,$TMP3
025446  010437  001242                  MOV     R4,$TMP4
025452  104146                  1$:     ERROR   +146
025454  000421                          BR      XDONE
025456  000000                  XTMP:   .WORD   0
025460  000000                  XDAT00: .WORD   0
025462  000000                  XDAT01: .WORD   0
025464  000000                  XDAT02: .WORD   0
025466  000000                  XDAT03: .WORD   0

025470  010421                  XPAT00: .WORD   010421
025472  021042                  XPAT01: .WORD   021042
025474  031463                  XPAT02: .WORD   031463
025476  042104                  XPAT03: .WORD   042104

025500  000000                  XPAT10: .WORD   0
025502  000000                  XAPT11: .WORD   0
025504  000000                  XPAT12: .WORD   0
025506  000000                  XPAT13: .WORD   0
025510  104210                  XPAT20: .WORD   104210
025512  114631                  XPAT21: .WORD   114631
025514  125252                  XPAT22: .WORD   125252
025516  135673                  XPAT23: .WORD   135673

025520                          XDONE:
025520  104413                          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?).
```

```
                                .SBTTL  TEST # 27 - SUBD WITH AC=0 TEST
                                ;;*************************************************************
                                ;*TEST 27        SUBD WITH AC=0 TEST
                                ;*
                                ;* THIS IS A TEST OF SUBD WITH AC=0.  BOTH POSITIVE
                                ;* AND NEGATIVE FSRC'S ARE TRIED.
                                ;*
                                ;;*************************************************************
 025522 000004                  TST27:  SCOPE
 025524 005037 026060                   CLR     YFLAG
 025530 012737 026100 026062            MOV     #YPAT00,YTMP1   ;P
 025536 012737 026110 026064            MOV     #YPAT10,YTMP2   ;N
 025544 012737 000210 026066            MOV     #210,YTMP3
 025552                         Y1:
 025552 012737 025560 001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 025560 012700 000200           1$:     MOV     #200,R0
 025564 170100                          LDFPS   R0              ;SET DOUBLE MODE
 025566 012700 026120                   MOV     #YPAT20,R0      ;SET AC0=0
 025572 172410                          LDD     (R0),AC0
 025574 013700 026062                   MOV     YTMP1,R0
 025600 173010                  Y2:     SUBD    (R0),AC0        ;TEST INSTRUCTION
 025602 170205                          STFPS   R5
 025604 170011                          SETD
 025606 012700 026070                   MOV     #YDAT00,R0      ;GET RESULT
 025612 174010                          STD     AC0,(R0)
 025614 012702 000004                   MOV     #4,R2
 025620 013701 026064                   MOV     YTMP2,R1        ;CHECK RESULT.
 025624 022021                  Y3:     CMP     (R0)+,(R1)+
 025626 001026                          BNE     Y6
 025630 077203                          SOB     R2,Y3
 025632 023705 026066                   CMP     YTMP3,R5        ;FPS CORRECT?
 025636 001401                          BEQ     Y4
 025640 000475                          BR      YERR3
 025642 005737 026060           Y4:     TST     YFLAG           ;FINISHED TEST?
 025646 001015                          BNE     Y5
 025650 012737 177777 026060            MOV     #-1,YFLAG
 025656 012737 026110 026062            MOV     #YPAT10,YTMP1
 025664 012737 026100 026064            MOV     #YPAT00,YTMP2
 025672 012737 000200 026066            MOV     #200,YTMP3
 025700 000724                          BR      Y1
 025702 000512                  Y5:     BR      YDONE
 025704 012702 000004           Y6:     MOV     #4,R2
 025710 012700 026062                   MOV     #YTMP1,R0       ;DID XOR OF SIGN BIT
 025714 012701 026070                   MOV     #YDAT00,R1      ;FAIL?
 025720 022021                  Y7:     CMP     (R0)+,(R1)+
 025722 001002                          BNE     YERR1
 025724 077203                          SOB     R2,Y7
 025726 000421                          BR      YERR2
 025730                         YERR1:                          ;DATA FAILURE
 025730 012737 025600 001236            MOV     #Y2,$TMP2
 025736 013737 026062 001240            MOV     YTMP1,$TMP3
 025744 012737 026120 001242            MOV     #YPAT20,$TMP4
 025752 012737 026070 001244            MOV     #YDAT00,$TMP5
 025760 013737 026064 001246            MOV     YTMP2,$TMP6
 025766 104147                  1$:     ERROR   +147
 025770 000457                          BR      YDONE
```

```
     025772                           YERR2:                                  ;XOR OF SIGN BIT
     025772  012737  025600  001236          MOV     #Y2,$TMP2                ;FAILED
     026000  013737  026062  001240          MOV     YTMP1,$TMP3
     026006  012737  026120  001242          MOV     #YPAT20,$TMP4
     026014  012737  026070  001244          MOV     #YDAT00,$TMP5
     026022  013737  026064  001246          MOV     YTMP2,$TMP6
     026030  104150                   1$:    ERROR   +150
     026032  000436                          BR      YDONE
     026034                           YERR3:                                  ;FPS WRONG.
     026034  012737  025600  001236          MOV     #Y2,$TMP2
     026042  010537  001240                  MOV     R5,$TMP3
     026046  013737  026066  001242          MOV     YTMP3,$TMP4
     026054  104151                   1$:    ERROR   +151
     026056  000424                          BR      YDONE

     026060  000000                   YFLAG:  .WORD   0
     026062  000000                   YTMP1:  .WORD   0
     026064  000000                   YTMP2:  .WORD   0
     026066  000000                   YTMP3:  .WORD   0

     026070  000000                   YDAT00: .WORD   0
     026072  000000                   YDAT01: .WORD   0
     026074  000000                   YDAT02: .WORD   0
     026076  000000                   YDAT03: .WORD   0

     026100  063146                   YPAT00: .WORD   063146
     026102  052525                   YPAT01: .WORD   052525
     026104  042104                   YPAT02: .WORD   042104
     026106  167356                   YPAT03: .WORD   167356

     026110  163146                   YPAT10: .WORD   163146
     026112  052525                   YPAT11: .WORD   052525
     026114  042104                   YPAT12: .WORD   042104
     026116  167356                   YPAT13: .WORD   167356

     026120  000000                   YPAT20: .WORD   0
     026122  000000                   YPAT21: .WORD   0
     026124  000000                   YPAT22: .WORD   0
     026126  000000                   YPAT23: .WORD   0

     026130                           YDONE:
     026130  104413                          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?).
```

```
                                        .SBTTL  TEST # 30 - ADDD WITH AC=0 TEST
                                        ;;*****************************************************************
                                        ;;*TEST 30        ADDD WITH AC=0 TEST
                                        ;
                                        ;@
                                        ;@ THIS IS A TEST OF ADDD WITH AC=0.  BOTH
                                        ;* POSITIVE AND NEGATIVE FSRC'S ARE TRIED.
                                        ;*
                                        ;;*****************************************************************
 026132  000004                         TST30:  SCOPE
 026134  005037  026370                         CLR     ZFLAG
 026140  012737  026406  026372                 MOV     #ZPAT00,ZTMP1   ;P
 026146  012737  000200  026374                 MOV     #200,ZTMP2
 026154                                 Z1:
 026154  012737  026162  001110                 MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 026162  012700  000200                 1$:     MOV     #200,R0
 026166  170100                                 LDFPS   R0              ;SET DOUBLE MODE
 026170  012700  026426                         MOV     #ZPAT20,R0      ;SET AC0=0
 026174  172410                                 LDD     (R0),AC0
 026176  013700  026372                         MOV     ZTMP1,R0
 026202  172010                         Z2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
 026204  170205                                 STFPS   R5
 026206  170011                                 SETD
 026210  012700  026376                         MOV     #ZDAT00,R0      ;GET RESULT
 026214  174010                                 STD     AC0,(R0)
 026216  012702  000004                         MOV     #4,R2
 026222  013701  026372                         MOV     ZTMP1,R1        ;RESULT CORRECT?
 026226  022021                         Z3:     CMP     (R0)+,(R1)+
 026230  001401                                 BEQ     Z4
 026232  000423                                 BR      ZERR1
 026234  077204                         Z4:     SOB     R2,Z3
 026236  023705  026374                         CMP     ZTMP2,R5        ;FPS CORRECT?
 026242  001401                                 BEQ     Z5
 026244  000437                                 BR      ZERR2
 026246  005737  026370                 Z5:     TST     ZFLAG           ;FINISHED TEST?
 026252  001012                                 BNE     Z6
 026254  012737  177777  026370                 MOV     #-1,ZFLAG
 026262  012737  026416  026372                 MOV     #ZPAT10,ZTMP1
 026270  012737  000210  026374                 MOV     #210,ZTMP2
 026276  000726                                 BR      Z1
 026300  000456                         Z6:     BR      ZDONE
 026302                                 ZERR1:                          ;DATA FAILURE
 026302  012737  026202  001236                 MOV     #Z2,$TMP2
 026310  013737  026372  001240                 MOV     ZTMP1,$TMP3
 026316  012737  026426  001242                 MOV     #ZPAT20,$TMP4
 026324  012737  026376  001244                 MOV     #ZDAT00,$TMP5
 026332  013737  026372  001246                 MOV     ZTMP1,$TMP6
 026340  104152                         1$:     ERROR   +152
 026342  000435                                 BR      ZDONE
 026344                                 ZERR2:
 026344  012737  026202  001236                 MOV     #Z2,$TMP2
 026352  010537  001240                         MOV     R5,$TMP3
 026356  013737  026374  001242                 MOV     ZTMP2,$TMP4
 026364  104153                         1$:     ERROR   +153
 026366  000423                                 BR      ZDONE
```

```
      026370  000000            ZFLAG:  .WORD   0
      026372  000000            ZTMP1:  .WORD   0
      026374  000000            ZTMP2:  .WORD   0

      026376  000000            ZDAT00: .WORD   0
      026400  000000            ZDAT01: .WORD   0
      026402  000000            ZDAT02: .WORD   0
      026404  000000            ZDAT03: .WORD   0

      026406  031463            ZPAT00: .WORD   031463
      026410  010421            ZPAT01: .WORD   010421
      026412  146314            ZPAT02: .WORD   146314
      026414  156735            ZPAT03: .WORD   156735

      026416  156735            ZPAT10: .WORD   156735
      026420  167356            ZPAT11: .WORD   167356
      026422  135673            ZPAT12: .WORD   135673
      026424  146314            ZPAT13: .WORD   146314

      026426  000000            ZPAT20: .WORD   0
      026430  000000            ZPAT21: .WORD   0
      026432  000000            ZPAT22: .WORD   0
      026434  000000            ZPAT23: .WORD   0

      026436                    ZDONE:
      026436  104413                    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?).


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```
                                          .SBTTL  TEST # 31 - ADDF & ADDD E(AC)=E(FSRC) & (BUT FT) TEST
                                          ;;*****************************************************************
                                          ;;*TEST 31       ADDF & ADDD E(AC)=E(FSRC) & (BUT FT) TEST
                                          ;;*
                                          ;;* THIS IS A TEST OF THE ADD INSTRUCTION WITH THE
                                          ;;* OPERANDS HAVING EQUAL EXPONENTS.  THE (BUF FT)
                                          ;;* FORK IN THE ROUND/TRUNK FLOWS IS ALSO TESTED.
                                          ;;*
                                          ;;*****************************************************************
 026440  000004                           TST31:  SCOPE
 026442                                   AA1:
 026442  012737  026450  001110                   MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 026450  012700  003240                   1$:     MOV     #3240,R0
 026454  170100                                   LDFPS   R0              ;SET FIV FIV FD AND FT
 026456  012737  027036  000244                   MOV     #AAERR0,FPVECT  ;IN CASE THE OVER/UNDER
 026464  012700  027414                           MOV     #AAPAT0,R0      ;FLOWS IN TRAP WILL
                                                                          ;OCCUR
 026470  172410                                   LDD     (R0),AC0        ;SET UP AC0
 026472  012737  026504  001236                   MOV     #AA2,$TMP2      ;OPERAND
 026500  012700  027424                           MOV     #AAPAT1,R0
 026504  172010                           AA2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
                                                                          ;SHOULD TRUNCATE
 026506  012700  027404                   AA3:    MOV     #AADAT0,R0
 026512  174010                                   STD     AC0,(R0)        ;GET THE RESULT
 026514  012701  027434                           MOV     #AAPAT2,R1
 026520  012702  000004                           MOV     #4,R2
 026524  022021                           AA4:    CMP     (R0)+,(R1)+     ;CORRECT?
 026526  001414                                   BEQ     AA7
 026530  012700  027444                           MOV     #AAPAT3,R0      ;DID (BUT FT) FAIL
 026534  012701  027404                           MOV     #AADAT0,R1
 026540  012702  000004                           MOV     #4,R2
 026544  022021                           AA5:    CMP     (R0)+,(R1)+
 026546  001401                                   BEQ     AA6
 026550  000565                                   BR      AAERR1          ;DATA ERROR
 026552  077204                           AA6:    SOB     R2,AA5
 026554  000137  027160                           JMP     AAERR2          ;(BUT FT) ERROR
 026560  077217                           AA7:    SOB     R2,AA4

                                          ;NOW TEST DOUBLE FLOATING ROUND MODE.

 026562                                   AA10:
 026562  012737  026570  001110                   MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 026570  012700  003200                   1$:     MOV     #3200,R0        ;SET FD FIV FIV. FT=0
 026574  170100                                   LDFPS   R0
 026576  012700  027414                           MOV     #AAPAT0,R0
 026602  172410                                   LDD     (R0),AC0        ;SET UP AC0 OPERAND
 026604  012737  026616  001236                   MOV     #AA11,$TMP2
 026612  012700  027424                           MOV     #AAPAT1,R0
 026616  172010                           AA11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
                                                                          ;SHOULD ROUND
 026620  012700  027404                   AA12:   MOV     #AADAT0,R0
 026624  174010                                   STD     AC0,(R0)        ;GET THE RESULT
 026626  012701  027444                           MOV     #AAPAT3,R1
 026632  012702  000004                           MOV     #4,R2
 026636  022021                           AA13:   CMP     (R0)+,(R1)+     ;CORRECT?
 026640  001425                                   BEQ     AA20
 026642  012700  027434                           MOV     #AAPAT2,R0      ;DID (BUT FT) FAIL?
```

```
 5296 026646  012701  027404              MOV     #AADATO,R1
 5297 026652  012702  000004              MOV     #4,R2
 5298 026656  022021              AA14:   CMP     (R0)+,(R1)+
 5299 026660  001413                      BEQ     AA17
 5300 026662  012700  027454              MOV     #AAPAT4,R0      ;WAS THE FLOATING
 5301 026666  012701  027404              MOV     #AADATO,R1      ;CONSTANT USED
 5302 026672  012702  000004              MOV     #4,R2           ;INSTEAD OF THE
 5303 026676  022021              AA15:   CMP     (R0)+,(R1)+     ;DOUBLE CONSTANT
 5304 026700  001401                      BEQ     AA16            ;IN THE ROUND
 5305 026702  000544                      BR      AAERR3  ;FLOWS?
 5306 026704  077204              AA16:   SOB     R2,AA15         ;DATA ERROR
 5307 026706  000546                      BR      AAERR4  ;CONSTANT ERROR
 5308 026710  077216              AA17:   SOB     R2,AA14
 5309 026712  000562                      BR      AAERR5  ;(BUT FT) ERROR
 5310 026714  077230              AA20:   SOB     R2,AA13
 5311
 5312                             ;NOW TEST ADDF WITH FT=0, ROUND MODE
 5313
 5314 026716                      AA21:
      026716  012737  026724  001110        MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 5315 026724  012700  003200      1$:     MOV     #3200,R0                ;FIV=1, FIV=1, FT=0
 5316 026730  170100                      LDFPS   R0
 5317 026732  012700  027414              MOV     #AAPAT0,R0      ;LOAD AC0 OPERAND
 5318 026736  172410                      LDD     (R0),AC0
 5319 026740  170001                      SETF                    ;ENTER FLOATING MODE
 5320 026742  012737  026754  001236        MOV     #AA22,$TMP2
 5321 026750  012700  027464              MOV     #AAPAT5,R0
 5322 026754  172010              AA22:   ADDF    (R0),AC0        ;TEST INSTRUCTION
 5323                                                             ;SHOULD ROUND
 5324 026756                      AA23:
 5325 026756  170011                      SETD                    ;RESET TO DOUBLE
 5326                                                             ;MODE
 5327 026760  012700  027404              MOV     #AADATO,R0      ;GET THE RESULT
 5328 026764  174010                      STD     AC0,(R0)
 5329 026766  012701  027474              MOV     #AAPAT6,R1      ;CORRECT?
 5330 026772  012702  000002              MOV     #2,R2
 5331 026776  022021              AA24:   CMP     (R0)+,(R1)+
 5332 027000  001413                      BEQ     AA27
 5333 027002  012700  027434              MOV     #AAPAT2,R0      ;WAS THE DOUBLE
 5334 027006  012701  027404              MOV     #AADATO,R1      ;CONSTANT USED INSTEAD
 5335 027012  012702  000002              MOV     #2,R2           ;OF THE FLOATING
 5336 027016  022011              AA25:   CMP     (R0)+,(R1)      ;CONSTANT IN THE
 5337 027020  001401                      BEQ     AA26            ;ROUND FLOWS?
 5338 027022  000534                      BR      AAERR6          ;DATA ERROR
 5339 027024  077204              AA26:   SOB     R2,AA25
 5340 027026  000550                      BR      AAERR7          ;CONSTANT ERROR
 5341 027030  077216              AA27:   SOB     R2,AA24
 5342 027032  000137  027504              JMP     AADONE
 5343
 5344                             ;COME HERE IF A TRAP OCCURS TO 244.
 5345
 5346 027036  013700  001236      AAERR0: MOV     $TMP2,R0        ;SEE IF THE TRAP WAS
 5347 027042  005720                      TST     (R0)+           ;AT A TEST INSTRUCTION
 5348 027044  020016                      CMP     R0,(SP)
 5349 027046  001402                      BEQ     1$
 5350 027050  000137  042534      10$:    JMP     FPSPUR
 5351 027054                      1$:
```

```
5352 027054  170300                        STST    R0              ;GET FEC
5353 027056  020027  000010                CMP     R0,#10
5354 027062  001405                        BEQ     20$             ;OVERFLOW
5355 027064  020027  000012                CMP     R0,#12
5356 027070  001410                        BEQ     30$             ;UNDERFLOW
5357 027072  000766                        BR      10$
5358 027074  027076                20$
5359 027076  011637  001236        20$.    MOV     (SP),$TMP2      ;REPORT OVERFLOW ERROR
5360 027102  022626                        CMP     (SP)+,(SP)+
5361 027104  104154                21$:    ERROR   +154
5362 027106  000137  027504        25$:    JMP     AADONE
5363 027112  011637  001236        30$:    MOV     (SP),$TMP2      ;REPORT UNDERFLOW
5364 027116  022626                        CMP     (SP)+,(SP)+     ;ERROR
5365 027120  104155                31$:    ERROR   +155
5366 027122  000771                        BR      25$
5367
5368                               ;ADDD RESULT INCORRECT
5369 027124  012737  027434  001246 AAERR1: MOV     #AAPAT2,$TMP6
5370 027132  012737  027414  001242 AAER10: MOV     #AAPAT0,$TMP4
5371 027140  012737  027424  001240        MOV     #AAPAT1,$TMP3
5372 027146  012737  027404  001244        MOV     #AADAT0,$TMP5
5373 027154  104162                1$:     ERROR   +162
5374 027156  000552                        BR      AADONE
5375 027160  012737  027434  001246 AAERR2: MOV     #AAPAT2,$TMP6   ;(BUT FT) FAILED.
5376 027166  012737  027414  001242        MOV     #AAPAT0,$TMP4
5377 027174  012737  027424  001240        MOV     #AAPAT1,$TMP3
5378 027202  012737  027404  001244        MOV     #AADAT0,$TMP5
5379 027210  104156                1$:     ERROR   +156
5380 027212  000534                        BR      AADONE
5381 027214  012737  027444  001246 AAERR3: MOV     #AAPAT3,$TMP6   ;DATA ERROR.
5382 027222  000743                        BR      AAER10
5383 027224  012737  027444  001246 AAERR4: MOV     #AAPAT3,$TMP6   ;BAD CONSTANT
5384 027232  012737  027414  001242        MOV     #AAPAT0,$TMP4
5385 027240  012737  027424  001240        MOV     #AAPAT1,$TMP3
5386 027246  012737  027404  001244        MOV     #AADAT0,$TMP5
5387 027254  104160                1$:     ERROR   +160
5388 027256  000512                        BR      AADONE
5389 027260  012737  027444  001246 AAERR5: MOV     #AAPAT3,$TMP6   ;(BUT FT) FAILED.
5390 027266  012737  027414  001242        MOV     #AAPAT0,$TMP4
5391 027274  012737  027424  001240        MOV     #AAPAT1,$TMP3
5392 027302  012737  027404  001244        MOV     #AADAT0,$TMP5
5393 027310  104157                1$:     ERROR   +157
5394 027312  000474                        BR      AADONE
5395 027314  012737  027464  001240 AAERR6: MOV     #AAPAT5,$TMP3   ;FD=0 AND
5396 027322  012737  027414  001242        MOV     #AAPAT0,$TMP4   ;DATA ERROR
5397 027330  012737  027404  001244        MOV     #AADAT0,$TMP5
5398 027336  012737  027474  001246        MOV     #AAPAT6,$TMP6
5399 027344  104160                1$:     ERROR   +160
5400 027346  000456                        BR      AADONE
5401 027350  012737  027464  001240 AAERR7: MOV     #AAPAT5,$TMP3   ;CONSTANT ERROR
5402 027356  012737  027414  001242        MOV     #AAPAT0,$TMP4
5403 027364  012737  027404  001244        MOV     #AADAT0,$TMP5
5404 027372  012737  027474  001246        MOV     #AAPAT6,$TMP6
5405 027400  104161                1$:     ERROR   +161
5406 027402  000440                        BR      AADONE
5407 027404  000000  000000  000000 AADAT0: .WORD   0,0,0,0
5408 027414  000200  000000  000000 AAPAT0: .WORD   200,0,0,0
```

```
5409 027424  000200  000000  000000  AAPAT1: .WORD   200,0,0,1
5410 027434  000400  000000  000000  AAPAT2: .WORD   400,0,0,0
5411 027444  000400  000000  000000  AAPAT3: .WORD   400,0,0,1
5412 027454  000400  000000  100000  AAPAT4: .WORD   400,0,100000,0
5413 027464  000200  000001  000000  AAPAT5: .WORD   200,1,0,0
5414 027474  000400  000001  000000  AAPAT6: .WORD   400,1,0,0
5415 027504                          AADONE:
     027504  104413                          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?).
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```
5426                                    .SBTTL  TEST # 32 - ADDF & ADDD WITH E(AC) LESS THAN E(FSRC) TEST
                                        ;;*****************************************************************
                                        ;*TEST 32        ADDF & ADDD WITH E(AC) LESS THAN E(FSRC) TEST
                                        ;*
                                        ;*THIS IS ATEST OF THE ADDD AND ADDF
                                        ;*INSTRUCTIONS AND THE ALIGN AC ALGORITHM
                                        ;*FLOWS.  THE CONSTANT (25 FOR FLOATING, 57 FOR
                                        ;*DOUBLE) USED IS CHECKED.  THEN SIMPLE
                                        ;*AND WORST CASE ALIGNMENT SITUATIONS ARE
                                        ;*TRIED.  NOTE E(AC) IS LESS THEN E(FSRC)
                                        ;*
                                        ;;*****************************************************************
    027506  000004                      TST32:  SCOPE
5427                                                                ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
5428 027510                             CC1:
    027510  012737  027516  001110              MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5429 027516  012704  003200             1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5430 027522  170104                             LDFPS   R4
5431 027524  012737  027544  001236              MOV     #CC2,$TMP2
5432 027532  012700  031172                      MOV     #CCP0,R0        ;SET AC0 OPERAND
5433 027536  172410                              LDD     (R0),AC0                ;AC0
5434 027540  012700  031212                      MOV     #CCP2,R0
5435 027544  172010                     CC2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5436 027546  170205                             STFPS   R5              ;GET FPS
5437 027550  012700  031162                      MOV     #CCDAT0,R0      ;GET THE RESULT
5438 027554  174010                              STD     AC0,(R0)
5439 027556  012701  031212                      MOV     #CCP2,R1        ;IS IT CORRECT
5440 027562  012702  000004                      MOV     #4,R2
5441 027566  022021                     CC3:    CMP     (R0)+,(R1)+
5442 027570  001415                             BEQ     CC6
5443 027572  012700  031162                      MOV     #CCDAT0,R0      ;DID A BAD
5444 027576  012701  031172                      MOV     #CCP0,R1        ;CONSTANT (NOT 57)
5445 027602  012702  000004                      MOV     #4,R2           ;GET GENERATED
5446 027606  022021                     CC4:    CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5447 027610  001402                             BEQ     CC5             ;FLOWS?
5448 027612  000137  030560                      JMP     CCER1           ;DATA ERROR.D
5449 027616  077205                     CC5:    SOB     R2,CC4
5450 027620  000137  030616                      JMP     CCER2           ;BAD CONSTANT.D
5451 027624  077220                     CC6:    SOB     R2,CC3
5452 027626  020405                             CMP     R4,R5           ;FPS CORRECT?
5453 027630  001402                             BEQ     CC7
5454 027632  000137  030524                      JMP     CCER0           ;BAD FPS.
5455                                    ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
5456 027636                             CC7:
    027636  012737  027644  001110              MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5457 027644  012704  003200             1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5458 027650  170104                             LDFPS   R4
5459 027652  012737  027672  001236              MOV     #CC8,$TMP2
5460 027660  012700  031172                      MOV     #CCP0,R0        ;SET AC0 OPERAND
5461 027664  172410                              LDD     (R0),AC0
5462 027666  012700  031202                      MOV     #CCP1,R0        ;FSRC
5463 027672  172010                     CC8:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5464 027674  170205                             STFPS   R5              ;GET FPS
5465 027676  012700  031162                      MOV     #CCDAT0,R0      ;GET THE RESULT
5466 027702  174010                              STD     AC0,(R0)
5467 027704  012701  031262                      MOV     #CCP7,R1        ;IS IT CORRECT
5468 027710  012702  000004                      MOV     #4,R2
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5469 027714  022021                  CC9:    CMP     (R0)+,(R1)+
5470 027716  001415                          BEQ     CC12
5471 027720  012700  031162                  MOV     #CCDATO,R0      ;DID A BAD
5472 027724  012701  031202                  MOV     #CCP1,R1        ;CONSTANT (NOT 57)
5473 027730  012702  000004                  MOV     #4,R2           ;GET GENERATED
5474 027734  022021                  CC10.   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5475 027736  001402                          BEQ     CC11            ;FLOWS?
5476 027740  000137  030654                  JMP     CCER3           ;DATA ERROR.D
5477 027744  077205                  CC11:   SOB     R2,CC10
5478 027746  000137  030672                  JMP     CCER4           ;BAD CONSTANT.D
5479 027752  077220                  CC12:   SOB     R2,CC9
5480 027754  020405                          CMP     R4,R5           ;FPS CORRECT?
5481 027756  001402                          BEQ     CC13
5482 027760  000137  030524                  JMP     CCER0           ;BAD FPS.
5483                                 ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
5484 027764                          CC13:
     027764  012737  027772  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5485 027772  012737  030020  001236  1$:     MOV     #CC14,$TMP2
5486 030000  012700  031172                  MOV     #CCP0,R0        ;SET UP AC0 OPERAND.
5487 030004  172410                          LDD     (R0),AC0
5488 030006  012704  003000                  MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5489 030012  170104                          LDFPS   R4
5490 030014  012700  031252                  MOV     #CCP6,R0        ;FSRC
5491 030020  172010                  CC14:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5492 030022  170205                          STFPS   R5
5493 030024  170011                          SETD                    ;REENTER DOUBLE MOVE
5494 030026  012700  031162                  MOV     #CCDATO,R0      ;GET THE RESULT
5495 030032  174010                          STD     AC0,(R0)
5496 030034  012701  031252                  MOV     #CCP6,R1        ;IS THE RESULT CORRECT?
5497 030040  012702  000002                  MOV     #2,R2
5498 030044  022021                  CC15:   CMP     (R0)+,(R1)+
5499 030046  001415                          BEQ     CC18
5500 030050  012700  031162                  MOV     #CCDATO,R0      ;WAS A BAD CONSTANT
5501 030054  012701  031222                  MOV     #CCP3,R1        ;USED (NOT 25) IN
5502 030060  012702  000002                  MOV     #2,R2           ;THE ALIGN FLOWS?
5503 030064  022021                  CC16:   CMP     (R0)+,(R1)+
5504 030066  001402                          BEQ     CC17
5505 030070  000137  030730                  JMP     CCER5           ;DATA ERROR F
5506 030074  077205                  CC17:   SOB     R2,CC16
5507 030076  000137  030764                  JMP     CCER6           ;BAD CONSTANT F
5508 030102  077220                  CC18:   SOB     R2,CC15
5509 030104  020405                          CMP     R4,R5
5510 030106  001402                          BEQ     CC19
5511 030110  000137  030542                  JMP     CCER90          ;BAD FPS.
5512                                 ;EXPONENT DIFFERENCE=24=30 (OCT) FD=0
5513 030114                          CC19:
     030114  012737  030122  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5514 030122  012737  030150  001236  1$:     MOV     #CC20,$TMP2
5515 030130  012700  031222                  MOV     #CCP3,R0        ;SET UP AC0 OPERAND.
5516 030134  172410                          LDD     (R0),AC0
5517 030136  012704  003000                  MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5518 030142  170104                          LDFPS   R4
5519 030144  012700  031242                  MOV     #CCP5,R0        ;FSRC
5520 030150  172010                  CC20:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5521 030152  170205                          STFPS   R5
5522 030154  170011                          SETD                    ;REENTER DOUBLE MOVE
5523 030156  012700  031162                  MOV     #CCDATO,R0      ;GET THE RESULT
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030162  174010                           STD     AC0,(R0)
030164  012701  031272                   MOV     #CCP10,R1       ;IS THE RESLT CORRECT?
030170  012702  000002                   MOV     #2,R2
030174  022021                   CC21:   CMP     (R0)+,(R1)+
030176  001415                           BEQ     CC24
030200  012700  031162                   MOV     #CCDATO,R0      ;WAS A BAD CONSTANT
030204  012701  031242                   MOV     #CCP5,R1        ;USED (NOT 25) IN
030210  012702  000002                   MOV     #2,R2           ;THE ALIGN FLOWS?
030214  022021                   CC22:   CMP     (R0)+,(R1)+
030216  001402                           BEQ     CC23
030220  000137  031020                   JMP     CCER7           ;DATA ERROR F
030224  077205                   CC23:   SOB     R2,CC22
030226  000137  031036                   JMP     CCER8           ;BAD CONSTANT F
030232  077220                   CC24:   SOB     R2,CC21
030234  020405                           CMP     R4,R5
030236  001402                           BEQ     CC25
030240  000137  030542                   JMP     CCER90          ;BAD FPS.
                                 ;EXPONENT DIFFERENCE=1 FD=1
030244                           CC25:
030244  012737  030252  001110           MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
030252  012704  003200           1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
030256  170104                           LDFPS   R4
030260  012737  030300  001236           MOV     #CC26,$TMP2
030266  012700  031172                   MOV     #CCP0,R0        ;SET AC0 OPERAND
030272  172410                           LDD     (R0),AC0
030274  012700  031222                   MOV     #CCP3,R0        ;FSRC
030300  172010                   CC26:   ADDD    (R0),AC0        ;TEST INSTRUCTION
030302  170205                           STFPS   R5              ;GET FPS
030304  012700  031162                   MOV     #CCDATO,R0      ;GET THE RESULT
030310  174010                           STD     AC0,(R0)
030312  012701  031302                   MOV     #CCP11,R1       ;IS IT CORRECT
030316  012702  000004                   MOV     #4,R2
030322  022021                   CC27:   CMP     (R0)+,(R1)+
030324  001415                           BEQ     CC30
030326  012700  031162                   MOV     #CCDATO,R0      ;DID A BAD
030332  012701  031222                   MOV     #CCP3,R1        ;CONSTANT (NOT 57)
030336  012702  000004                   MOV     #4,R2           ;GET GENERATED
030342  022021                   CC28:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
030344  001402                           BEQ     CC29            ;FLOWS?
030346  000137  031072                   JMP     CCER10          ;DATA ERROR.D
030352  077205                   CC29:   SOB     R2,CC28
030354  000137  031110                   JMP     CCER11          ;BAD CONSTANT.D
030360  077220                   CC30:   SOB     R2,CC27
030362  020405                           CMP     R4,R5           ;FPS CORRECT?
030364  001402                           BEQ     CC31
030366  000137  030524                   JMP     CCER0           ;BAD FPS.
                                 ;EXPONENT DIFFERENCE=100=144 (OCT) FD=1
030372                           CC31:
030372  012737  030400  001110           MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
030400  012704  003200           1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
030404  170104                           LDFPS   R4
030406  012737  030426  001236           MOV     #CC32,$TMP2
030414  012700  031172                   MOV     #CCP0,R0        ;SET AC0 OPERAND
030420  172410                           LDD     (R0),AC0
030422  012700  031232                   MOV     #CCP4,R0        ;FSRC
030426  172010                   CC32:   ADDD    (R0),AC0        ;TEST INSTRUCTION
030430  170205                           STFPS   R5              ;GET FPS
```

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5579 030432 012700 031162            MOV     #CCDATO,R0      ;GET THE RESULT
5580 030436 174010                   STD     AC0,(R0)
5581 030440 012701 031232            MOV     #CCP4,R1        ;IS IT CORRECT
5582 030444 012702 000004            MOV     #4,R2
5583 030450 022021           CC33:   CMP     (R0)+,(R1)+
5584 030452 001415                   BEQ     CC36
5585 030454 012700 031162            MOV     #CCDATO,R0      ;DID A BAD
5586 030460 012701 031232            MOV     #CCP4,R1        ;CONSTANT (NOT 57)
5587 030464 012702 000004            MOV     #4,R2           ;GET GENERATED
5588 030470 022021           CC34:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5589 030472 001402                   BEQ     CC35            ;FLOWS?
5590 030474 000137 031126            JMP     CCER12          ;DATA ERROR.D
5591 030500 077205           CC35:   SOB     R2,CC34
5592 030502 000137 031144            JMP     CCER13          ;BAD CONSTANT.D
5593 030506 077220           CC36:   SOB     R2,CC33
5594 030510 020405                   CMP     R4,R5           ;FPS CORRECT?
5595 030512 001402                   BEQ     CC37
5596 030514 000137 030524            JMP     CCER0           ;BAD FPS.
5597 030520 000137 031322    CC37:   JMP     CCDONE
5598 030524 010437 001242    CCER0:  MOV     R4,$TMP4        ;FPS ERROR D
5599 030530 010537 001240            MOV     R5,$TMP3
5600 030534 104164           1$:     ERROR   +164
5601 030536 000137 031322            JMP     CCDONE
5602 030542 010437 001242    CCER90: MOV     R4,$TMP4        ;FPS ERROR F
5603 030546 010537 001240            MOV     R5,$TMP3
5604 030552 104165           1$:     ERROR   +165
5605 030554 000137 031322            JMP     CCDONE
5606 030560 012737 031212 001240 CCER1:  MOV     #CCP2,$TMP3     ;DATA ERROR D
5607 030566 012737 031212 001246         MOV     #CCP2,$TMP6
5608 030574 012737 031172 001242 CCER50: MOV     #CCP0,$TMP4
5609 030602 012737 031162 001244         MOV     #CCDATO,$TMP5
5610 030610 104166           1$:     ERROR   +166
5611 030612 000137 031322            JMP     CCDONE
5612 030616 012737 031212 001240 CCER2:  MOV     #CCP2,$TMP3     ;CONSTANT BAD D(B)
5613 030624 012737 031212 001246         MOV     #CCP2,$TMP6
5614 030632 012737 031172 001242 CCER22: MOV     #CCP0,$TMP4
5615 030640 012737 031162 001244         MOV     #CCDATO,$TMP5
5616 030646 104172           1$:     ERROR   +172
5617 030650 000137 031322            JMP     CCDONE
5618 030654 012737 031202 001240 CCER3:  MOV     #CCP1,$TMP3
5619 030662 012737 031262 001246         MOV     #CCP7,$TMP6
5620 030670 000741                       BR      CCER50
5621 030672 012737 031202 001240 CCER4:  MOV     #CCP1,$TMP3     ;CONSTANT BAD D(G)
5622 030700 012737 031262 001246         MOV     #CCP7,$TMP6
5623 030706 012737 031172 001242 CCER44: MOV     #CCP0,$TMP4
5624 030714 012737 031162 001244         MOV     #CCDATO,$TMP5
5625 030722 104173           1$:     ERROR   +173
5626 030724 000137 031322            JMP     CCDONE
5627 030730 012737 031252 001240 CCER5:  MOV     #CCP6,$TMP3     ;DATA ERROR F
5628 030736 012737 031252 001246         MOV     #CCP6,$TMP6
5629 030744 012737 031172 001242 CCER55: MOV     #CCP0,$TMP4
5630 030752 012737 031162 001244         MOV     #CCDATO,$TMP5
5631 030760 104170           1$:     ERROR   +170
5632 030762 000557                       BR      CCDONE
5633 030764 012737 031252 001240 CCER6:  MOV     #CCP6,$TMP3     ;CONSTANT BAD F(B)
5634 030772 012737 031252 001246         MOV     #CCP6,$TMP6
5635 031000 012737 031172 001242         MOV     #CCP0,$TMP4
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031006  012737  031162  001244            MOV     #CCDATO,$TMP5
031014  104174                    1$:     ERROR   +174
031016  000541                            BR      CCDONE
031020  012737  031242  001240  CCER7:    MOV     #CCP5,$TMP3      ;DATA ERROR F
031026  012737  031272  001246            MOV     #CCP10,$TMP6
031034  000743                            BR      CCER55
031036  012737  031242  001240  CCER8:    MOV     #CCP5,$TMP3      ;CONSTANT BAD F(G)
031044  012737  031272  001246            MOV     #CCP10,$TMP6
031052  012737  031162  001244            MOV     #CCDATO,$TMP5
031060  012737  031172  001242            MOV     #CCP0,$TMP4
031066  104175                    1$:     ERROR   +175
031070  000514                            BR      CCDONE
031072  012737  031222  001240  CCER10:   MOV     #CCP3,$TMP3      ;DATA ERROR D
031100  012737  031302  001246            MOV     #CCP11,$TMP6
031106  000632                            BR      CCER50
031110  012737  031222  001240  CCER11:   MOV     #CCP3,$TMP3      ;CONSTANT BAD D(G)
031116  012737  031302  001246            MOV     #CCP11,$TMP6
031124  000670                            BR      CCER44
031126  012737  031232  001240  CCER12:   MOV     #CCP4,$TMP3      ;DATA ERROR D
031134  012737  031232  001246            MOV     #CCP4,$TMP6
031142  000614                            BR      CCER50
031144  012737  031232  001240  CCER13:   MOV     #CCP4,$TMP3      ;CONSTANT BAD D(B)
031152  012737  031232  001246            MOV     #CCP4,$TMP6
031160  000624                            BR      CCER22
031162  000000  000000  000000  CCDATO:   .WORD   0,0,0,0
031172  000200  000000  000000  CCP0:     .WORD   200,0,0,0        ;E(AC)=1
031202  016200  000000  000000  CCP1:     .WORD   16200,0,0,0      ;E(FSRC)=E(AC)+56=57
031212  016400  000000  000000  CCP2:     .WORD   16400,0,0,0      ;E(FSRC)=E(AC)+57=58
031222  000400  000000  000000  CCP3:     .WORD   400,0,0,0        ;E(FSRC)=E(AC)+1=2
031232  031200  000000  000000  CCP4:     .WORD   31200,0,0,0      ;E(FSRC)=E(AC)+100=101=145(OCT)
031242  006200  000000  000000  CCP5:     .WORD   6200,0,0,0       ;E(FSRC)=E(AC)+24=25=31(OCT)
031252  006400  000000  000000  CCP6:     .WORD   6400,0,0,0       ;E(FSRC)=E(AC)+25=26=32(OCT)
031262  016200  000000  000000  CCP7:     .WORD   16200,0,0,1      ;CCP1 RES
031272  006200  000001  000000  CCP10:    .WORD   6200,1,0,0       ;CCP5 RES
031302  000500  000000  000000  CCP11:    .WORD   500,0,0,0        ;CCP3 RES
031312  000200  000000  000000  CCP12:    .WORD   200,0,0,0        ;BAD CONSTANT ;RES CCP2,CCP4
031322                          CCDONE:
031322  104413                            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?).
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                                      .SBTTL  TEST # 33 - ADDF & ADDD WITH E(AC) GREATER THAN E(FSRC) TEST
                                      ;;*************************************************************
                                      ;;*TEST 33        ADDF & ADDD WITH E(AC) GREATER THAN E(FSRC) TEST
                                      ;;*
                                      ;;*THIS IS A TEST OF THE ADDD AND ADDF
                                      ;;*INSTRUCTIONS AND THE ALIGN FSRC ALGORITHM
                                      ;;*FLOWS.  FIRST THE CONSTANT USED IS CHECKED.
                                      ;;*THEN SIMPLE AND WORST CASE ALIGNMENT
                                      ;;*SITUATIONS ARE TRIED.  NOTE E(AC)
                                      ;;*IS GREATER THAN E(FSRC).
                                      ;;*
                                      ;;*************************************************************
 031324  000004                       TST33:  SCOPE
                                      ;EXPONENT DIFFERENCE=57=71 (OCT) FD-1
 031326                               BB1:
 031326  012737  031334  001110               MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 031334  012704  003200               1$:     MOV     #3200,R4        ;SET FIV FIV, AND FD
 031340  170104                               LDFPS   R4
 031342  012737  032214  000244               MOV     #BBERO,FPVECT   ;SET UP FOR ERROR
 031350  012737  031370  001236               MOV     #BB2,$TMP2      ;IN CASE THE OVER\
                                                                      ;UNDER FLOWS FAIL.
 031356  012700  032556                       MOV     #BBPAT2,R0      ;SET AC0 OPERAND.
 031362  172410                               LDD     (R0),AC0
 031364  012700  032546                       MOV     #BBPAT1,R0      ;FSRC
 031370  172010                       BB2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
 031372  170205                               STFPS   R5
 031374  012700  032526               BB3:    MOV     #BBDAT0,R0      ;GET THE RESULT
 031400  174010                               STD     AC0,(R0)
 031402  012701  032556                       MOV     #BBPAT2,R1      ;RESULT CORRECT?
 031406  012702  000004                       MOV     #4,R2
 031412  022021                       BB4:    CMP     (R0)+,(R1)+
 031414  001402                               BEQ     BB5
 031416  000137  032254                       JMP     BBER1           ;DATA ERROR D
 031422  077205                       BB5:    SOB     R2,BB4
                                                                      ;WAS FPS CORRECT?
 031424  020405                               CMP     R4,R5
 031426  001402                               BEQ     BB6
 031430  000137  032214                       JMP     BBERO           ;FPS ERROR
                                      ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
 031434                               BB6:
 031434  012737  031442  001110               MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 031442  012704  003200               1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
 031446  170104                               LDFPS   R4
 031450  012737  031470  001236               MOV     #BB7,$TMP2
 031456  012700  032576                       MOV     #BBPAT4,R0      ;SET AC0 OPERAND
 031462  172410                               LDD     (R0),AC0
 031464  012700  032546                       MOV     #BBPAT1,R0      ;FSRC
 031470  172010                       BB7:    ADDD    (R0),AC0        ;TEST INSTRUCTION
 031472  170205                               STFPS   R5              ;GET FPS
 031474  012700  032526                       MOV     #BBDAT0,R0      ;GET THE RESULT
 031500  174010                               STD     AC0,(R0)
 031502  012701  032636                       MOV     #BBP10,R1       ;IS IT CORRECT
 031506  012702  000004                       MOV     #4,R2
 031512  022021                       BB10:   CMP     (R0)+,(R1)+
 031514  001415                               BEQ     BB13
 031516  012700  032526                       MOV     #BBDAT0,R0      ;DID A BAD
 031522  012701  032576                       MOV     #BBPAT4,R1      ;CONSTANT (NOT 57)
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031526  012702  000004                  MOV     #4,R2           ;GET GENERATED
031532  022021                  BB11:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
031534  001402                          BEQ     BB12            ;FLOWS?
031536  000137  032312                  JMP     BBER2           ;DATA ERROR.D
031542  077205                  BB12:   SOB     R2,BB11
031544  000137  032330                  JMP     BBER3           ;BAD CONSTANT.D
031550  077220                  BB13:   SOB     R2,BB10
031552  020405                          CMP     R4,R5           ;FPS CORRECT?
031554  001402                          BEQ     BB14
031556  000137  032214                  JMP     BBER0           ;BAD FPS.
                                ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
031562                          BB14:
031562  012737  031570  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
031570  012737  031616  001236  1$:     MOV     #BB15,$TMP2
031576  012700  032536                  MOV     #BBPAT0,R0      ;SET UP AC0 OPERAND
031602  172410                          LDD     (R0),AC0
031604  012704  003000                  MOV     #3000,R4        ;SET FIV AND FIV
                                                                ;CLEAR FD
031610  170104                          LDFPS   R4
031612  012700  032546                  MOV     #BBPAT1,R0      ;FSRC
031616  172010                  BB15:   ADDF    (R0),AC0        ;TEST INSTRUCTION
031620  170205                          STFPS   R5
031622  170011                          SETD                    ;REENTED DOUBLE MODE.
031624  012700  032526                  MOV     #BBDAT0,R0      ;GET THE RESULT
031630  174010                          STD     AC0,(R0)
031632  012701  032536                  MOV     #BBPAT0,R1      ;IS THE RESULT
031636  012702  000002                  MOV     #2,R2           ;CORRECT?
031642  022021                  BB16:   CMP     (R0)+,(R1)+
031644  001402                          BEQ     BB17
031646  000137  032364                  JMP     BBER4           ;DATA ERROR F
031652  077205                  BB17:   SOB     R2,BB16
031654  020405                          CMP     R4,R5           ;IS FPS CORRECT?
031656  001402                          BEQ     BB20
031660  000137  032234                  JMP     BBER10          ;FPS ERROR.
                                ;EXPONENT DIFFERENCE=24=30 (OCT)
031664                          BB20:
031664  012737  031672  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
031672  012737  031720  001236  1$:     MOV     #BB21,$TMP2
031700  012700  032566                  MOV     #BBPAT3,R0      ;SET UP AC0 OPERAND.
031704  172410                          LDD     (R0),AC0
031706  012704  003000                  MOV     #3000,R4        ;SET FIU,FIV. CLEAR FD.
031712  170104                          LDFPS   R4
031714  012700  032546                  MOV     #BBPAT1,R0      ;FSRC
031720  172010                  BB21:   ADDF    (R0),AC0        ;TEST INSTRUCTION
031722  170205                          STFPS   R5
031724  170011                          SETD                    ;REENTER DOUBLE MODE
031726  012700  032526                  MOV     #BBDAT0,R0      ;GET THE RESULT
031732  174010                          STD     AC0,(R0)
031734  012701  032626                  MOV     #BBP7,R1        ;IS THE RESULT CORRECT?
031740  012702  000002                  MOV     #2,R2
031744  022021                  BB22:   CMP     (R0)+,(R1)+
031746  001415                          BEQ     BB25
031750  012700  032526                  MOV     #BBDAT0,R0      ;WAS A BAD CONSTANT
031754  012701  032566                  MOV     #BBPAT3,R1      ;USED (NOT 25) IN
031760  012702  000002                  MOV     #2,R2           ;THE ALLIGN FLOWS?
031764  022021                  BB23:   CMP     (R0)+,(R1)+
031766  001402                          BEQ     BB24
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031770  000137  032420                  JMP     BBER5           ;DATA ERROR F
031774  077205                  BB24:   SOB     R2,BB23
031776  000137  032436                  JMP     BBER6           ;BAD CONSTANT F
032002  077220                  BB25:   SOB     R2,BB22
032004  020405                          CMP     R4,R5
032006  001402                          BEQ     BB26
032010  000137  032234                  JMP     BBER10          ;BAD FPS.
                                ;EXPONENT DIFFERENCE=1
032014                          BB26:
032014  012737  032022  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
032022  012737  032050  001236  1$:     MOV     #BB27,$TMP2
032030  012704  003200                  MOV     #3200,R4
032034  170104                          LDFPS   R4              ;SET UP AC0 OPERAND
032036  012700  032606                  MOV     #BBPAT5,R0
032042  172410                          LDD     (R0),AC0
032044  012700  032546                  MOV     #BBPAT1,R0      ;FSRC
032050  172010                  BB27:   ADDD    (R0),AC0        ;TEST INSTRUCTION
032052  170205                          STFPS   R5
032054  012700  032526                  MOV     #BBDAT0,R0      ;GET THE RESULT.
032060  174010                          STD     AC0,(R0)
032062  012701  032646                  MOV     #BBP11,R1       ;IS IT CORRECT?
032066  012702  000004                  MOV     #4,R2
032072  022021                  BB30:   CMP     (R0)+,(R1)+
032074  001402                          BEQ     BB31
032076  000137  032472                  JMP     BBER7           ;DATA ERROR D
032102  077205                  BB31:   SOB     R2,BB30
032104  020405                          CMP     R4,R5           ;IS FPS CORRECT
032106  001402                          BEQ     BB32
032110  000137  032214                  JMP     BBER0
                                ;EXPONENT DIFFERENCE=100=144 (OCT)
032114                          BB32:
032114  012737  032122  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
032122  012737  032150  001236  1$:     MOV     #BB33,$TMP2
032130  012704  003200                  MOV     #3200,R4
032134  170104                          LDFPS   R4              ;SET FIV,FIV AND FD
032136  012700  032616                  MOV     #BBPAT6,R0      ;SET UP AC0 OPERAND.
032142  172410                          LDD     (R0),AC0
032144  012700  032546                  MOV     #BBPAT1,R0      ;FSRC
032150  172010                  BB33:   ADDD    (R0),AC0        ;TEST INSTRUCTION
032152  170205                          STFPS   R5
032154  012700  032526                  MOV     #BBDAT0,R0      ;GET THE RESULT
032160  174010                          STD     AC0,(R0)
032162  012701  032616                  MOV     #BBPAT6,R1      ;IS IT CORRECT
032166  012702  000004                  MOV     #4,R2
032172  022021                  BB34:   CMP     (R0)+,(R1)+
032174  001402                          BEQ     BB35
032176  000137  032510                  JMP     BBER8           ;DATA ERROR D
032202  077205                  BB35:   SOB     R2,BB34
032204  020405                          CMP     R4,R5           ;IS FPS CORRECT
032206  001002                          BNE     BBER0
032210  000137  032656                  JMP     BBDONE
032214  010437  001242          BBER0:  MOV     R4,$TMP4        ;FPS ERROR D
032220  010537  001240                  MOV     R5,$TMP3
032224  104164                  1$:     ERROR   +164
032226  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
```

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                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                   ;THE USER TYPED CONTROL G?).
032230  000137  032656                      JMP     BBDONE
032234  010437  001242            BBER10:   MOV     R4,$TMP4       ;FPS ERROR F
032240  010537  001240                      MOV     R5,$TMP3
032244  104165                    1$:       ERROR   +165
032246  104413                              RSETUP                 ;GO INITIALIZE THE FPS AND STACK; AND
                                                                   ;SEE IF THE USER HAS EXPRESSED
                                                                   ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                   ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                   ;THE USER TYPED CONTROL G?).
032250  000137  032656                      JMP     BBDONE
032254  012737  032556  001242    BBER1:    MOV     #BBPAT2,$TMP4  ;DATA ERROR D
032262  012737  032556  001246              MOV     #BBPAT2,$TMP6
032270  012737  032546  001240    BBER11:   MOV     #BBPAT1,$TMP3
032276  012737  032526  001244              MOV     #BBDAT0,$TMP5
032304  104166                    1$:       ERROR   +166
032306  000137  032656                      JMP     BBDONE
032312  012737  032576  001242    BBER2:    MOV     #BBPAT4,$TMP4
032320  012737  032636  001246              MOV     #BBP10,$TMP6
032326  000760                              BR      BBER11
032330  012737  032576  001242    BBER3:    MOV     #BBPAT4,$TMP4  ;BAD CONSTANT D
032336  012737  032636  001246              MOV     #BBP10,$TMP6
032344  012737  032546  001240              MOV     #BBPAT1,$TMP3
032352  012737  032526  001244              MOV     #BBDAT0,$TMP5
032360  104167                    1$:       ERROR   +167
032362  000535                              BR      BBDONE
032364  012737  032536  001242    BBER4:    MOV     #BBPAT0,$TMP4  ;DATA ERROR F
032372  012737  032536  001246              MOV     #BBPAT0,$TMP6
032400  012737  032546  001240    BBER40:   MOV     #BBPAT1,$TMP3
032406  012737  032526  001244              MOV     #BBDAT0,$TMP5
032414  104170                    1$:       ERROR   +170
032416  000517                              BR      BBDONE
032420  012737  032566  001242    BBER5:    MOV     #BBPAT3,$TMP4
032426  012737  032626  001246              MOV     #BBP7,$TMP6
032434  000761                              BR      BBER40
032436  012737  032566  001242    BBER6:    MOV     #BBPAT3,$TMP4  ;CONSTANT ERROR F
032444  012737  032626  001246              MOV     #BBP7,$TMP6
032452  012737  032546  001240              MOV     #BBPAT1,$TMP3
032460  012737  032526  001244              MOV     #BBDAT0,$TMP5
032466  104171                    1$:       ERROR   +171
032470  000472                              BR      BBDONE
032472  012737  032606  001242    BBER7:    MOV     #BBPAT5,$TMP4
032500  012737  032546  001246              MOV     #BBPAT11,$TMP6
032506  000670                              BR      BBER11
032510  012737  032616  001242    BBER8:    MOV     #BBPAT6,$TMP4
032516  012737  032616  001246              MOV     #BBPAT6,$TMP6
032524  000661                              BR      BBER11
032526  000000  000000  000000    BBDAT0:   .WORD   0,0,0,0
032536  006400  000000  000000    BBPAT0:   .WORD   6400,0,0,0     ;F(AC)=E(FSRC)+25=26=32(OCT)
032546  000200  000000  000000    BBPAT1:   .WORD   200,0,0,0      ;E(FSRC)=1
032556  016400  000000  000000    BBPAT2:   .WORD   16400,0,0,0    ;E(AC)=E(FSRC)+57=58=72(OCT)
032566  006200  000000  000000    BBPAT3:   .WORD   6200,0,0,0     ;E(AC)=E(FSRC)+24=25=31(OCT)
032576  016200  000000  000000    BBPAT4:   .WORD   16200,0,0,0    ;E(AC)=E(FSR6)+56=57=71(OCT)
032606  000400  000000  000000    BBPAT5:   .WORD   400,0,0,0      ;E(AC)=E(FSRC)+1=2
032616  031200  000000  000000    BBPAT6:   .WORD   31200,0,0,0    ;E(AC)=E(FSRC)+100=101=145(OCT)
032626  006200  000001  000000    BBP7:     .WORD   6200,1,0,0     ;BBPAT3 RES
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5886 032636  016200  000000  000000  BBP10:   .WORD    16200,0,0,1      ;BBPAT4 RES
5887 032646  000500  000000  000000  BBP11:   .WORD    500,0,0,0        ;BBPAT5 RES
5888 032656                          BBDONE:
     032656  104413                           RSETUP                    ;GO INITIALIZE THE FPS AND STACK; AND
                                                                        ;SEE IF THE USER HAS EXPPFSSED
                                                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                        ;THE USER TYPED CONTROL G?).
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5896                                    .SBTTL  TEST # 34 - ADDD WITH NEGATVE OPRANDS TEST
                                        ;;*****************************************************************
                                        ;*TEST 34       ADDD WITH NEGATVE OPRANDS TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE ADDD INSTRUCTION
                                        ;*WITH NEGATIVE OPERANDS.  EVERY COMBINATION OF
                                        ;*OPERAND SIGNS IS TRIED.
                                        ;*
                                        ;;*****************************************************************
     032660  000004                     TST34:  SCOPE
5897                                    ;BOTH OPERANDS NEGATIVE
5898 032662                             DD1:
     032662  012737  032670  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5899 032670  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
5900 032674  170104                             LDFPS   R4
5901 032676  012737  032716  001236             MOV     #DD2,$TMP2
5902 032704  012700  034576                     MOV     #DDP1,R0                ;SET AC0 OPERAND
5903 032710  172410                             LDD     (R0),AC0
5904 032712  012700  034576                     MOV     #DDP1,R0                ;ESRC
5905 032716  172010                     DD2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5906 032720  170205                             STFPS   R5                      ;GET FPS
5907 032722  012700  034556                     MOV     #DDDAT0,R0              ;GET THE RESULT
5908 032726  174010                             STD     AC0,(R0)
5909 032730  012701  034676                     MOV     #DDP9,R1                ;IS IT CORRECT
5910 032734  012702  000004                     MOV     #4,R2
5911 032740  022021                     DD3:    CMP     (R0)+,(R1)+
5912 032742  001415                             BEQ     DD6
5913 032744  012700  034556                     MOV     #DDDAT0,R0              ;DID A ADD-SUB
5914 032750  012701  034626                     MOV     #DDP4,R1                ;FLOW A FAILURE
5915 032754  012702  000004                     MOV     #4,R2
5916 032760  022021                     DD4:    CMP     (R0)+,(R1)+
5917 032762  001402                             BEQ     DD5                     ;216,442,500
5918 032764  000137  034006                     JMP     DDER1                   ;DATA ERROR,D
5919 032770  077205                     DD5:    SOB     R2,DD4
5920 032772  000137  034044                     JMP     DDER2                   ;FLOW FAILURE,D
5921 032776  077220                     DD6:    SOB     R2,DD3
5922 033000  052704  000010                     BIS     #10,R4
5923 033004  020405                             CMP     R4,R5                   ;FPS CORRECT?
5924 033006  001402                             BEQ     DD7
5925 033010  000137  033770                     JMP     DDER0                   ;BAD,FPS
5926                                    ;AC POS FSRC NEG        AC=-FSRC
5927 033014                             DD7:
     033014  012737  033022  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5928 033022  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
5929 033026  170104                             LDFPS   R4
5930 033030  012737  033050  001236             MOV     #DD8,$TMP2
5931 033036  012700  034606                     MOV     #DDP2,R0                ;SET AC0 OPERAND
5932 033042  172410                             LDD     (R0),AC0
5933 033044  012700  034576                     MOV     #DDP1,R0                ;FSPC
5934 033050  172010                     DD8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5935 033052  170205                             STFPS   R5                      ;GET FPS
5936 033054  012700  034556                     MOV     #DDDAT0,R0              ;GET THE RESULT
5937 033060  174010                             STD     AC0,(R0)
5938 033062  012701  034566                     MOV     #DDP0,R1                ;IS IT CORRECT
5939 033066  012702  000004                     MOV     #4,R2
5940 033072  022021                     DD10:   CMP     (R0)+,(R1)+
5941 033074  001402                             BEQ     DD11
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033076 000137 034102                        JMP     DDER3                   ;FLOW FAILURE
033102 077205                       DD11:   SOB     R2,DD10
033104 052704 000004                        BIS     #4,R4
033110 020405                               CMP     R4,R5                   ;FPS CORRECT?
033112 001402                               BEQ     DD12
033114 000137 033770                        JMP     DDER0                   ;BAD FPS
                                    ;AC NEG FSRC POS                AC=-FSRC
033120                              DD12:
033120 012737 033126 001110                 MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
033126 012704 003200                1$:     MOV     #3200,R4                ;SET FIU, FIV, AND FD
033132 170104                               LDFPS   R4
033134 012737 033154 001236                 MOV     #DD13,$TMP2
033142 012700 034576                        MOV     #DDP1,R0                ;SET AC0 OPERAND
033146 172410                               LDD     (R0),AC0
033150 012700 034606                        MOV     #DDP2,R0                ;FSRC
033154 172010                       DD13:   ADDD    (R0),AC0                ;TEST INSTRUCTION
033156 170205                               STFPS   R5                      ;GET FPS
033160 012700 034556                        MOV     #DDDAT0,R0              ;GET THE RESULT
033164 174010                               STD     AC0,(R0)
033166 012701 034566                        MOV     #DDP0,R1                ;IS IT CORRECT
033172 012702 000004                        MOV     #4,R2
033176 022021                       DD14:   CMP     (R0)+,(R1)+
033200 001402                               BEQ     DD15
033202 000137 034140                        JMP     DDER4                   ;FLOW FAILURE 216,440,121
033206 077205                       DD15:   SOB     R2,DD14
033210 052704 000004                        BIS     #4,R4
033214 020405                               CMP     R4,R5                   ;EPS CORRECT?
033216 001402                               BEQ     DD16
033220 000137 033770                        JMP     DDER0                   ;BAD FPS
                                    ;AC0 POC        FSRC    NEG     /AC/ > /FSRC/
033224                              DD16:
033224 012737 033232 001110                 MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
033232 012704 003200                1$:     MOV     #3200,R4                ;SET FIV, FIV AND FD
033236 170104                               LDFPS   R4
033240 012737 033260 001236                 MOV     #DD17,$TMP2
033246 012700 034616                        MOV     #DDP3,R0                ;SET AC0 OPERAND
033252 172410                               LDD     (R0),AC0
033254 012700 034646                        MOV     #DDP6,R0                ;ESPC
033260 172010                       DD17:   ADDD    (R0),AC0                ;TEST INSTRUCTION
033262 170205                               STFPS   R5                      ;GET FPS
033264 012700 034556                        MOV     #DDDAT0,R0              ;GET THE RESULT
033270 174010                               STD     AC0,(R0)
033272 012701 034656                        MOV     #DDP7,R1                ;IS IT CORRECT
033276 012702 000004                        MOV     #4,R2
033302 022021                       DD18:   CMP     (R0)+,(R1)+
033304 001415                               BEQ     DD21
033306 012700 034556                        MOV     #DDDAT0,R0              ;FLOWS FAILURE
033312 012701 034666                        MOV     #DDP8,R1                ;216,440,101
033316 012702 000004                        MOV     #4,R2                   ;GET GENERATED
033322 022021                       DD19:   CMP     (R0)+,(R1)+
033324 001402                               BEQ     DD20
033326 000137 034176                        JMP     DDER5                   ;DATA ERROR.
033332 077205                       DD20:   SOB     R2,DD19
033334 000137 034234                        JMP     DDER6
033340 077220                       DD21:   SOB     R2,DD18
033342 020405                               CMP     R4,R5                   ;EPS CORRECT?
033344 001402                               BEQ     DD22
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     033346  000137  033770                 JMP     DDERO                   ;BAD FPS
                                    ;AC NEG FSRC      POS       /FSRC/ > /AC/
     033352                         DD22:
     033352  012737  033360  001110         MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
     033360  012704  003200          1$:    MOV     #3200,R4                ;SET FIO,FIV, AND FD
     033364  170104                         LDFPS   R4
     033366  012737  033406  001236         MOV     #DD23,$TMP2
     033374  012700  034646                 MOV     #DDP6,R0                ;SET AC0 OPERAND
     033400  172410                         LDD     (R0),AC0
     033402  012700  034616                 MOV     #DDP3,R0                ;FSPC
     033406  172010                  DD23:  ADDD    (R0),AC0                ;TEST INSTRUCTION
     033410  170205                         STFPS   R5                      ;GET FPS
     033412  012700  034556                 MOV     #DDDAT0,R0              ;GET THE RESULT
     033416  174010                         STD     AC0,(R0)
     033420  012701  034656                 MOV     #DDP7,R1                ;IS IT CORRECT?
     033424  012702  000004                 MOV     #4,R2
     033430  022021                  DD24:  CMP     (R0)+,(R1)+
     033432  001415                         BEQ     DD27
     033434  012700  034556                 MOV     #DDDAT0,R0              ;FLO,S FAILURE
     033440  012701  034666                 MOV     #DDP8,R1                ;CONSTANT (NOT 57)
     033444  012702  000004                 MOV     #4,R2                   ;216,042,101
     033450  021011                  DD25:  CMP     (R0),(R1)
     033452  001402                         BEQ     DD26
     033454  000137  034272                 JMP     DDER7                   ;DATA ERROR.
     033460  077205                  DD26:  SOB     R2,DD25
     033462  000137  034330                 JMP     DDER8
     033466  077220                  DD27:  SOB     R2,DD24
     033470  020405                         CMP     R4,R5                   ;FPS CORRECT?
     033472  001402                         BEQ     DD30
     033474  000137  033770                 JMP     DDERO                   ;BAD FPS
                                    ;AC0 POS          FSRC      NEG     /AC/</FRSRC/
     033500                         DD30:
     033500  012737  033506  001110         MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
     033506  012704  003200          1$:    MOV     #3200,R4                ;SET FIO,FIV,AND FD
     033512  170104                         LDFPS   R4
     033514  012737  033534  001236         MOV     #DD31,$TMP2
     033522  012700  034626                 MOV     #DDP4,R0                ;SET AC0 OPERAND
     033526  172410                         LDD     (R0),AC0
     033530  012700  034636                 MOV     #DDP5,R0                ;FSPC
     033534  172010                  DD31:  ADDD    (R0),AC0                ;TEST INSTRUCTION
     033536  170205                         STFPS   R5                      ;GET FPS
     033540  012700  034556                 MOV     #DDDAT0,R0              ;GET THE RESULT
     033544  174010                         STD     AC0,(R0)
     033546  012701  034666                 MOV     #DDP8,R1                ;IS IT CORRECT
     033552  012702  000004                 MOV     #4,R2
     033556  022021                  DD32:  CMP     (R0)+,(R1)+
     033560  001415                         BEQ     DD35                    ;ADD-SUB
     033562  012700  034556                 MOV     #DDDAT0,R0              ;FLOWAS FAILURE
     033566  012701  034656                 MOV     #DDP7,R1                ;CON 216 N440 NOT 141
     033572  012702  000004                 MOV     #4,R2                   ;GET GENERATED
     033576  022021                  DD33:  CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
     033600  001402                         BEQ     DD34                    ;FLOWS?
     033602  000137  034366                 JMP     DDER9                   ;DATA ERROR, D
     033606  077205                  DD34:  SOB     R2,DD33
     033610  000137  034424                 JMP     DDER10
     033614  077220                  DD35:  SOB     R2,DD32
     033616  052704  000010                 BIS     #10,R4
```

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6052 033622  020405                        CMP     R4,R5                   ;FPS CORRECT?
6053 033624  001402                        BEQ     DD36
6054 033626  000137  033770                JMP     DDER0                   ;BAD FPS
6055                              ;ACO NEG          FSRC    POS     /FSRC/</AC/
6056 033632                       DD36:
     033632  012737  033640  001110        MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
6057 033640  012704  003200        1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
6058 033644  170104                        LDFPS   R4
6059 033646  012737  033666  001236        MOV     #DD37,$TMP2
6060 033654  012700  034636                MOV     #DDP5,R0                ;SET ACO OPERAND
6061 033660  172410                        LDD     (R0),AC0
6062 033662  012700  034626                MOV     #DDP4,R0                ;FSPC
6063 033666  172010                DD37:   ADDD    (R0),AC0                ;TEST INSTRUCTION
6064 033670  170205                        STFPS   R5                      ;GET FPS
6065 033672  012700  034556                MOV     #DDDAT0,R0              ;GET THE RESULT
6066 033676  174010                        STD     AC0,(R0)
6067 033700  012701  034666                MOV     #DDP8,R1                ;IS IT CORRECT
6068 033704  012702  000004                MOV     #4,R2
6069 033710  022021                DD38:   CMP     (R0)+,(R1)+
6070 033712  001415                        BEQ     DD41
6071 033714  012700  034556                MOV     #DDDAT0,R0              ;ADD SUB
6072 033720  012701  034656                MOV     #DDP7,R1                ;FLOWS FAILURES
6073 033724  012702  000004                MOV     #4,R2                   ;GET 216,042,141
6074 033730  022021                DD39:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
6075 033732  001402                        BEQ     DD40                    ;FLOWS?
6076 033734  000137  034462                JMP     DDER11                  ;DATA ERROR. D
6077 033740  077205                DD40:   SOB     R2,DD39
6078 033742  000137  034520                JMP     DDER12                  ;BAD CONSTANT.D
6079 033746  077220                DD41:   SOB     R2,DD38
6080 033750  052704  000010                BIS     #10,R4
6081 033754  020405                        CMP     R4,R5                   ;FPS CORRECT?
6082 033756  001402                        BEQ     DD42
6083 033760  000137  033770                JMP     DDER0                   ;BAD FPS
6084 033764  000137  034706        DD42:   JMP     DDDONE
6085 033770  010437  001242        DDER0:  MOV     R4,$TMP4                ;FPS ERROR
6086 033774  010537  001240                MOV     R5,$TMP3
6087 034000  104164                1$:     ERROR   +164
6088 034002  000137  034706                JMP     DDDONE
6089 034006                       DDER1:
     034006  012737  034576  001240        MOV     #DDP1,$TMP3
     034014  012737  034576  001242        MOV     #DDP1,$TMP4
     034022  012737  034556  001244        MOV     #DDDAT0,$TMP5
     034030  012737  034676  001246        MOV     #DDP9,$TMP6
     034036  104165                1$:     ERROR   +165
     034040  000137  034706                JMP     DDDONE
6090 034044                       DDER2:
     034044  012737  034576  001240        MOV     #DDP1,$TMP3
     034052  012737  034576  001242        MOV     #DDP1,$TMP4
     034060  012737  034556  001244        MOV     #DDDAT0,$TMP5
     034066  012737  034676  001246        MOV     #DDP9,$TMP6
     034074  104176                1$:     ERROR   +176
     034076  000137  034706                JMP     DDDONE
6091 034102                       DDER3:
     034102  012737  034576  001240        MOV     #DDP1,$TMP3
     034110  012737  034606  001242        MOV     #DDP2,$TMP4
     034116  012737  034556  001244        MOV     #DDDAT0,$TMP5
     034124  012737  034566  001246        MOV     #DDP0,$TMP6
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        034132  104214                  1$:     ERROR   +214
        034134  000137  034706                    JMP     DDDONE
6092    034140                          DDER4:
        034140  012737  034606  001240            MOV     #DDP2,$TMP3
        034146  012737  034576  001242            MOV     #DDP1,$TMP4
        034154  012737  034556  001244            MOV     #DDDATO,$TMP5
        034162  012737  034566  001246            MOV     #DDP0,$TMP6
        034170  104200                  1$:     ERROR   +200
        034172  000137  034706                    JMP     DDDONE
6093    034176                          DDER5:
        034176  012737  034646  001240            MOV     #DDP6,$TMP3
        034204  012737  034616  001242            MOV     #DDP3,$TMP4
        034212  012737  034556  001244            MOV     #DDDATO,$TMP5
        034220  012737  034656  001246            MOV     #DDP7,$TMP6
        034226  104165                  1$:     ERROR   +165
        034230  000137  034706                    JMP     DDDONE
6094    034234                          DDER6:
        034234  012737  034646  001240            MOV     #DDP6,$TMP3
        034242  012737  034616  001242            MOV     #DDP3,$TMP4
        034250  012737  034556  001244            MOV     #DDDATO,$TMP5
        034256  012737  034656  001246            MOV     #DDP7,$TMP6
        034264  104201                  1$:     ERROR   +201
        034266  000137  034706                    JMP     DDDONE
6095    034272                          DDER7:
        034272  012737  034616  001240            MOV     #DDP3,$TMP3
        034300  012737  034646  001242            MOV     #DDP6,$TMP4
        034306  012737  034556  001244            MOV     #DDDATO,$TMP5
        034314  012737  034656  001246            MOV     #DDP7,$TMP6
        034322  104165                  1$:     ERROR   +165
        034324  000137  034706                    JMP     DDDONE
6096    034330                          DDER8:
        034330  012737  034616  001240            MOV     #DDP3,$TMP3
        034336  012737  034646  001242            MOV     #DDP6,$TMP4
        034344  012737  034556  001244            MOV     #DDDATO,$TMP5
        034352  012737  034656  001246            MOV     #DDP7,$TMP6
        034360  104202                  1$:     ERROR   +202
        034362  000137  034706                    JMP     DDDONE
6097    034366                          DDER9:
        034366  012737  034636  001240            MOV     #DDP5,$TMP3
        034374  012737  034626  001242            MOV     #DDP4,$TMP4
        034402  012737  034556  001244            MOV     #DDDATO,$TMP5
        034410  012737  034666  001246            MOV     #DDP8,$TMP6
        034416  104165                  1$:     ERROR   +165
        034420  000137  034706                    JMP     DDDONE
6098    034424                          DDER10:
        034424  012737  034636  001240            MOV     #DDP5,$TMP3
        034432  012737  034626  001242            MOV     #DDP4,$TMP4
        034440  012737  034556  001244            MOV     #DDDATO,$TMP5
        034446  012737  034666  001246            MOV     #DDP8,$TMP6
        034454  104203                  1$:     ERROR   +203
        034456  000137  034706                    JMP     DDDONE
6099    034462                          DDER11:
        034462  012737  034626  001240            MOV     #DDP4,$TMP3
        034470  012737  034636  001242            MOV     #DDP5,$TMP4
        034476  012737  034556  001244            MOV     #DDDATO,$TMP5
        034504  012737  034666  001246            MOV     #DDP8,$TMP6
        034512  104165                  1$:     ERROR   +165
```

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        034514  000137  034706                            JMP     DDDONE
        034520                              DDER12:
        034520  012737  034626  001240                    MOV     #DDP4,$TMP3
        034526  012737  034636  001242                    MOV     #DDP5,$TMP4
        034534  012737  034556  001244                    MOV     #DDDATO,$TMP5
        034542  012737  034666  001246                    MOV     #DDP8,$TMP6
        034550  104204                      1$:           ERROR   +204
        034552  000137  034706                            JMP     DDDONE
        034556  000000  000000  000000      DDDATO:       .WORD   0,0,0,0
        034566  000000  000000  000000      DDP0:         .WORD   0,0,0,0
        034576  100200  000000  000000      DDP1:         .WORD   100200,0,0,0     ;-DDP2
        034606  000200  000000  000000      DDP2:         .WORD   200,0,0,0        ;-DDP1
        034616  001100  000000  000000      DDP3:         .WORD   1100,0,0,0       ;EXP=4  ;FRAC=...110...
        034626  000600  000000  000000      DDP4:         .WORD   600,0,0,0        ;EXP=3  ;FRAC=...100...
        034636  101100  000000  000000      DDP5:         .WORD   101100,0,0,0     ;-DDP3
        034646  100600  000000  000000      DDP6:         .WORD   100600,0,0,0     ;-DDP4
        034656  001000  000000  000000      DDP7:         .WORD   1000,0,0,0       ;DDP3+DDP6
        034666  101000  000000  000000      DDP8:         .WORD   101000,0,0,0     ;DDP5+DDP4
        034676  100400  000000  000000      DDP9:         .WORD   100400,0,0,0     ;DDP1+DDP1
        034706                              DDDONE:
        034706  104413                                    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?).
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```
6120                                    .SBTTL  TEST # 35 - SUBD TEST
                                        ;*****************************************************************
                                        ;*TEST 35       SUBD TEST
                                        ;*
                                        ;* THIS IS A TEST OF THE SUBD INSTRUCTION.
                                        ;* BOTH A POSITIVE AND A NEGATIVE NUMBER
                                        ;* IS SUBTRACTED FROM IT SELF
                                        ;*
                                        ;*****************************************************************
     034710  000004                     TST35:  SCOPE
6121                                            ;USE POSITIVE OPERANDS
6122 034712                             EE1:
     034712  012737  034720  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
6123 034720  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
6124 034724  170104                             LDFPS   R4
6125 034726  012737  034746  001236             MOV     #EE2,$TMP2
6126 034734  012700  035432                     MOV     #EEP1,R0                ;SET AC0 OPERAND
6127 034740  172410                             LDD     (R0),AC0
6128 034742  012700  035432                     MOV     #EEP1,R0                ;FSPC
6129 034746  173010                     EE2:    SUBD    (R0),AC0                ;TEST INSTRUCTION
6130 034750  170205                             STFPS   R5                      ;GET FPS
6131 034752  012700  035410                     MOV     #EEDAT0,R0              ;GET THE RESULT
6132 034756  174010                             STD     AC0,(R0)
6133 034760  012701  035420                     MOV     #EEP0,R1                ;IS IT CORRECT?
6134 034764  012702  000004                     MOV     #4,R2
6135 034770  022021                     EE3:    CMP     (R0)+,(R1)+
6136 034772  001415                             BEQ     EE6
6137 034774  012700  035410                     MOV     #EEDAT0,R0              ;DID A BAD
6138 035000  012701  035442                     MOV     #EEP2,R1                ;CONSTANT (NOT 57)
6139 035004  012702  000004                     MOV     #4,R2                   ;GET GENERATED
6140 035010  022021                     EE4:    CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
6141 035012  001402                             BEQ     EE5                     ;FLOWS?
6142 035014  000137  035220                     JMP     EEER1                   ;DATA ERROR.D
6143 035020  077205                     EE5:    SOB     R2,EE4
6144 035022  000137  035256                     JMP     EEER2                   ;BAD CONSTANT.D
6145 035026  077220                     EE6:    SOB     R2,EE3
6146 035030  052704  000004                     BIS     #4,R4
6147 035034  020405                             CMP     R4,R5                   ;FPS CORRECT?
6148 035036  001402                             BEQ     EE7
6149 035040  000137  035202                     JMP     EEER0                   ;BAD FPS
6150                                            ;USE NEGATIVE OPERANDS
6151 035044                             EE7:
     035044  012737  035052  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
6152 035052  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
6153 035056  170104                             LDFPS   R4
6154 035060  012737  035100  001236             MOV     #EE8,$TMP2
6155 035066  012700  035452                     MOV     #EEP3,R0                ;SET AC0 OPERAND
6156 035072  172410                             LDD     (R0),AC0
6157 035074  012700  035452                     MOV     #EEP3,R0                ;FSPC
6158 035100  173010                     EE8:    SUBD    (R0),AC0                ;TEST INSTRUCTION
6159 035102  170205                             STFPS   R5                      ;GET FPS
6160 035104  012700  035410                     MOV     #EEDAT0,R0              ;GET THE RESULT
6161 035110  174010                             STD     AC0,(R0)
6162 035112  012701  035420                     MOV     #EEP0,R1                ;IS IT CORRECT?
6163 035116  012702  000004                     MOV     #4,R2
6164 035122  022021                     EE9:    CMP     (R0)+,(R1)+
6165 035124  001415                             BEQ     EE12
```

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035126  012700  035410                  MOV     #EEDATO,R0              ;DID A BAD
035132  012701  035462                  MOV     #EEP4,R1                ;CONSTANT (NOT 57)
035136  012702  000004                  MOV     #4,R2                   ;GET GENERATED
035142  022021                  EE10:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
035144  001402                          BEQ     EE11                    ;FLOWS?
035146  000137  035314                  JMP     EEER3                   ;DATA ERROR.D
035152  077205                  EE11:   SOB     R2,EE10
035154  000137  035352                  JMP     EEER4                   ;BAD CONSTANT.D
035160  077220                  EE12:   SOB     R2,EE9
035162  052704  000004                  BIS     #4,R4
035166  020405                          CMP     R4,R5                   ;FPS CORRECT?
035170  001402                          BEQ     EE13
035172  000137  035202                  JMP     EEER0                   ;BAD FPS.
035176  000137  035472          EE13:   JMP     EEDONE
035202  010437  001242          EEER0:  MOV     R4,$TMP4                ;BAD FPS
035206  010537  001240                  MOV     R5,$TMP3
035212  104205                  1$:     ERROR   +205
035214  000137  035472                  JMP     EEDONE
035220                          EEER1:
035220  012737  035432  001240          MOV     #EEP1,$TMP3
035226  012737  035432  001242          MOV     #EEP1,$TMP4
035234  012737  035410  001244          MOV     #EEDATO,$TMP5
035242  012737  035420  001246          MOV     #EEP0,$TMP6
035250  104206                  1$:     ERROR   +206
035252  000137  035472                  JMP     EEDONE
035256                          EEER2:
035256  012737  035432  001240          MOV     #EEP1,$TMP3
035264  012737  035432  001242          MOV     #EEP1,$TMP4
035272  012737  035410  001244          MOV     #EEDATO,$TMP5
035300  012737  035420  001246          MOV     #EEP0,$TMP6
035306  104207                  1$:     ERROR   +207
035310  000137  035472                  JMP     EEDONE
035314                          EEER3:
035314  012737  035452  001240          MOV     #EEP3,$TMP3
035322  012737  035452  001242          MOV     #EEP3,$TMP4
035330  012737  035410  001244          MOV     #EEDATO,$TMP5
035336  012737  035420  001246          MOV     #EEP0,$TMP6
035344  104206                  1$:     ERROR   +206
035346  000137  035472                  JMP     EEDONE
035352                          EEER4:
035352  012737  035452  001240          MOV     #EEP3,$TMP3
035360  012737  035452  001242          MOV     #EEP3,$TMP4
035366  012737  035410  001244          MOV     #EEDATO,$TMP5
035374  012737  035420  001246          MOV     #EEP0,$TMP6
035402  104207                  1$:     ERROR   +207
035404  000137  035472                  JMP     EEDONE
035410  000000  000000  000000  EEDATO: .WORD   0,0,0,0
035420  000000  000000  000000  EEP0:   .WORD   0,0,0,0,0
035432  000200  000000  000000  EEP1:   .WORD   200,0,0,0
035442  000400  000000  000000  EEP2:   .WORD   400,0,0,0
035452  100200  000000  000000  EEP3:   .WORD   100200,0,0,0
035462  100400  000000  000000  EEP4:   .WORD   100400,0,0,0
035472                          EEDONE:
035472  104413                          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
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;THE USER TYPED (CONTROL G?).

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                                        .SBTTL  TEST # 36 - NORMALIZE ALGORITHM TEST
                                        ;;*****************************************************************
                                        ;;*TEST 36        NORMALIZE ALGORITHM TEST
                                        ;;*
                                        ;;* THIS IS A TEST OF THE NORMALIZE
                                        ;;* FLOW ALGORITHM.  TWO PATTERNS ARE USED,
                                        ;;* FIRST THE MINIMUM SITUATION REQUIRING ONE
                                        ;;* LEFT SHIFT AND THEN THE MAXIMUM SITUATION
                                        ;;* REQUIRING 56 SHIFTS.
                                        ;;*
                                        ;;*****************************************************************
035474  000004                          TST36:  SCOPE
                                        ;USE DATA PATTERNS THAT REQUIRE ONLY ONE LEFT SHIFT TO NORMALIZE
035476                                  FF1:
035476  012737  035504  001110                  MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
035504  012704  003200                  1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
035510  170104                                  LDFPS   R4
035512  012737  035532  001236                  MOV     #FF2,$TMP2
035520  012700  036030                          MOV     #FFP2,R0                ;SET AC0 OPERAND
035524  172410                                  LDD     (R0),AC0
035526  012700  036040                          MOV     #FFP3,R0                ;FSRC
035532  172010                          FF2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
035534  170205                                  STFPS   R5                      ;GET FPS
035536  012700  036000                          MOV     #FFDAT0,R0              ;GET THE RESULT
035542  174010                                  STD     AC0,(R0)
035544  012701  036050                          MOV     #FFP4, R1               ;IS IT CORRECT
035550  012702  000004                          MOV     #4,R2
035554  022021                          FF3:    CMP     (R0)+,(R1)+
035556  001401                                  BEQ     FF4
035560  000470                                  BR      FFER2                   ;BAD DATA
035562  077204                          FF4:    SOB     R2,FF3
035564  020405                                  CMP     R4,R5                   ;FPS CORRECT?
035566  001401                                  BEQ     FF5
035570  000437                                  BR      FFER0                   ;BAD FPS
                                        ;USE DATA PATTERNS WHICH REQUIRE 56 LEFT SHIFTS TO NORMALIZE
                                        ;THE RESULT
035572                                  FF5:
035572  012737  035600  001110                  MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
035600  012704  003200                  1$:     MOV     #3200,R4                ;SET FIU, FIV, AND FD
035604  170104                                  LDFPS   R4
035606  012737  035626  001236                  MOV     #FF6,$TMP2
035614  012700  036010                          MOV     #FFP0,R0                ;SET AC0 OPERAND
035620  172410                                  LDD     (R0),AC0
035622  012700  036020                          MOV     #FFP1,R0                ;FSRC
035626  172010                          FF6:    ADDD    (R0),AC0                ;TEST INSTRUCTION
035630  170205                                  STFPS   R5                      ;GET FPS
035632  012700  036000                          MOV     #FFDAT0,R0              ;GET THE RESULT
035636  174010                                  STD     AC0,(R0)
035640  012701  036050                          MOV     #FFP4,R1                ;IS IT CORRECT
035644  012702  000004                          MOV     #4,R2
035650  022021                          FF7:    CMP     (R0)+,(R1)+
035652  001401                                  BEQ     FF10
035654  000413                                  BR      FFER1                   ;BATA
035656  077204                          FF10:   SOB     R2,FF7
035660  020405                                  CMP     R4,R5                   ;FPS CORRECT?
035662  001401                                  BEQ     FF11
035664  000401                                  BR      FFER0                   ;BAD FPS
```

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035666  000474                          FF11:     BR      FFDONE

035670  010537  001240                  FFER0:    MOV     R5,$TMP3
035674  010437  001242                            MOV     R4,$TMP4
035700  104164                          1$:       ERROR   +164
035702  000466                                    BR      FFDONE

035704                                  FFER1:
035704  012737  036020  001240                    MOV     #FFP1,$TMP3
035712  012737  036010  001242                    MOV     #FFP0,$TMP4
035720  012737  036000  001244                    MOV     #FFDAT0,$TMP5
035726  012737  036050  001246                    MOV     #FFP4,$TMP6
035734  104210                          1$:       ERROR   +210
035736  000137  036060                            JMP     FFDONE

035742                                  FFER2:
035742  012737  036040  001240                    MOV     #FFP3,$TMP3
035750  012737  036030  001242                    MOV     #FFP2,$TMP4
035756  012737  036000  001244                    MOV     #FFDAT0,$TMP5
035764  012737  036050  001246                    MOV     #FFP4,$TMP6
035772  104210                          1$:       ERROR   +210
035774  000137  036060                            JMP     FFDONE


036000  000000  000000  000000          FFDAT0:   .WORD   0,0,0,0
036010  016000  000000  000000          FFP0:     .WORD   16000,0,0,1
036020  116000  000000  000000          FFP1:     .WORD   116000,0,0,0
036030  000500  000000  000000          FFP2:     .WORD   500,0,0,0
036040  100400  000000  000000          FFP3:     .WORD   100400,0,0,0
036050  000200  000000  000000          FFP4:     .WORD   200,0,0,0        ;FFP4=FFP0+FFP1=FFP3+FFP4
036060                                  FFDONE:
036060                                  TST37:
```

```
5269                                    .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
036060                                  $EOP:
036060  000004                                  SCOPE
036062  005037  001102                         CLR     $TSTNM          ;;ZERO THE TEST NUMBER
036066  005037  001302                         CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
036072  005237  001324                         INC     $PASS           ;;INCREMENT THE PASS NUMBER
036076  100004                               1000$:  BPL     1000$           ;BRANCH IF STILL PLUS                   ;DPM002
036100  005037  001324                         CLR     $PASS           ;CLEAR THE PASS COUNTER                 ;DPM002
036104  005237  036514                         INC     $PASS2          ;INCREMENT OVERFLOW PASS COUNTER        ;DPM002
036110  005327                               1000$:  DEC     (PC)+           ;;LOOP?
036112  000001                               $EOPCT: .WORD   1
036114  003402                                       BLE     999$            ;NO                             ;DPM002
036116  000137  036442                               JMP     $DOAGN          ;;YES
036122  012737                               999$:   MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
036124  000001                               $ENDCT: .WORD   1
036126  036112                                       $EOPCT
036130  005737  001112                               TST     $ERTTL          ;SEE IF ANY ERRORS THIS PASS            ;DPM002
036134  001007                                       BNE     5000$           ;BRANCH IF SO TO PRINT THE EOP          ;DPM002
036136  005737  036512                               TST     EPENDS          ;SEE IF EOP MSGS ARE DISABLED           ;DPM002
036142  001120                                       BNE     $GET42          ;BRANCH IF SO                           ;DPM002
036144  032737  000003  001324                       BIT     #3,$PASS        ;PRINT EOP EVERY 4TH PASS               ;DPM002
036152  001114                                       BNE     $GET42          ;BRANCH IF NOT MULTIPLE OF 10           ;DPM002
036154                                  5000$:
036154  104401  036162                               TYPE    ,65$            ;;TYPE ASCIZ STRING
036160  000407                                       BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <12><15>/END PASS # /
036200                                  64$:
036200  005737  036514                               TST     $PASS2          ;SEE IF OVERFLOW HAS NON-ZERO VALUE     ;DPM002
036204  001440                                       BEQ     4900$           ;BRANCH IF ZERO
036206  013746  036514                               MOV     $PASS2,-(SP)    ;;SAVE $PASS2 FOR TYPEOUT
                                                                             ;;TYPE OVERFLOW PASS NUMBER IN OCTAL    ;DPM002
036212  104403                                       TYPOS                   ;;GO TYPE--OCTAL ASCII
036214     006                                       .BYTE   6               ;;TYPE 6 DIGITS
036215     000                                       .BYTE   0               ;;SUPPRESS LEADING ZEROS
036216  005737  001324                               TST     $PASS           ;SEE IF PASS COUNT IS ZERO              ;DPM002
036222  001007                                       BNE     3000$           ;BRANCH IF NOT                          ;DPM002
036224  104401  036232                               TYPE    ,67$            ;;TYPE ASCIZ STRING
036230  000403                                       BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  !00000.
036240                                  66$:
036240  000426                                       BR      4910$           ;GO TEST $ERTTL                         ;DPM002
036242  012737  070000  001244           3000$:  MOV     #70000,$TMP5    ;CHECK 5TH OCTAL DIGIT FIRST            ;DPM002
036250  033737  001244  001324           4000$:  BIT     $TMP5,$PASS     ;CHECK TO SEE IF OCTAL DIGIT IS ZERO    ;DPM002
036256  001013                                       BNE     4900$           ;BRANCH OUT IF ZERO                     ;DPM002
036260  104401  036266                               TYPE    ,69$            ;;TYPE ASCIZ STRING
036264  000401                                       BR      68$             ;;GET OVER THE ASCIZ
                                        ;;69$:  .ASCIZ  '0'
036270                                  68$:
036270  006237  001244                               ASR     $TMP5           ;SHIFT THE THREE BITS RIGHT 3 PLACES    ;DPM002
036274  006237  001244                               ASR     $TMP5           ;                               ;DPM002
```

```
036300  006237  001244                     ASR     $TMP5                   ;                                       ;DPM002
036304  000761                             BR      4000$                   ;BRANCH BACK TO CHECK $PASS             ;DPM002
036306                           4900$:
036306  013746  001324                     MOV     $PASS,-(SP)             ;;SAVE $PASS FOR TYPEOUT
                                                                           ;;TYPE PASS NUMBER IN OCTAL
036312  104403                             TYPOS                           ;;GO TYPE--OCTAL ASCII
036314     006                             .BYTE   6                       ;;TYPE 6 DIGITS
036315     000                             .BYTE   0                       ;;SUPPRESS LEADING ZEROS
036316  005737  001112           4910$:    TST     $ERTTL                  ;SEE IF ANY ERRORS THIS PASS            ;DPM002
036322  001426                             BEQ     5001$                   ;BRANCH AROUND REPORT IF NONE           ;DPM002
036324  104401  036332                     TYPE    ,71$                    ;;TYPE ASCIZ STRING
036330  000415                             BR      70$                     ;;GET OVER THE ASCIZ
                                 ;;71$:   .ASCIZ  /  TOTAL ERRORS THIS PASS /
036364                           70$:
036364  013746  001112                     MOV     $ERTTL,-(SP)            ;;SAVE $ERTTL FOR TYPEOUT
                                                                           ;;TOTAL NUMBER OF ERRORS IN OCTAL
036370  104403                             TYPOS                           ;;GO TYPE--OCTAL ASCII
036372     006                             .BYTE   6                       ;;TYPE 6 DIGITS
036373     000                             .BYTE   0                       ;;SUPPRESS LEADING ZEROS
036374  005037  001112                     CLR     $ERTTL                  ;;CLEAR ERROR TOTAL
036400  104401  001313           5001$:    TYPE    ,$CRLF                  ;;TYPE CARRIAGE RETURN, LINE FEED
036404  013700  000042           $GET42:   MOV     @#42,R0                 ;;GET MONITOR ADDRESS
036410  001414                             BEQ     $DOAGN                  ;;BRANCH IF NO MONITOR
036412  005046                             CLR     -(SP)                   ;;INSURE THE "T" BIT IS CLEAR
036414  012746  036422                     MOV     #$CLR.T,-(SP)           ;;SETUP FOR AN RTI OR RTT
036420  000426                             BR      $RTRN                   ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                                                           ;;WITH A CLEARED "T" BIT
036422                           $CLR.T:
036422  013700  000042                     MOV     @#42,R0                 ;;INSURE R0 CONTAINS THE MONITORS
036426  001405                             BEQ     $DOAGN                  ;;RETURN ADDRESS
036430  000005                             RESET                           ;;CLEAR THE WORLD
036432  004710                   $ENDAD:   JSR     PC,(R0)                 ;;GO TO MONITOR
036434  000240                             NOP                             ;;SAVE ROOM
036436  000240                             NOP                             ;;FOR
036440  000240                             NOP                             ;;ACT11
036442                           $DOAGN:
036442  104400                             TRAP                            ;;PUSH OLD PSW AND PC ON STACK
036444  042716  000020                     BIC     #20,(SP)                ;;CLEAR THE "T" BIT
036450  032777  010000  142462             BIT     #BIT12,@SWR             ;;RUN WITH TRACE TRAP?
036456  001005                             BNE     1$                      ;;BR IF NO
036460  005137  036504                     COM     $TBIT                   ;;IS IT TIME FOR TRACE TRAP
036464  100402                             BMI     1$                      ;;BR IF NO
036466  052716  000020                     BIS     #20,(SP)                ;;SET TRACE TRAP
036472  012746  036500           1$:       MOV     #$LOOP,-(SP)            ;;JUMP TO START OF TEST
036476  000002                   $RTRN:    RTI                             ;;RETURN--THIS IS CHANGED TO
                                                                           ;;AN "RTT" IF "RTT" IS A LEGAL
                                                                           ;;INSTRUCTION
036500                           $LOOP:
036500  000137                             JMP     @(PC)+                  ;;RETURN
036502  004456                   $RTNAD:   .WORD   LOOP
036504  000000                   $TBIT:    .WORD   0                       ;;"T" BIT STATE INDICATOR
036506     377     377     000   $ENULL:   .BYTE   -1,-1,0                 ;;NULL CHARACTER STRING
                                           .EVEN
036512  000000                   EPENDS:   .WORD   0                       ;LOCATION FOR EOP PRINT FLAG            ;DPM002
036514  000000                   $PASS2:   .WORD   0                       ;LOCATION FOR PASS COUNT OVERFLOW       ;DPM002
```

```
                        .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

036516  105777  142422       $SCOPE: TSTB    @$TKS           ;IS A CHARACTER WAITING?                ;DPM002
036522  100042                       BPL     9000$           ;BRANCH IF NOT                          ;DPM002
036524  013737  001146  001244       MOV     $TKB,$TMP5      ;WASTE THE CHARACTER, CLEARING READY    ;DPM002
036532  005737  036512               TST     EPENDS          ;SEE WHICH STATE ENABLE/DISABLE IS IN   ;DPM002
036536  001017                       BNE     8000$           ;BRANCH IF EOP'S DISABLED               ;DPM002
036540  005237  036512               INC     EPENDS          ;SET FLAG DISABLING PRINTOUTS           ;DPM002
036544  104401  036552               TYPE    ,65$            ;;TYPE ASCIZ STRING
036550  000411                       BR      64$             ;;GET OVER THE ASCIZ
                        ;;65$:  .ASCIZ  <CRLF>!EOP'S DISABLED!<CRLF>
036574                  64$:
036574  000415                       BR      9000$           ;BRANCH OVER ENABLE ROUTINE             ;DPM002
036576  005037  036512       8000$:  CLR     EPENDS          ;CLEAR FLAG ENABLING PRINTOUTS          ;DPM002
036602  104401  036610               TYPE    ,67$            ;;TYPE ASCIZ STRING
036606  000410                       BR      66$             ;;GET OVER THE ASCIZ
                        ;;67$:  .ASCIZ  <CRLF>!EOP'S ENABLED!<CRLF>
036630                  66$:
036630                  9000$:
036630  104407                       CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
036632  032777  040000  142300 1$:    BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
036640  001131                       BNE     $OVER           ;;YES IF SW14=1
                        ;#####START OF CODE FOR THE XOR TESTER#####
036642  000416           $XTSTR:     BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                            ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
036644  013746  000004               MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
036650  012737  036670  000004       MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
036656  005737  177060               TST     @#177060        ;;TIME OUT ON XOR?
036662  012637  000004               MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
036666  000500                       BR      $SVLAD          ;;GO TO THE NEXT TEST
036670  022626           5$:         CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
036672  012637  000004               MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
036676  000440                       BR      7$              ;;LOOP ON THE PRESENT TEST
036700                  6$:;#####END OF CODE FOR THE XOR TESTER#####
036700  032777  000400  142232       BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
036706  001404                       BEQ     2$              ;;BR IF NO
036710  127737  142224  001102       CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
036716  001502                       BEQ     $OVER           ;;BR IF YES
036720  013737  177766  037142 2$:    MOV     177766,CPSAVE   ;MOVE CPU ERR REG VALUE TO LOC FOR TST  ;DPM001
036726  032737  000001  037142       BIT     #BIT00,CPSAVE   ;SEE IF THE POWER MONITOR BIT IS ON     ;DPM001
036734  001406                       BEQ     2000$           ;BRANCH TO CONTINUE ROUTINE IF CLEAR    ;DPM001
036736  042737  000001  177766       BIC     #BIT00,177766   ;CLEAR THE BIT FOUND TO BE SET           ;DPM001
036744  104177                       ERROR   +177            ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
036746  105037  001103               CLRB    $ERFLG          ;CLEAR THE ERROR FLAG FOR NEXT TEST     ;DPM001
036752  105737  001103       2000$:  TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
```

```
036756  001421                          BEQ     3$                      ;;BR IF NO
036760  123737  001115  001103          CMPB    $ERMAX,$ERFLG           ;;MAX. ERRORS FOR THIS TEST OCCURRED?
036766  101015                          BHI     3$                      ;;BR IF NO
036770  032777  001000  142142          BIT     #BIT09,@SWR             ;;LOOP ON ERROR?
036776  001404                          BEQ     4$                      ;;BR IF NO
037000  013737  001110  001106  7$:     MOV     $LPERR,$LPADR           ;;SET LOOP ADDRESS TO LAST SCOPE
037006  000446                          BR      $OVER
037010  105037  001103          4$:     CLRB    $ERFLG                  ;;ZERO THE ERROR FLAG
037014  005037  001302                  CLR     $TIMES                  ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
037020  000415                          BR      1$                      ;;ESCAPE TO THE NEXT TEST
037022  032777  004000  142110  3$:     BIT     #BIT11,@SWR             ;;INHIBIT ITERATIONS?
037030  001011                          BNE     1$                      ;;BR IF YES
037032  005737  001324                  TST     $PASS                   ;;IF FIRST PASS OF PROGRAM
037036  001406                          BEQ     1$                      ;;      INHIBIT ITERATIONS
037040  005237  001104                  INC     $ICNT                   ;;INCREMENT ITERATION COUNT
037044  023737  001302  001104          CMP     $TIMES,$ICNT            ;;CHECK THE NUMBER OF ITERATIONS MADE
037052  002024                          BGE     $OVER                   ;;BR IF MORE ITERATION REQUIRED
037054  012737  000001  001104  1$:     MOV     #1,$ICNT                ;;REINITIALIZE THE ITERATION COUNTER
037062  013737  037140  001302          MOV     $MXCNT,$TIMES           ;;SET NUMBER OF ITERATIONS TO DO
037070  105237  001102          $SVLAD: INCB    $TSTNM                  ;;COUNT TEST NUMBERS
037074  113737  001102  001322          MOVB    $TSTNM,$TESTN           ;;SET TEST NUMBER IN APT MAILBOX
037102  011637  001106                  MOV     (SP),$LPADR             ;;SAVE SCOPE LOOP ADDRESS
037106  011637  001110                  MOV     (SP),$LPERR             ;;SAVE ERROR LOOP ADDRESS
037112  005037  001304                  CLR     $ESCAPE                 ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
037116  112737  000001  001115          MOVB    #1,$ERMAX               ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
037124  013777  001102  142010  $OVER:  MOV     $TSTNM,@DISPLAY         ;;DISPLAY TEST NUMBER
037132  013716  001106                  MOV     $LPADR,(SP)             ;;FUDGE RETURN ADDRESS
037136  000002                          RTI                             ;;FIXES PS
037140  000001                  $MXCNT: 1                               ;;MAX. NUMBER OF ITERATIONS
037142  000000                  CPSAVE: .WORD   0                       ;LOCATION TO SAVE CPU ERR REG CONTENTS  ;DPM001
```

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6273                                          .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
                                              ;;*CALL
                                              ;;*        ERROR   N          ;;ERROR=EMT AND N=ERROR ITEM NUMBER

037144  000000                          IBSAVE: .WORD   0                  ;LOC'N TO HOLD $ITEMB DURING DUAL ERR      ;DPM001
037146  105037  037144                  $ERROR: CLRB    IBSAVE             ;CLEAR THE ITEM BYTE SAVE LOCATION         ;DPM001
037152  104407                                  CKSWR                      ;;TEST FOR CHANGE IN SOFT-SWR
037154  105237  001103                  7$:     INCB    $ERFLG             ;;SET THE ERROR FLAG
037160  001775                                  BEQ     7$                 ;;DON'T LET THE FLAG GO TO ZERO
037162  013777  001102  141752                  MOV     $TSTNM,@DISPLAY    ;;DISPLAY TEST NUMBER AND ERROR FLAG
037170  032777  002000  141742                  BIT     #BIT10,@SWR        ;;BELL ON ERROR?
037176  001402                                  BEQ     1$                 ;;NO - SKIP
037200  104401  001306                          TYPE    ,$BELL             ;;RING BELL
037204  005237  001112                  1$:     INC     $ERTTL             ;;COUNT THE NUMBER OF ERRORS
037210  011637  001116                          MOV     (SP),$ERRPC        ;;GET ADDRESS OF ERROR INSTRUCTION
037214  162737  000002  001116                  SUB     #2,$ERRPC
037222  117737  141670  001114                  MOVB    @$ERRPC,$ITEMB     ;;STRIP AND SAVE THE ERROR ITEM CODE
037230  122737  000177  001114                  CMPB    #177,$ITEMB        ;SEE IF THIS IS THE POWER FAIL CALL        ;DPM001
037236  001421                                  BEQ     1000$              ;BRANCH AROUND PMB TEST IF IT IS           ;DPM001
037240  013737  177766  037142                  MOV     177766,CPSAVE      ;MOVE CPU ERR REG TO CPSAVE FOR TEST       ;DPM001
037246  032737  000001  037142                  BIT     #BIT00,CPSAVE      ;SEE IF POWER MONITOR BIT IS SET           ;DPM001
037254  001412                                  BEQ     1000$              ;BRANCH IF OK                              ;DPM001
037256  042737  000001  177766                  BIC     #BIT00,177766      ;CLEAR THE BIT FOUND SET                   ;DPM001
037264  013737  001116  037144                  MOV     $ERRPC,IBSAVE      ;SAVE $ERRPC                               ;DPM001
037272  104177                                  ERROR   +177               ;CALL SPECIAL POWER MONITOR BIT ERROR      ;DPM001
037274  013737  037144  001116                  MOV     IBSAVE,$ERRPC      ;RESTORE $ERRPC
037302                                  1000$:
037302  032777  020000  141630                  BIT     #BIT13,@SWR        ;;SKIP TYPEOUT IF SET
037310  001004                                  BNE     20$                ;;SKIP TYPEOUTS
037312  004737  042010                          JSR     PC,ERTYPE          ;;GO TO USER ERROR ROUTINE
037316  104401  001313                          TYPE    ,$CRLF
037322                                  20$:
037322  122737  000001  001336                  CMPB    #APTENV,$ENV       ;;RUNNING IN APT MODE
037330  001007                                  BNE     2$                 ;;NO,SKIP APT ERROR REPORT
037332  113737  001114  037344                  MOVB    $ITEMB,21$         ;;SET ITEM NUMBER AS ERROR NUMBER
037340  004737  040642                          JSR     PC,$ATY4           ;;REPORT FATAL ERROR TO APT
037344     000                          21$:    .BYTE   0
037345     000                                  .BYTE   0
037346  000777                          22$:    BR      22$                ;;APT ERROR LOOP
037350  005737  037144                  2$:     TST     IBSAVE             ;SEE IF POWER FAIL ERROR CALL              ;DPM001
037354  001005                                  BNE     3$                 ;BRANCH IF NOT - HALT NOT ALLOWED          ;DPM001
037356  005777  141556                          TST     @SWR               ;;HALT ON ERROR
037362  100002                                  BPL     3$                 ;;SKIP IF CONTINUE
037364  000000                                  HALT                       ;;HALT ON ERROR!
037366  104407                                  CKSWR                      ;;TEST FOR CHANGE IN SOFT-SWR
037370  032777  001000  141542          3$:     BIT     #BIT09,@SWR        ;;LOOP ON ERROR SWITCH SET?
037376  001405                                  BEQ     4$                 ;;BR IF NO
```

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037400  005737  037144                TST     IBSAVE          ;SEE IF THIS IS THE PWR MONITOR ERROR   ;DPM001
037404  001263                        BNE     7$              ;BRANCH BACK IF SO - NO FUDGING         ;DPM001
037406  013716  001110                MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
037412  005737  001304        4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
037416  001405                        BEQ     5$              ;;BR IF NONE
037420  005737  037144                TST     IBSAVE          ;SEE IF THIS IS THE PWR MONITOR ERROR   ;DPM001
037424  001253                        BNE     7$              ;BRANCH BACK IF SO - NO FUDGING         ;DPM001
037426  013716  001304                MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
037432                          5$:
037432  022737  036432  000042        CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
037440  001001                        BNE     6$              ;;BRANCH IF NO
037442  000000                        HALT                    ;;YES
037444                          6$:
037444  032777  001000  141466        BIT     #BIT09,@SWR
037452  001013                        BNE     ERM10
037454  011637  001162                MOV     (SP),$REG0              ;SEE IF ERROR #377
037460  062737  177776  001162        ADD     #-2,$REG0
037466  122777  000377  141466        CMPB    #377,@$REG0
037474  001002                        BNE     ERM10
037476  062716  000002                ADD     #2,(SP)
037502  000002              ERM10:    RTI
```

```
6275                                .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
      037504                        $SAVREG:
      037504  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
      037506  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
      037510  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
      037512  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
      037514  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
      037516  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
      037520  016646  000022                MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
      037524  016646  000022                MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
      037530  016646  000022                MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
      037534  016646  000022                MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
      037540  000002                        RTI
                                    ;;*RESTORE R0-R5
                                    ;;*CALL:
                                    ;;*        RESREG
      037542                        $RESREG:
      037542  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
      037546  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
      037552  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
      037556  012666  000022                MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
      037562  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
      037564  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
      037566  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
      037570  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
      037572  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
      037574  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
      037576  000002                        RTI
```

```
6277                                    .SBTTL  TYPE ROUTINE
                                        ;;*****************************************************************
                                        ;;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;;*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
                                        ;;*
     037600  105737  001157             $TYPE:  TSTB    $TPFLG                  ;;IS THERE A TERMINAL?
     037604  100002                             BPL     1$                      ;;BR IF YES
     037606  000000                             HALT                            ;;HALT HERE IF NO TERMINAL
     037610  000430                             BR      3$                      ;;LEAVE
     037612  010046                     1$:     MOV     R0,-(SP)                ;;SAVE R0
     037614  017600  000002                     MOV     @2(SP),R0               ;;GET ADDRESS OF ASCIZ STRING
     037620  122737  000001  001336             CMPB    #APTENV,$ENV            ;;RUNNING IN APT MODE
     037626  001011                             BNE     62$                     ;;NO,GO CHECK FOR APT CONSOLE
     037630  132737  000100  001337             BITB    #APTSPOOL,$ENVM         ;;SPOOL MESSAGE TO APT
     037636  001405                             BEQ     62$                     ;;NO,GO CHECK FOR CONSOLE
     037640  010037  037650                     MOV     R0,61$                  ;;SETUP MESSAGE ADDRESS FOR APT
     037644  004737  040632                     JSR     PC,$ATY3                ;;SPOOL MESSAGE TO APT
     037650  000000                     61$:    .WORD   0                       ;;MESSAGE ADDRESS
     037652  132737  000040  001337     62$:    BITB    #APTCSUP,$ENVM          ;;APT CONSOLE SUPPRESSED
     037660  001003                             BNE     60$                     ;;YES,SKIP TYPE OUT
     037662  112046                     2$:     MOVB    (R0)+,-(SP)             ;;PUSH CHARACTER TO BE TYPED ONTO STACK
     037664  001005                             BNE     4$                      ;;BR IF IT ISN'T THE TERMINATOR
     037666  005726                             TST     (SP)+                   ;;IF TERMINATOR POP IT OFF THE STACK
     037670  012600                     60$:    MOV     (SP)+,R0                ;;RESTORE R0
     037672  062716  000002             3$:     ADD     #2,(SP)                 ;;ADJUST RETURN PC
     037676  000002                             RTI                             ;;RETURN
     037700  122716  000011             4$:     CMPB    #HT,(SP)                ;;BRANCH IF <HT>
     037704  001430                             BEQ     8$
     037706  122716  000200                     CMPB    #CRLF,(SP)              ;;BRANCH IF NOT <CRLF>
     037712  001006                             BNE     5$
     037714  005726                             TST     (SP)+                   ;;POP  <CR><LF> EQUIV
     037716  104401                             TYPE                            ;;TYPE A CR AND LF
     037720  001313                             $CRLF
     037722  105037  040140                     CLRB    $CHARCNT                ;;CLEAR CHARACTER COUNT
     037726  000755                             BR      2$                      ;;GET NEXT CHARACTER
     037730  004737  040012             5$:     JSR     PC,$TYPEC               ;;GO TYPE THIS CHARACTER
     037734  123726  001156             6$:     CMPB    $FILLC,(SP)+            ;;IS IT TIME FOR FILLER CHARS.?
     037740  001350                             BNE     2$                      ;;IF NO GO GET NEXT CHAR.
     037742  013746  001154                     MOV     $NULL,-(SP)             ;;GET # OF FILLER CHARS. NEEDED
                                                                                ;;AND THE NULL CHAR.
     037746  105366  000001             7$:     DECB    1(SP)                   ;;DOES A NULL NEED TO BE TYPED?
     037752  002770                             BLT     6$                      ;;BR IF NO--GO POP THE NULL OFF OF STACK
     037754  004737  040012                     JSR     PC,$TYPEC               ;;GO TYPE A NULL
     037760  105337  040140                     DECB    $CHARCNT                ;;DO NOT COUNT AS A COUNT
     037764  000770                             BR      7$                      ;;LOOP
                                        ;HORIZONTAL TAB PROCESSOR
     037766  112716  000040             8$:     MOVB    #' ,(SP)                ;;REPLACE TAB WITH SPACE
```

```
037772  004737  040012          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
037776  132737  000007  040140          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
040004  001372                          BNE     9$              ;;TAB STOP
040006  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
040010  000724                          BR      2$              ;;GET NEXT CHARACTER
040012                          $TYPEC:
040012  105777  141126                  TSTB    @$TKS           ;;CHAR IN KYBD BUFFER?          ;MJD001
040016  100022                          BPL     10$             ;;BR IF NOT                     ;MJD001
040020  017746  141122                  MOV     @$TKB,-(SP)     ;;GET CHAR                      ;MJD001
040024  042716  177600                  BIC     #177600,(SP)    ;;STRIP EXTRANEOUS BITS         ;MJD001
040030  122716  000023                  CMPB    #$XOFF,(SP)     ;;WAS CHAR XOFF                 ;MJD001
040034  001012                          BNE     102$            ;;BR IF NOT                     ;MJD001
040036                          101$:                                                           ;MJD001
040036  105777  141102                  TSTB    @$TKS           ;;WAIT FOR CHAR                 ;MJD001
040042  100375                          BPL     101$                                            ;MJD001
040044  117716  141076                  MOVB    @$TKB,(SP)      ;;GET CHAR                      ;MJD001
040050  042716  177600                  BIC     #177600,(SP)    ;;STRIP IT                      ;MJD001
040054  122716  000021                  CMPB    #$XON,(SP)      ;;WAS IT XON?                   ;MJD001
040060  001366                          BNE     101$            ;;BR IF NOT                     ;MJD001
040062                          102$:                                                           ;MJD001
040062  005726                          TST     (SP)+           ;;FIX STACK                     ;MJD001
040064                          10$:                                                            ;MJD001
040064  105777  141060                  TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
040070  100375                          BPL     10$                                             ;MJD001
040072  126627  000002  000021          CMPB    2(SP),#$XON     ;;IS CHARACTER A RANDOM XON?    ;RAN001
040100  001420                          BEQ     $TYPEX          ;;BRANCH IF YES                 ;RAN001
040102  116677  000002  141042          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
040110  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
040116  001003                          BNE     1$              ;;BRANCH IF NO
040120  105037  040140                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
040124  000406                          BR      $TYPEX          ;;EXIT
040126  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
040134  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
040136  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
040140  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
040142  000207                  $TYPEX: RTS     PC
```

```
                                        .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

040144  017646  000000          $TYPOS: MOV     @(SP),-(SP)       ;;PICKUP THE MODE
040150  116637  000001  040375          MOVB    1(SP),$0FILL      ;;LOAD ZERO FILL SWITCH
040156  112637  040377                  MOVB    (SP)+,$0MODE+1    ;;NUMBER OF DIGITS TO TYPE
040162  062716  000002                  ADD     #2,(SP)           ;;ADJUST RETURN ADDRESS
040166  000406                          BR      $TYPON
040170  112737  000001  040375  $TYPOC: MOVB    #1,$0FILL         ;;SET THE ZERO FILL SWITCH
040176  112737  000006  040377          MOVB    #6,$0MODE+1       ;;SET FOR SIX(6) DIGITS
040204  112737  000005  040374  $TYPON: MOVB    #5,$0CNT          ;;SET THE ITERATION COUNT
040212  010346                          MOV     R3,-(SP)          ;;SAVE R3
040214  010446                          MOV     R4,-(SP)          ;;SAVE R4
040216  010546                          MOV     R5,-(SP)          ;;SAVE R5
040220  113704  040377                  MOVB    $0MODE+1,R4       ;;GET THE NUMBER OF DIGITS TO TYPE
040224  005404                          NEG     R4
040226  062704  000006                  ADD     #6,R4             ;;SUBTRACT IT FOR MAX. ALLOWED
040232  110437  040376                  MOVB    R4,$0MODE         ;;SAVE IT FOR USE
040236  113704  040375                  MOVB    $0FILL,R4         ;;GET THE ZERO FILL SWITCH
040242  016605  000012                  MOV     12(SP),R5         ;;PICKUP THE INPUT NUMBER
040246  005003                          CLR     R3                ;;CLEAR THE OUTPUT WORD
040250  006105                  1$:     ROL     R5                ;;ROTATE MSB INTO "C"
040252  000404                          BR      3$                ;;GO DO MSB
040254  006105                  2$:     ROL     R5                ;;FORM THIS DIGIT
040256  006105                          ROL     R5
040260  006105                          ROL     R5
040262  010503                          MOV     R5,R3
040264  006103                  3$:     ROL     R3                ;;GET LSB OF THIS DIGIT
040266  105337  040376                  DECB    $0MODE            ;;TYPE THIS DIGIT?
040272  100021                          BPL     7$                ;;BR IF NO
040274  042703  177770                  BIC     #177770,R3        ;;GET RID OF JUNK
040300  001002                          BNE     4$                ;;TEST FOR 0
040302  005704                          TST     R4                ;;SUPPRESS THIS 0?
040304  001403                          BEQ     5$                ;;BR IF YES
040306  005204                  4$:     INC     R4                ;;DON'T SUPPRESS ANYMORE 0'S
```

```
040310  052703  000060                   BIS     #'0,R3            ;;MAKE THIS DIGIT ASCII
040314  052703  000040          5$:      BIS     #' ,R3            ;;MAKE ASCII IF NOT ALREADY
040320  122703  000040                   CMPB    #' ,R3            ;IS THIS A SPACE CHARACTER?                ;DPM002
040324  001404                           BEQ     7$                ;BRANCH IF SO - DON'T TYPE                 ;DPM002
040326  110337  040372                   MOVB    R3,8$             ;;SAVE FOR TYPING
040332  104401  040372                   TYPE    ,8$               ;;GO TYPE THIS DIGIT
040336  105337  040374          7$:      DECB    $OCNT             ;;COUNT BY 1
040342  003344                           BGT     2$                ;;BR IF MORE TO DO
040344  002402                           BLT     6$                ;;BR IF DONE
040346  005204                           INC     R4                ;;INSURE LAST DIGIT ISN'T A BLANK
040350  000741                           BR      2$                ;;GO DO THE LAST DIGIT
040352  012605                  6$:      MOV     (SP)+,R5          ;;RESTORE R5
040354  012604                           MOV     (SP)+,R4          ;;RESTORE R4
040356  012603                           MOV     (SP)+,R3          ;;RESTORE R3
040360  016666  000002  000004           MOV     2(SP),4(SP)       ;;SET THE STACK FOR RETURNING
040366  012616                           MOV     (SP)+,(SP)
040370  000002                           RTI                       ;;RETURN
040372     000                  8$:      .BYTE   0                 ;;STORAGE FOR ASCII DIGIT
040373     000                           .BYTE   0                 ;;TERMINATOR FOR TYPE ROUTINE
040374     000                  $OCNT:   .BYTE   0                 ;;OCTAL DIGIT COUNTER
040375     000                  $OFILL:  .BYTE   0                 ;;ZERO FILL SWITCH
040376  000000                  $OMODE:  .WORD   0                 ;;NUMBER OF DIGITS TO TYPE
```

```
                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
                                ;;*****************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES.
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                   ;;GO TO THE ROUTINE
040400                          $TYPDS:
040400  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
040402  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
040404  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
040406  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
040410  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
040412  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
040416  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
040422  100004                          BPL     1$              ;;BR IF INPUT IS POS.
040424  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
040426  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
040434  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
040436  012703  040614                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
040442  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
040446  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
040450  016001  040604                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
040454  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
040456  002402                          BLT     4$              ;;BR IF DONE
040460  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
040462  000774                          BR      3$
040464  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
040466  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
040470  001002                          BNE     5$              ;;FALL THROUGH IF 0
040472  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
040474  100407                          BMI     7$              ;;BR IF YES
040476  106316                  5$:     ASLB    (SP)            ;;MSD?
040500  103003                          BCC     6$              ;;BR IF NO
040502  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
040510  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
040514  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
040520  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
040522  005720                          TST     (R0)+           ;;JUST INCREMENTING
040524  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
040530  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
040532  003002                          BGT     8$              ;;GO TO EXIT
040534  010502                          MOV     R5,R2           ;;GET THE LSD
040536  000764                          BR      6$              ;;GO CHANGE TO ASCII
040540  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
040542  100003                          BPL     9$              ;;BR IF NO
040544  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
040552  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
040554  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
040556  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
040560  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
040562  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
040564  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
040566  104401  040614                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
```

```
040572  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
040600  012616                          MOV     (SP)+,(SP)
040602  000002                          RTI                     ;;RETURN TO USER
040604  023420                  $DTBL:  10000.
040606  001750                          1000.
040610  000144                          100.
040612  000012                          10.
040614                          $DBLK:  .BLKW   4
```

```
6283                                  .SBTTL  APT COMMUNICATIONS ROUTINE
                                      ;;*****************************************************************
      040624 112737 000001 041070   $ATY1:  MOVB    #1,$FFLG          ;;TO REPORT FATAL ERROR
      040632 112737 000001 041066   $ATY3:  MOVB    #1,$MFLG          ;;TO TYPE A MESSAGE
      040640 000403                         BR      $ATYC
      040642 112737 000001 041070   $ATY4:  MOVB    #1,$FFLG          ;;TO ONLY REPORT FATAL ERROR
      040650                        $ATYC:
      040650 010046                         MOV     R0,-(SP)          ;;PUSH R0 ON STACK
      040652 010146                         MOV     R1,-(SP)          ;;PUSH R1 ON STACK
      040654 105737 041066                  TSTB    $MFLG             ;;SHOULD TYPE A MESSAGE?
      040660 001450                         BEQ     5$                ;;IF NOT:  BR
      040662 122737 000001 001336           CMPB    #APTENV,$ENV      ;;OPERATING UNDER APT?
      040670 001031                         BNE     3$                ;;IF NOT:  BR
      040672 132737 000100 001337           BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
      040700 001425                         BEQ     3$                ;;IF NOT:  BR
      040702 017600 000004                  MOV     @4(SP),R0         ;;GET MESSAGE ADDR.
      040706 062766 000002 000004           ADD     #2,4(SP)                  ;;BUMP RETURN ADDR.
      040714 005737 001316          1$:     TST     $MSGTYPE          ;;SEE IF DONE W/ LAST XMISSION?
      040720 001375                         BNE     1$                ;;IF NOT:  WAIT
      040722 010037 001332                  MOV     R0,$MSGAD         ;;PUT ADDR IN MAILBOX
      040726 105720                 2$:     TSTB    (R0)+             ;;FIND END OF MESSAGE
      040730 001376                         BNE     2$
      040732 163700 001332                  SUB     $MSGAD,R0         ;;SUB START OF MESSAGE
      040736 006200                         ASR     R0                ;;GET MESSAGE LNGTH IN WORDS
      040740 010037 001334                  MOV     R0,$MSGLGT        ;;PUT LENGTH IN MAILBOX
      040744 012737 000004 001316           MOV     #4,$MSGTYPE       ;;TELL APT TO TAKE MSG.
      040752 000413                         BR      5$
      040754 017637 000004 041000   3$:     MOV     @4(SP),4$         ;;PUT MSG ADDR IN JSR LINKAGE
      040762 062766 000002 000004           ADD     #2,4(SP)                  ;;BUMP RETURN ADDRESS
      040770 013746 177776                  MOV     177776,-(SP)      ;;PUSH 177776 ON STACK
      040774 004737 037600                  JSR     PC,$TYPE          ;;CALL TYPE MACRO
      041000 000000                 4$:     .WORD   0
      041002                        5$:
      041002 105737 041070          10$:    TSTB    $FFLG             ;;SHOULD REPORT FATAL ERROR?
      041006 001416                         BEQ     12$               ;;IF NOT:  BR
      041010 005737 001336                  TST     $ENV              ;;RUNNING UNDER APT?
      041014 001413                         BEQ     12$               ;;IF NOT:  BR
      041016 005737 001316          11$:    TST     $MSGTYPE          ;;FINISHED LAST MESSAGE?
      041022 001375                         BNE     11$               ;;IF NOT:  WAIT
      041024 017637 000004 001320           MOV     @4(SP),$FATAL     ;;GET ERROR #
      041032 062766 000002 000004           ADD     #2,4(SP)                  ;;BUMP RETURN ADDR.
      041040 005237 001316                  INC     $MSGTYPE          ;;TELL APT TO TAKE ERROR
      041044 105037 041070          12$:    CLRB    $FFLG             ;;CLEAR FATAL FLAG
      041050 105037 041067                  CLRB    $LFLG             ;;CLEAR LOG FLAG
      041054 105037 041066                  CLRB    $MFLG             ;;CLEAR MESSAGE FLAG
      041060 012601                         MOV     (SP)+,R1          ;;POP STACK INTO R1
      041062 012600                         MOV     (SP)+,R0          ;;POP STACK INTO R0
      041064 000207                         RTS     PC                ;;RETURN
      041066    000                 $MFLG:  .BYTE   0                 ;;MESSG. FLAG
      041067    000                 $LFLG:  .BYTE   0                 ;;LOG FLAG
      041070    000                 $FFLG:  .BYTE   0                 ;;FATAL FLAG
                                            .EVEN
             000200                 APTSIZE=200
             000001                 APTENV=001
             000100                 APTSPOOL=100
             000040                 APTCSUP=040
```

```
6285                                    .SBTTL  TTY INPUT ROUTINE
                                        ;;*****************************************************************
                                        .ENABL  LSB
                                        ;;*****************************************************************
                                        ;*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.
041072  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
041100  001074                          BNE     15$             ;;BRANCH IF NO
041102  105777  140036                  TSTB    @$TKS           ;;CHAR THERE?
041106  100071                          BPL     15$             ;;IF NO, DON'T WAIT ARCUND
041110  117746  140032                  MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
041114  042716  177600                  BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
041120  022726  000007                  CMP     #7,(SP)+        ;;IS IT A CONTROL G?
041124  001062                          BNE     15$             ;;NO, RETURN TO USER
041126  123727  001134  000001          CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
041134  001456                          BEQ     15$             ;;BRANCH IF YES
041136  104401  041511                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
041142  104401  041516          $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
041146  013746  000176                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
041152  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
041154  104401  041527                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
041160  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
041162  005046                          CLR     -(SP)           ;;THE NEW SWR
041164  105777  137754          7$:     TSTB    @$TKS           ;;CHAR THERE?
041170  100375                          BPL     7$              ;;IF NOT TRY AGAIN
041172  117746  137750                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
041176  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
041202  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
041206  001005                          BNE     10$             ;;BRANCH IF NOT
041210  104401  041504                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
041214  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
041220  000757                          BR      19$             ;;LET'S TRY IT AGAIN
041222  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
041226  001022                          BNE     16$             ;;BRANCH IF NO
041230  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
041234  001403                          BEQ     11$             ;;BRANCH IF YES
041236  016677  000002  137674          MOV     2(SP),@SWR      ;;SAVE NEW SWR
041244  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
041250  104401  001313          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
041254  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
041262  001003                          BNE     15$             ;;BRANCH IF NOT
041264  012777  000100  137652          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
041272  000002                  15$:    RTI                     ;;RETURN
041274  004737  040012          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
041300  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
041304  002420                          BLT     18$             ;;BRANCH IF YES
041306  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
041312  003015                          BGT     18$             ;;BRANCH IF YES
041314  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
041320  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
041324  001403                          BEQ     17$             ;;BRANCH IF YES
041326  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
041330  006316                          ASL     (SP)            ;;    CHAR OVER TO MAKE
041332  006316                          ASL     (SP)            ;;    ROOM FOR NEW ONE.
041334  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
```

```
041340  056616  177776            BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
041344  000707                    BR      7$              ;;GET THE NEXT ONE
041346  104401  001312    18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
041352  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
                          ;
041354  011646    $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
041356  016666  000004  000002    MOV     4(SP),2(SP)     ;;SAVE THE PS
041364  105777  137554    1$:     TSTB    @$TKS           ;;WAIT FOR
041370  100375                    BPL     1$              ;;A CHARACTER
041372  117766  137550  000004    MOVB    @$TKB,4(SP)     ;;READ THE TTY
041400  042766  177600  000004    BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
041406  026627  000004  000023    CMP     4(SP),#23       ;;IS IT A CONTROL-S?
041414  001013                    BNE     3$              ;;BRANCH IF NO
041416  105777  137522    2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
041422  100375                    BPL     2$              ;;LOOP UNTIL ITS THERE
041424  117746  137516            MOVB    @$TKB,-(SP)     ;;GET CHARACTER
041430  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
041434  022627  000021            CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
041440  001366                    BNE     2$              ;;IF NOT DISCARD IT
041442  000750                    BR      1$              ;;YES, RESUME
041444  026627  000004  000021 3$:CMP     4(SP),#$XON     ;;IS IT A RANDOM XON?           ;RAN001
041452  001744                    BEQ     1$              ;;BRANCH IF YES                 ;RAN001
041454  026627  000004  000140    CMP     4(SP),#140      ;;IS IT UPPER CASE?
041462  002407                    BLT     4$              ;;BRANCH IF YES
041464  026627  000004  000175    CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
041472  003003                    BGT     4$              ;;BRANCH IF YES
041474  042766  000040  000004    BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
041502  000002            4$:     RTI                     ;;GO BACK TO USER
041504     136     125     015 $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
041511     136     107     015 $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
041516     015     012     123 $MSWR:  .ASCIZ  <15><12>/SWR = /
041527     040     040     116 $MNEW:  .ASCIZ  /  NEW = /
```

```
6287                                         .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.
        041540  010046                       $TRAP:  MOV     R0,-(SP)         ;;SAVE R0
        041542  016600  000002                       MOV     2(SP),R0         ;;GET TRAP ADDRESS
        041546  005740                               TST     -(R0)            ;;BACKUP BY 2
        041550  111000                               MOVB    (R0),R0          ;;GET RIGHT BYTE OF TRAP
        041552  006300                               ASL     R0               ;;POSITION FOR INDEXING
        041554  016000  041574                       MOV     $TRPAD(R0),R0    ;;INDEX TO TABLE
        041560  000200                               RTS     R0               ;;GO TO ROUTINE
                                             ;;THIS IS USE TO HANDLE THE ''GETPRI'' MACRO
        041562  011646                       $TRAP2: MOV     (SP),-(SP)       ;;MOVE THE PC DOWN
        041564  016666  000004  000002               MOV     4(SP),2(SP)      ;;MOVE THE PSW DOWN
        041572  000002                               RTI                      ;;RESTORE THE PSW
                                             .SBTTL  TRAP TABLE
                                             ;;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                             ;;*BY THE ''TRAP'' INSTRUCTION.
                                             ;       ROUTINE
                                             ;       -------
        041574  041562                       $TRPAD: .WORD   $TRAP2
        041576  037600                               $TYPE   ;;CALL=TYPE      TRAP+1(104401)  TTY TYPEOUT ROUTINE
        041600  040170                               $TYPOC  ;;CALL=TYPOC     TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
        041602  040144                               $TYPOS  ;;CALL=TYPOS     TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
        041604  040204                               $TYPON  ;;CALL=TYPON     TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
        041606  040400                               $TYPDS  ;;CALL=TYPDS     TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
        041610  041142                               $GTSWR  ;;CALL=GTSWR     TRAP+6(104406)  GET SOFT-SWR SETTING
        041612  041072                               $CKSWR  ;;CALL=CKSWR     TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
        041614  041354                               $RDCHR  ;;CALL=RDCHR     TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
        041616  037504                               $SAVREG ;;CALL=SAVREG    TRAP+11(104411) SAVE R0-R5 ROUTINE
        041620  037542                               $RESREG ;;CALL=RESREG    TRAP+12(104412) RESTORE R0-R5 ROUTINE
6288    041622  042622                               .RSET   ;;CALL=RSETUP    TRAP+13(104413) ROUTINE TO RESET STACK AND FPS
6289            000030                       $TERM=.-$TRPAD
```

```
529                                     .SBTTL  POWER DOWN AND UP ROUTINES
                                        ;;*****************************************************************
                                        ;POWER DOWN ROUTINE
041624  012737  042002  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
041632  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
041640  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
041642  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
041644  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
041646  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
041650  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
041652  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
041654  017746  137260                MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
041660  010637  042006                MOV     SP,$SAVR6       ;;SAVE SP
041664  012737  041676  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
041672  000000                        HALT
041674  000776      -                 BR      .-2             ;;HANG UP
                                        ;;*****************************************************************
                                        ;POWER UP ROUTINE
041676  012737  042002  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
041704  013706  042006                MOV     $SAVR6,SP       ;;GET SP
041710  005037  042006                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
041714  005237  042006          1$:   INC     $SAVR6          ;;WAIT FOR THE INC
041720  001375                        BNE     1$              ;;OF  WORD
041722  012677  137212                MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
041726  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
041730  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
041732  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
041734  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
041736  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
041740  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
041742  012737  041624  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
041750  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
041756  104401                        TYPE                    ;;REPORT THE POWER FAILURE
041760  042672                $PWRMG: .WORD   POWERM          ;;POWER FAIL MESSAGE POINTER
041762  012716                        MOV     (PC)+,(SP)      ;;RESTART AT START
041764  003616                $PWRAD: .WORD   START           ;;RESTART ADDRESS
041766  042766  000020  000002        BIC     #20,2(SP)       ;;CLEAR "T" BIT
041774  005037  036504                CLR     $TBIT           ;;CLEAR THE "T" BIT FLAG
042000  000002                        RTI
042002  000000                $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
042004  000776                        BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
042006  000000                $SAVR6: 0                       ;;PUT THE SP HERE
```

```
                                        .SBTTL  ERROR TYPE OUT ROUTINE
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE IS CALLED TO TYPE AN ERROR MESSAGE WHICH IS INCLUDED
                                ;*IN THE ERROR MESSAGE DATA TABLE. IT IS CALLED BY THE $EPROR ROUTINE
                                ;*OR BY FIRST SETTING $ITEMB EQUAL TO THE ERROR TABLE ITEM TO BE PRINTED
                                ;*OUT AND THEN ECECUTING A:
                                ;*              JSR     PC,ERTYPE
                                ;*
042010  104401  001313          ERTYPE: TYPE    ,$CRLF          ;TYPE A CRLF
042014  113737  001102  001232          MOVB    $TSTNM,$TMP0
042022  042737  177400  001232          BIC     #177400,$TMP0
042030  013737  001116  001234          MOV     $ERRPC,$TMP1    ;GET PC OF CALL
042036  010046                          MOV     R0,-(SP)        ;SAVE R0
042040  113700  001114                  MOVB    $ITEMB,R0       ;GET THE ITEM NUMBER.
042044  042700  177400                  BIC     #177400,R0      ;CLEAR UPPER BYTE EXPOSING OFFSET
042050  001005                          BNE     1$              ;BRANCH IF OFFSET EXISTS
042052  013746  001116                  MOV     $ERRPC,-(SP)    ;IF ZERO THEN JUST
042056  104402                          TYPOC                   ;PRINT THE PC
042060  000137  042406                  JMP     ERT5
042064  022700  000377          1$:     CMP     #377,R0
042070  001005                          BNE     20$
042072  016600  000004                  MOV     4(SP),R0
042076  011000                          MOV     (R0),R0
042100  062700  000400                  ADD     #400,R0
042104  010037  001320          20$:    MOV     R0,$FATAL       ;MOVE ITEM NUMBER TO $FATAL FOR APT     ;DPM001
042110  005300                          DEC     R0              ;OTHERWISE MAKE R0 AN
042112  006300                          ASL     R0              ;INDEX FOR THE TABLE.
042114  006300                          ASL     R0
042116  006300                          ASL     R0
042120  062700  001442                  ADD     #$ERRTB,R0
042124  012037  042134          110$:   MOV     (R0)+,2$        ;PICK UP THE ADDRESS OF THE EM, ERROR MESSAGE
042130  001404                          BEQ     3$              ;BRANCH IF NONE
042132  104401                          TYPE
042134  000000          2$:     .WORD   0
042136  104401                          TYPE
042140  001313                          .WORD   $CRLF
042142  012037  042152          3$:     MOV     (R0)+,4$        ;GET THE DH,DATA HEADER
042146  001404                          BEQ     5$
042150  104401                          TYPE
042152  000000          4$:     .WORD   0
042154  104401                          TYPE
042156  001313                          .WORD   $CRLF
042160  010146          5$:     MOV     R1,-(SP)        ;SAVE R1,R2 AND R3
042162  010246                          MOV     R2,-(SP)
042164  010346                          MOV     R3,-(SP)
042166  012001                          MOV     (R0)+,R1        ;GET THE ADDRESS OF THE DATA TABLE
042170  001501                          BEQ     ERT4            ;RETURN IF NO DATA.
042172  011000                          MOV     (R0),R0         ;GET A POINTER TO THE DATA FORMAT TABLE
```

```
042174  105710                  ERT1:   TSTB    (R0)            ;FORMAT ZERO?
042176  001003                          BNE     8$              ;BRANCH IF NOT

042200  013146                          MOV     @(R1)+,-(SP)    ;FORMAT ZERO SO TYPE
042202  104402                          TYPOC                   ;AN OCTAL NUMBER.
042204  000465                          BR      ERT2

042206  122710  000002          8$:     CMPB    #2,(R0)         ;FORMAT TWO?
042212  001006                          BNE     9$

042214  013102                          MOV     @(R1)+,R2       ;FORMAT TWO SO TYPE TWO OCTAL NUMBERS
042216  004737  042522                  JSR     PC,TOCTNM       ;TYPE 1 NUMBER
042222  004737  042522                  JSR     PC,TOCTNM       ;TYPE 2ND NUMBER
042226  000454                          BR      ERT2

042230  122710  000003          9$:     CMPB    #3,(R0)         ;FORMAT THREE?
042234  001007                          BNE     10$             ;BRANCH IF NOT

042236  013102                          MOV     @(R1)+,R2       ;FORMAT THREE SO TYPE FOUR OCTAL NUMBERS.
042240  012703  000004                  MOV     #4,R3           ;TYPE 4 NUMBERS
042244  004737  042522          90$:    JSR     PC,TOCTNM       ;TYPE AN OCTAL NUMBER
042250  077303                          SOB     R3,90$          ;SUBTRACT 1 AND BRANCH IF NOT DONE
042252  000442                          BR      ERT2

042254  122710  000004          10$:    CMPB    #4,(R0)         ;FORMAT FOUR?
042260  001004                          BNE     11$             ;BRANCH IF NOT

042262  013146                          MOV     @(R1)+,-(SP)    ;FORMAR FOUR SO TYPE
042264  104403                          TYPOS                   ;AN OCTAL NUMBER
042266     016                          .BYTE   16              ;SUPPRESSING LEADING ZEROES.
042267     000                          .BYTE   0
042270  000433                          BR      ERT2

042272  122710  000005          11$:    CMPB    #5,(R0)         ;FORMAT FIVE?
042276  001005                          BNE     13$

042300  012137  042306                  MOV     (R1)+,12$       ;FORMAT FIVE SO TYPE AN
042304  104401                          TYPE                    ;ASCIZ STRING.
042306  000000                  12$:    .WORD   0
042310  000425                          BR      ERT3

042312  122710  000011          13$:    CMPB    #11,(R0)        ;FORMAT ELEVEN?
042316  001005                          BNE     15$             ;BRANCH IF NOT
042320  013137  042326                  MOV     @(R1)+,14$      ;FORMAT ELEVEN SO PICK
042324  104401                          TYPE                    ;A POINTER TO AN ASCIZ
042326  000000                  14$:    .WORD   0               ;STRING.
042330  000415                          BR      ERT3

042332  122710  000012          15$:    CMPB    #12,(R0)        ;FORMAT TWELVE?
042336  001007                          BNE     17$             ;BRANCH IF NOT

042340  013102                          MOV     @(R1)+,R2       ;FORMAT TWELVE SO TYPE
042342  012703  000006                  MOV     #6,R3           ;TYPE SIX OCTAL NUMBERS
042346  004737  042522          16$:    JSR     PC,TOCTNM       ;TYPE AN OCTAL NUMBER
042352  077303                          SOB     R3,16$          ;SUBTRACT 1 AND BRANCH IF NOT DONE YET
042354  000401                          BR      ERT2

```

```
6406 042356  000000                 17$:    HALT                    ;UNDEFINED FORMAT FOR DATA?????
6407
6408 042360  104407                 ERT2:   TYPE                    ;PRINT A TAB AFTER TYPING
6409 042362  042740                         .WORD   $TAB            ;AN DATA TABLE ENTRY
6410                                                                 ;OF ALL FORMATS EXCEPT
6411                                                                 ;ASCIZ, FORMATS 5 OR 11
6412
6413 042364  005200                 ERT3:   INC     R0              ;POINT TO THE NEXT FORMAT
6414 042366  005711                         TST     (R1)            ;END OF DATA TABLE.
6415 042370  001401                         BEQ     ERT4
6416 042372  000700                         BR      ERT1
6417
6418 042374  104401                 ERT4:   TYPE                    ;DONE.
6419 042376  001313                         .WORD   $CRLF
6420 042400  012603                         MOV     (SP)+,R3        ;RESTORE R1,R2 AND R3
6421 042402  012602                         MOV     (SP)+,R2
6422 042404  012601                         MOV     (SP)+,R1
6423 042406  012600                 ERT5:   MOV     (SP)+,R0        ;RESTORE R0.
6424 042410  000207                         RTS     PC              ;AND RETURN.
6425
6426
6427 042412  042422  042456  042506 PFECWS: .WORD   PFECEM,PFECDH,PFECAD,PFECFT ;ADRSES OF DATA/ASCII BELOW ;DPM001
6428 042422     120     117     127 PFECEM: .ASCIZ  ?POWER MONITOR BIT FOUND SET? ;ERROR MESSAGE            ;DPM001
6429 042456     124     105     123 PFECDH: .ASCIZ  ?TESTNO  ERR PC  CPUERR? ;ERROR DATA HEADER             ;DPM001
6430                                        .EVEN
6431 042506  001322  001116  037142 PFECAD: .WORD   $TESTN,$ERRPC,CPSAVE,0 ;ADDRESSES OF DATA             ;DPM001
6432 042516     000     000     000 PFECFT: .BYTE   0,0,0,0             ;FORMAT TABLE                    ;DPM001
6433
6434 042522  012246                 TOCTNM: MOV     (R2)+,-(SP)     ;MOVE THE NUMBER TO THE STACK FOR PRINTING
6435 042524  104402                         TYPOC                   ;TYPE AN OCTAL NUMBER
6436 042526  104401  042742                 TYPE    ,SPACE          ;TYPE A SPACE CHARACTER
6437 042532  000207                         RTS     PC              ;EXIT BACK
```

```
                                .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.
                        ;*
042534  011637  001236  FPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
042540  022626          FPSPUR: CMP     (SP)+,(SP)+             ;RESTORE SP.
042542  170200                  STFPS   R0                      ;GET FPS
042544  010037  001240          MOV     R0,$TMP3
042550  170300                  STST    R0                      ;GET FEC
042552  010037  001242          MOV     R0,$TMP4
042556  104211          1$:     ERROR   +211
042560  104413                  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?).
042562  000137  036060          JMP     $EOP
```

```
                                .SBTTL  CPU SPURIOUS TRAP TO 4 HANDLER
                        ;;**************************************************************
                        ;;**************************************************************
                        ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 4.
                        ;*
042566 011637 001236    CPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
042572 022626                   CMP     (SP)+,(SP)+
042574 104212           1$:     ERROR   +212
042576 104413                   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?).
042600 000137 036060                    JMP     $EOP
```

```
                                        .SBTTL  CPU SPURIOUS TRAP TO 10 HANDLER
                                ;;*************************************************************
                                ;;*************************************************************
                                ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 10.
                                ;*
042604  011637  001236          CPTWO:  MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
042610  022626                          CMP     (SP)+,(SP)+
042612  104213                  1$:     ERROR   +213
042614  104413                          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?).
042616  000137  036060                  JMP     $EOP
```

```
                                .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.
                        ;*
042622  023727  001140  177570  .RSET:  CMP     SWR,#177570             ;SEE IF THERE IS A PHYSICAL
                                                                        ;CONSOLE SWITCH REGISTER.
042630  001001                          BNE     1$                      ;BRANCH IF NO.
042632  104407                          CKSWR                           ;OTHERWISE TYPE THE CONTENTS
                                                                        ;OF THE PROGRAM VIRTUAL SWITCH REGISTER
                                                                        ;AND GIVE THE USER A CHANCE TO
                                                                        ;MODIFY IT.
042634  012737  042534  000244  1$:     MOV     #FPSPUR,FPVECT
042642  012737  042566  000004          MOV     #CPSPUR,ERRVECT
042650  012737  042604  000010          MOV     #CPTWO,10
042656  011600                          MOV     (SP),R0                 ;SAVE RETURN ADDRESS.
042660  012706  001100                  MOV     #STACK,SP               ;RESET THE STACK POINTER.
042664  005004                          CLR     R4                      ;CLEAR THE FPS.
042666  170104                          LDFPS   R4
042670  000110                          JMP     (R0)                    ;RETURN.
```

```
                                          .SBTTL  SPECIAL MESSAGES
042672  200     120     117  POWERM:  .ASCIZ  <CRLF>'POWER FAILURE. PROGRAM RESTARTING.'<CRLF>
042737  000                  NULL:    .BYTE   0
042740  011     000          $TAB:    .ASCIZ  <TAB>
042742  040     040     000  SPACE:   .ASCIZ  '  '
042745  200     120     103  LFIEX1:  .ASCIZ  <CRLF>'PC OF LAST FPP INSTRUCTION EXECUTED: '<TAB>
043015  200     114     101  LFIEX2:  .ASCIZ  <CRLF>'LAST FPP INSTRUCTION EXECUTED: '<TAB>
043057  200     106     114  FPSMS:   .ASCIZ  <CRLF>'FLOATING POINT STATUS REGISTER:    '
043123  200     106     105  FECMS:   .ASCIZ  <CRLF>'FEC:      '
043134  124     110     105  $THE:    .ASCIZ  'THE '
043141  011     040     111  NOOP1:   .ASCIZ  <TAB>' INSTRUCTION FAILED.'<CRLF>
043170  105     111     124  NOOP15:  .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR MICROPROGRAM FLOW WENT'
043265  200     106     122  NOOP2:   .ASCIZ  <CRLF>'FROM STATE '
043302  124     117     040  NOOP3:   .ASCIZ  'TO STATE '
043314  200     111     116  NOOP4:   .ASCIZ  <CRLF>'INSTEAD OF '
043331  200     124     110  NOOP5:   .ASCIZ  <CRLF>'THEREBY EXECUTING A '
043357  011     040     111  NOOP6:   .ASCIZ  <TAB>' INSTEAD OF A '
043377  011     040     111  NOOP7:   .ASCIZ  <TAB>' INSTRUCTION.'<CRLF>
043417  040     040     124  NOOP10:  .ASCII  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
043460  107     117     124           .ASCIZ  'GOT FPS. EXPECTED FPS.'<CRLF>
043510  101     040     102  NOOP11:  .ASCIZ  'A BAD CONSTANT MAY HAVE BEEN USED.'<CRLF>
043554  011     114     104  LFPS1:   .ASCIZ  <TAB>'LDFPS'<TAB>'REG'
043567  011     114     104  LD1:     .ASCIZ  <TAB>'LDD'<TAB>'(REG),A'<TAB>'//FSRC#0//'
043617  011     114     104  LD2:     .ASCIZ  <TAB>'LDD'<TAB>'A,A'
043630  011     123     124  STFS1:   .ASCIZ  <TAB>'STFPS'<TAB>'REG'
043643  011     123     124  ST1:     .ASCIZ  <TAB>'STD'<TAB>'A,(REG)'
043660  011     123     124  ST2:     .ASCIZ  <TAB>'STD'<TAB>'A,A'
043671  011     103     106  CFCC1:   .ASCIZ  <TAB>'CFCC'
043677  011     123     105  SETF1:   .ASCIZ  <TAB>'SETF'
043705  011     123     105  SETD1:   .ASCIZ  <TAB>'SETD'
043713  011     123     105  SETI1:   .ASCIZ  <TAB>'SETI'
043721  011     123     105  SETL1:   .ASCIZ  <TAB>'SETL'
043727  011     111     114  ILL1:    .ASCIZ  <TAB>'ILLEGAL FPP INSTRUCTION'
043760  011     123     124  STST1:   .ASCIZ  <TAB>'STST'<TAB>'REG'
043772  011     111     114  ILL2:    .ASCIZ  <TAB>'ILLEGAL FPP INSTRUCTION (FID=1)'
044033  040     040     124  ILLMS:   .ASCIZ  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FPS.'<CRLF>
044101  105     130     120  MS1:     .ASCIZ  'EXPECTED '
044113  107     117     124  MS2:     .ASCIZ  'GOT '
044120  103     117     116  MS3:     .ASCIZ  'CONTENTS OF LOCATIONS '
044147  040     124     110  MS4:     .ASCIZ  ' THROUGH '
044161  106     101     111  MS5:     .ASCIZ  'FAILURE IN THE MICROPROGRAM FLOW.'
044223  103     117     116  MS6:     .ASCIZ  'CONTROL WENT '
044241  106     122     117  MS7:     .ASCIZ  'FROM STATE '
044255  040     124     117  MS10:    .ASCIZ  ' TO STATE '
044270  102     125     124  MS11.    .ASCIZ  'BUT SHOULD HAVE GONE'
044315  103     117     116  MS12:    .ASCIZ  'CONTROL FLOW SHOULD HAVE GONE'
044353  102     125     124  MS13:    .ASCIZ  'BUT DID NOT.'
044370  040     040     124  MS14:    .ASCII  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
044431  107     117     124           .ASCIZ  'GOT PC.'<TAB>'EXPECTED PC.'
044456  111     116     123  MS15:    .ASCIZ  'INSTRUCTION TESTED: '
044503  040     117     122  MS16:    .ASCIZ  ' OR '
044510  124     105     123  MS17:    .ASCIZ  'TESTING ACCUMULATOR '
044535  132     105     122  MNUM0.   .ASCIZ  'ZERO '
044543  117     116     105  MNUM1:   .ASCIZ  'ONE '
044550  124     127     117  MNUM2:   .ASCIZ  'TWO '
044555  124     110     122  MNUM3:   .ASCIZ  'THREE '
044564  106     117     125  MNUM4:   .ASCIZ  'FOUR '
```

```
044572  106  111  126  MNUM5:  .ASCIZ  'FIVE '
044600  040  040  124  MS20:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
044641  104  101  124  MS21:   .ASCIZ  'DATA (FLOATING POINT NUMBER): '
044700  114  117  107  MS22:   .ASCIZ  'LOGICAL AND OF FAILING '
044730  114  117  107  MS23:   .ASCIZ  'LOGICAL OR OF FAILING '
044757  040  040  124  MS24.   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERRORS.'<TAB>
045021  116  125  115          .ASCIZ  'NUMBER OF ERRORS(OCTAL).'
045052  105  130  120  MS25:   .ASCIZ  'EXPECTED DATA IN '
045074  107  117  124  MS26:   .ASCIZ  'GOT DATA IN '
045111  200  101  103  MS27:   .ASCIZ  <CRLF>'AC0= '
045120  200  101  103  MS30:   .ASCIZ  <CRLF>'AC1= '
045127  200  101  103  MS31:   .ASCIZ  <CRLF>'AC2= '
045136  200  101  103  MS32:   .ASCIZ  <CRLF>'AC3= '
045145  200  101  103  MS33:   .ASCIZ  <CRLF>'AC4= '
045154  200  101  103  MS34:   .ASCIZ  <CRLF>'AC5= '
045163  123  105  124  MS35:   .ASCIZ  'SET '
045170  103  114  105  MS36:   .ASCIZ  'CLEAR '
045177  114  117  101  MS37:   .ASCIZ  'LOADED DATA: '
045215  122  105  101  MS40:   .ASCIZ  'READ DATA: '
045231  105  130  120  MS415:  .ASCIZ  'EXPECTED DATA: '
045251  104  101  124  MS41:   .ASCIZ  'DATA IN (R0) FSRC: '
045275  104  101  124  MS42:   .ASCIZ  'DATA IN AC0: '
045313  107  117  124  MS43:   .ASCIZ  'GOT RESULT: '
045330  105  130  120  MS44:   .ASCIZ  'EXPECTED RESULT: '
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6576                                            .SBTTL  ERROR MESSAGES
6577 045352     114     104     106    EM1:     .ASCIZ  'LDFPS AND STFPS TEST FAILED.'
6578 045407     114      04     106    EM2:     .ASCIZ  'LDFPS AND STFPS TEST ERROR SUMMARY.'
6579 045453     103     106     103    EM3:     .ASCIZ  'CFCC TRANSFERED BAD DATA TO THE PSW.'
6580 045520     103     106     103    EM4:     .ASCIZ  'CFCC MODIFIED THE FPS REGISTER.'
6581 045560     125     116     105    EM5:     .ASCIZ  'UNEXPECTED FPP TRAP TO 244.'
6582 045614     125     116     105    EM6:     .ASCIZ  'UNEXPECTED CPU TRAP TO 4.'
6583 045646     125     116     105    EM7:     .ASCIZ  'UNEXPECTED CPU TRAP TO 10.'
6584          045560                   EM10=EM5
6585 045701     125     116     101    EM11:    .ASCIZ  'UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 10.'
6586          000000                   EM12=0
6587          000000                   EM13=0
6588 045762     114     104     106    EM14:    .ASCII  'LDFPS R0 FAILED IN THE FSRC FLOWS.'
6589 046024     040     124     122             .ASCII  ' TRAPPED TO 4.'
6590 046042     200     104     111             .ASCIZ  <CRLF>'DID NOT GO FROM STATE 400 TO 670.'
6591 046105     123     124     106    EM15:    .ASCII  'STFPS R1 FAILED IN THE FDST FLOWS.'
6592 046147     040     124     122             .ASCII  ' TRAPPED TO 4.'
6593 046165     200     104     111             .ASCIZ  <CRLF>'DID NOT GO FROM STATE 634 TO 710.'
6594 046230     101     116     040    EM16:    .ASCIZ  'AN ILLEGAL FPP INSTRUCTION DID NOT TRAP.'
6595 046301     101     116     040    EM17:    .ASCII  'AN ILLEGAL FPP INSTRUCTION'
6596 046333     200     124     122             .ASCII  <CRLF>'TRAPPED TO 244, BUT FAILED TO SET '
6597 046376     124     110     105             .ASCII  'THE FPS CORRECTLY.'<CRLF>'EITHER A BAD CONSTANT '
6598 046447     127     101     123             .ASCIZ  'WAS GENERATED OR THE ALU LOGICAL OR FUNCTION FAILED.'
6599 046534     101     116     040    EM20:    .ASCII  'AN ILLEGAL FPP INSTRUCTION'
6600 046566     040     124     122             .ASCII  ' TRAPPED TO 244, BUT A SUBSEQUENT '
6601 046630     040     123     124             .ASCII  ' STST'<CRLF>
6602 046636     106     101     111             .ASCIZ  'FAILED TO PICK UP THE CORRECT FEC CODE = 2.'
6603 046712     123     124     123    EM21:    .ASCII  'STST R4 FAILED IN THE DESTINATION FLOWS.'
6604 046762     040     124     122             .ASCII  ' TRAPPED TO 4.'<CRLF>
6605 047001     104     111     104             .ASCIZ  'DID NOT GO FROM STATE 636 TO 710.'
6606 047043     101     116     040    EM22:    .ASCII  'AN ILLEGAL FPP INSTRUCTION,'
6607 047076     127     111     124             .ASCIZ  'WITH INTERRUPTS DISABLED.'
6608          047043                   EM23=EM22
6609          047043                   EM24=EM22
6610 047130     123     117     125    EM25:    .ASCII  'SOURCE LOCATIONS MODIFIED BY, LDD.'
6611 047172     200     101     040             .ASCIZ  <CRLF>'A DATO WAS PERFORMED INSTEAD OF A DATI.'
6612 047243     114     104     104    EM26:    .ASCII  'LDD (R0),AC0 FAILED.'<CRLF>
6613 047270     122     060     040             .ASCIZ  'R0 WAS MODIFIED.'
6614          047243                   EM27=EM26
6615 047311     124     110     105    EM30:    .ASCII  'THE PC WAS BAD AFTER  '
6616 047337     101     116     040             .ASCIZ  'AN FPP INSTRUCTION.'
6617 047363     123     124     104    EM31:    .ASCII  'STD AC0,(R0) FAILED.'<CRLF>
6618 047410     122     060     040             .ASCIZ  'R0 WAS MODIFIED.'
6619          0,7363                   EM32=EM31
6620 047431     123     124     104    EM33:    .ASCII  'STD AC0,(R0) FAILED.'<CRLF>
6621 047456     117     125     124             .ASCIZ  'OUTPUT BAD.'
6622 047472     123     124     104    EM34:    .ASCII  'STD AC0,(R0) FAILED IN THE FDST FLOWS.'
6623 047540     200     124     110             .ASCIZ  <CRLF>'THE (BUT GR7) FORK FAILED.'
6624 047574     114     104     104    EM35:    .ASCII  'LDD (R0),AC0 FAILED IN THE FSRC FLOWS.'
6625 047642     200     124     110             .ASCIZ  <CRLF>'THE (BUT GR7) FORK FAILED.'
6626 047676     123     124     104    EM36:    .ASCII  'STD AC0,(R0) FAILED IN THE FDST FLOWS.'
6627 047744     200     124     110             .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
6628 047777     114     104     104    EM37:    .ASCII  'LDD (R0),AC0 FAILED IN THE FSRC FLOWS.'
6629 050045     200     124     110             .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
6630 050100     114     104     104    EM40:    .ASCII  'LDD (R0),AC0 OR THE STD AC0,(R0) FAILED.'
6631 050150     200     102     101             .ASCIZ  <CRLF>'BAD DATA WAS DETECTED AFTER A SEQUENCE OF THE TWO INSTRUCTIONS.'
6632 050251     106     120     123    EM41:    .ASCIZ  'FPS BAD AFTER EXECUTION OF:
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6637 050306                             EM42:
     050306    114      104      104             .ASCII  /LDD (R0),AC0 FAILED IN THE FSRC FLOWS./<CRLF>
     050355    124      110      105             .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6638 050427                             EM43:
     050427    123      124      104             .ASCII  /STD AC0,(R0) FAILED IN THE FDST FLOWS./<CRLF>
     050476    124      110      105             .ASCIZ  /THE (BUT FDST) FORK FAILED. TRAPPED TO 4./
6639 050550    106      120      120    EM44:    .ASCIZ  'FPP ACCUMULATORS DATA TEST FAILED.'
6640        050550                      EM45=EM44
6641 050613    106      120      120    EM46:    .ASCIZ  'FPP ACCUMULATORS DUAL ADDRESSING TEST FAILED.'
6646 050671                             EM47:
     050671    114      104      040             .ASCII  /LD AC1,AC0 FAILED IN THE FSRC FLOWS./
     050735    124      110      105             .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6647 051007    114      104      040    EM50:    .ASCII  'LD AC1,AC0 FAILED IN THE FSRC FLOWS.'
6648 051053    124      110      105             .ASCIZ  'THE (BUT FD) FORK FAILED.'
6649 051105    114      104      040    EM51:    .ASCIZ  'LD AC1,AC0 TRANSFERRED BAD DATA.'
6659 051146                             EM52:
     051146    114      104      104             .ASCII  /LDD (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     051215    124      110      105             .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6660 051267                             EM53:
     051267    114      104      104             .ASCII  /LDD (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     051336    200      122      060             .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     051353    105      111      124             .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     051422    104      111      104             .ASCIZ  \DID NOT GO FROM STATE 627 TO 322.\
6661 051464                             EM54:
     051464    114      104      104             .ASCIZ  /LDD (R0)+,AC0 TRANSFERRED BAD DATA./
6662 051530                             EM55:
     051530    114      104      104             .ASCII  /LDD -(R0),AC0 FAILED IN THE FSRC FLOWS./
     051577    124      110      105             .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6663 051651                             EM56:
     051651    114      104      104             .ASCII  /LDD -(R0),AC0 FAILED IN THE FSRC FLOWS./
     051720    200      122      060             .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     051735    105      111      124             .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     052004    104      111      104             .ASCIZ  \DID NOT GO FROM STATE 627 TO 324.\
6664 052046                             EM57:
     052046    114      104      104             .ASCIZ  /LDD -(R0),AC0 TRANSFERRED BAD DATA./
6665 052112                             EM60:
     052112    114      104      106             .ASCII  /LDF (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     052161    200      122      060             .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     052176    105      111      124             .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     052245    104      111      104             .ASCIZ  \DID NOT GO FROM STATE 627 TO 322.\
6666 052307                             EM61:
     052307    114      104      106             .ASCIZ  /LDF (R0)+,AC0 TRANSFERRED BAD DATA./
6667 052353    114      104      106    EM62:    .ASCII  'LDF (R0)+,AC0 FAILED IN THE FSRC FLOWS.'
6668 052422    200      124      110             .ASCII  <CRLF>'THE (BUT FD) FORK FAILED.'<CRLF>
6669 052455    127      105      116             .ASCII  'WENT FROM STATE 441 TO 077,'<CRLF>
6670 052511    111      116      123             .ASCIZ  'INSTEAD OF FROM 441 TO 076.'
6671 052545    114      104      104    EM63:    .ASCII  'LDD #NUM,AC0 FAILED IN THE FSRC FLOWS.'
6672 052613    200      124      110             .ASCII  <CRLF>'THE (BUT GR7) FORK FAILED.'<CRLF>
6673 052647    127      105      116             .ASCII  'WENT FROM STATE 207 TO 174,'<CRLF>
6674 052703    111      116      123             .ASCIZ  'INSTEAD OF FROM 207 TO 176.'
6675 052737    114      104      104    EM64:    .ASCII  'LDD #NUM,AC0 FAILED IN THE FSRC FLOWS.'
6676 053005    200      101      040             .ASCIZ  <CRLF>'A BAD CONSTANT WAS USED WHEN THE PC WAS INCREMENTED.'
6677        052737                      EM65=EM64
6678 053073                             EM66:
     053073    114      104      104             .ASCIZ  /LDD #NUM,AC0 TRANSFERRED BAD DATA./
6700 053136                             EM67:
     053136    114      104      104             .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
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:RROR MESSAGES

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                053206  200  124  110          .ASCII  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
                053260  200  127  105          .ASCII  <CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326,\
                053332  200  111  116          .ASCIZ  <CRLF>\INSTEAD OF FROM 627 TO 323.\
6701 053367                             EM70:
                053367  114  104  104          .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
                053437  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
6702 053512                             EM71:
                053512  114  104  104          .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
                053562  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
6703 053614                             EM72:
                053614  114  104  104          .ASCII  'LDD @(R0)+,AC0'<CRLF>
                053633  106  101  111          .ASCIZ  'FAILED TO INCREMENT R0 BY 2.'
6704 053670                             EM73:
                053670  114  104  104          .ASCIZ  'LDD @(R0)+,AC0 LOADED BAD DATA.'
6705 053730                             EM74:
                053730  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
                054000  200  124  110          .ASCII  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
                054052  200  127  105          .ASCII  <CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326,\
                054124  200  111  116          .ASCIZ  <CRLF>\INSTEAD OF FROM 627 TO 325.\
6706 054161                             EM75:
                054161  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
                054231  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
6707 054304                             EM76:
                054304  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
                054354  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
6708 054406                             EM77:
                054406  114  104  104          .ASCII  'LDD @-(R0),AC0'<CRLF>
                054425  106  101  111          .ASCIZ  'FAILED TO DECREMENT R0 BY 2.'
6709 054462                             EM100:
                054462  114  104  104          .ASCIZ  'LDD @-(R0),AC0 LOADED BAD DATA.'
6710 054522                             EM101:
                054522  114  104  104          .ASCII  'LDD NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
                054573  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
6711 054646                             EM102:
                054646  114  104  104          .ASCII  'LDD NUM(R0),AC0'<CRLF>
                054666  106  101  111          .ASCIZ  'FAILED TO AFFECT R0 BY 2.'
6712 054720                             EM103:
                054720  114  104  104          .ASCII  'LDD NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
                054771  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
6713 055023                             EM104:
                055023  114  104  104          .ASCIZ  'LDD NUM(R0),AC0 LOADED BAD DATA.'
6714 055064                             EM105:
                055064  114  104  104          .ASCII  'LDD @NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
                055136  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
6715 055211                             EM106:
                055211  114  104  104          .ASCII  'LDD @NUM(R0),AC0'<CRLF>
                055232  106  101  111          .ASCIZ  'FAILED TO AFFECT R0 BY 2.'
6716 055264                             EM107:
                055264  114  104  104          .ASCII  'LDD @NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
                055336  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
6717 055370                             EM110:
                055370  114  104  104          .ASCIZ  'LDD @NUM(R0),AC0 LOADED BAD DATA.'
6733 055432                             EM111:
                055432  114  104  104          .ASCII  /LDD AC7,AC0 FAILED TO TRAP TO 244./
                055474  200  101  103          .ASCIZ  <CRLF>/AC7 IS AN ILLEGAL ACCUMULATOR./
6734         055432                     EM112=EM111
6735 055534                             EM113:
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ERROR MESSAGES

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      055534     114     104     104          .ASCII  /LDD AC6,AC0 FAILED TO TRAP TO 244./
      055576     200     101     103          .ASCIZ  <CRLF>/AC6 IS AN ILLEGAL ACCUMULATOR./
 6736          055534                  EM114=EM113
 6737          055432                  EM115=EM111
 6738          055534                  EM116=EM113
 6739 055636                          EM117:
      055636     125     123     105          .ASCII  'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO,'
      055720     200     124     122          .ASCIZ  <CRLF>'TRAPPED BUT FAILED TO SET FPS CORRECTLY.'
 6740 055772                          EM120:
      055772     125     123     105          .ASCII  'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO,'
      056054     200     124     122          .ASCIZ  <CRLF>'TRAPPED BUT FAILED TO SET FEC CORRECTLY.'
 6741 056126     123     124     040  EM121:  .ASCII  'ST AC0,AC1 FAILED IN THE FDST FLOWS.'
 6742 056172     200     124     110          .ASCIZ  <CRLF>'THE (BUT FDST) FORK FAILED. TRAPPED TO 4.'
 6743 056245     123     124     040  EM122:  .ASCII  'ST AC0,AC1 FAILED IN THE FDST FLOWS.'
 6744 056311     200     124     110          .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
 6745 056344     123     124     040  EM123:  .ASCIZ  'ST AC0,AC1 TRANSFERRED BAD DATA.'
 6746 056405                          EM124:
      056405     106     120     123          .ASCII  'FPS BAD AFTER LDD (R0),AC0.'
      056440     200     124     110          .ASCIZ  <CRLF>\THE (BUT EZBT Y8) FORK FAILED.\
 6747 056500                          EM125:
      056500     106     120     123          .ASCII  'FPS BAD AFTER LDD (R0),AC0.'
      056533     200     124     110          .ASCIZ  <CRLF>\THE (BUT ENBT) FORK FAILED.\
 6748 056570     114     104     104  EM126:  .ASCII  'LDD (R0),AC0 TRAPPED TO 244.'
 6749 056624     040     106     123          .ASCII  ' FSRC= -0 AND FIUV= 0.'<CRLF>
 6750 056653     124     110     105          .ASCII  'THE (BUT FIUV) FORK FAILED.'
 6751 056706     200     127     105          .ASCII  <CRLF>'WENT FROM STATE 256 TO 354.'
 6752 056742     200     111     116          .ASCIZ  <CRLF>'INSTEAD OF FROM 256 TO 254.'
 6753 056777     114     104     104  EM127:  .ASCII  'LDD (R0),AC0 FAILED TO TRAP TO 244.'
 6754 057042     040     106     123          .ASCII  ' FSRC= -0, FIUV= 1.'
 6755 057065     200     124     110          .ASCII  <CRLF>'THE (BUT FIUV) FOR FAILED.'<CRLF>
 6756 057121     127     105     116          .ASCII  'WENT FROM STATE 256 TO 254.'
 6757 057154     200     111     116          .ASCIZ  <CRLF>'INSTEAD OF FROM 256 THE 354.'
 6758 057212     114     104     104  EM130:  .ASCII  'LDD (R0),AC0 TRAPPED TO 244.'
 6759 057246     106     123     122          .ASCII  'FSRC= -0, FIUV= 1.'<CRLF>
 6760 057271     102     125     124          .ASCIZ  'BUT FEC WAS BAD.'
 6761 057312                          EM131:
      057312     114     104     103          .ASCIZ  /LDCFD (R0),AC0 LOADED BAD DATA./
 6762 057352                          EM132:
      057352     114     104     103          .ASCIZ  /LDCDF (R0),AC0 LOADED BAD DATA./
 6803 057412                          EM133:
      057412     101     104     104          .ASCIZ  /ADDD (R0),AC0 WITH (R0)=AC0=0 /
 6804 057451                          EM134:
      057451     101     104     104          .ASCIZ  /ADDF (R0),AC0 WITH (R0)=AC0=0 /
 6805 057510                          EM135:
      057510     123     125     102          .ASCIZ  /SUBD (R0),AC0 WITH (R0)=AC0=0 /
 6806 057547                          EM136:
      057547     123     125     102          .ASCIZ  /SUBF (R0),AC0 WITH (R0)=AC0=0 /
 6807          057412                  EM137=EM133
 6808          057451                  EM140=EM134
 6809          057510                  EM141=EM135
 6810          057547                  EM142=EM136
 6811 057606                          EM143:
      057606     101     104     104          .ASCIZ  /ADDD (R0),AC0 WITH (R0)=0 /
 6812 057641                          EM144:
      057641     123     125     102          .ASCIZ  /SUBD (R0),AC0 WITH (R0)=0 /
 6813          057606                  EM145=EM143
 6814          057641                  EM146=EM144
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 6815 057674                                EM147:
      057674     123      125      102              .ASCIZ  /SUBD (R0),AC0 WITH AC0-0 /
 6816          057674                       EM150=EM147
 6817          057674                       EM151=EM147
 6818 057726                                EM152:
      057726     101      104      104              .ASCIZ  /ADDD (R0),AC0 WITH AC0=0 /
 6819          057726                       EM153=EM152
 6820 057760                                EM154:
      057760     101      116      040              .ASCII  'AN OVERFLOW ERROR OCCURRED ON ADD'<CRLF>
      060022     103      101      125              .ASCII  'CAUSING A TRAP TO 244.'
      060050     200      050      102              .ASCII  <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
      060141     200      123      110              .ASCIZ  <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
 6821 060212                                EM155:
      060212     101      116      040              .ASCII  'AN UNDERFLOW ERROR OCCURRED ON ADD'<CRLF>
      060255     103      101      125              .ASCII  'CAUSING A TRAP TO 244.'
      060303     200      050      102              .ASCII  <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
      060374     200      123      110              .ASCIZ  <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
 6822 060445                                EM156:
      060445     101      104      104              .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./
      060523     200      124      110              .ASCII  <CRLF>'THE (BUT FD) FORK FAILED. WENT'
      060562     106      122      117              .ASCII  \FROM STATE 665 TO 113.\<CRLF>
      060611     111      116      123              .ASCIZ  \INSTEAD OF FROM 665 TO 313.\<CRLF>\WITH FT SET.\
 6823 060662                                EM157:
      060662     101      104      104              .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./
      060740     200      124      110              .ASCII  <CRLF>'THE (BUT FD) FORK FAILED. WENT'
      060777     106      122      117              .ASCII  \FROM STATE 665 TO 313.\<CRLF>
      061026     111      116      123              .ASCIZ  \INSTEAD OF FROM 665 TO 113.\<CRLF>\WITH FT CLEAR.\
 6824 061101                                EM160:
      061101     101      104      104              .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
      061160     124      110      105              .ASCII  'THE FLOATING CONSTANT WAS USED INSTEAD OF THE DOUBLE CONSTANT'<CRLF>
      061256     111      116      040              .ASCIZ  'IN THE ROUND ALGORITHM.'
 6825 061306                                EM161:
      061306     101      104      104              .ASCII  /ADDF (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
      061365     124      110      105              .ASCII  'THE DOUBLE CONSTANT WAS USED INSTEAD OF THE FLOATING CONSTANT'<CRLF>
      061463     111      116      040              .ASCIZ  'IN THE ROUND ALGORITHM.'
 6826 061513                                EM162:
      061513     101      104      104              .ASCIZ  /ADDD (R0),AC0 PRODUCED A BAD RESULT./
 6827 061560                                EM163:
      061560     101      104      104              .ASCIZ  /ADDF (R0),AC0 PRODUCED A BAD RESULT./
 6828 061625                                EM164:
      061625     124      110      105              .ASCIZ  \THE FPS WAS BAD AFTER ADDD (R0),AC0.\
 6829 061672                                EM165:
      061672     124      110      105              .ASCIZ  \THE FPS WAS BAD AFTER ADDF (R0),AC0.\
 6830 061737                                EM166:
      061737     101      104      104              .ASCII  /ADDD (R0),AC0 PRODUCED A BAD RESULT./<CRLF>
      062004     120      122      117              .ASCIZ  'PROBABLE ERROR IN THE ALIGN FLOWS.'
 6831 062047                                EM167:
      062047     101      104      104              .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      062120     106      114      117              .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 111, TO 014.\
      062210     200      101      040              .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
      062245     127      101      123              .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6832 062306                                EM170:
      062306     101      104      104              .ASCII  /ADDF (R0),AC0 PRODUCED A BAD RESULT./<CRLF>
      062353     120      122      117              .ASCIZ  'PROBABLE ERROR IN THE ALIGN FLOWS.'
 6833 062416                                EM171:
      062416     101      104      104              .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      062467     106      114      117              .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 111, TO 014.\
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ERROR MESSAGES

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      062557     200     101     040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
      062614     127     101     123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6834  062655                                EM172:
      062655     101     104     104          .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      062726     106     114     117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
      063016     200     101     040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
      063053     127     101     123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6835  063114                                EM173:
      063114     101     104     104          .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      063165     106     114     117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
      063255     200     101     040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
      063312     127     101     123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6836  063353                                EM174:
      063353     101     104     104          .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      063424     106     114     117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
      063514     200     101     040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
      063551     127     101     123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6837  063612                                EM175:
      063612     101     104     104          .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
      063663     106     114     117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
      063753     200     101     040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
      064010     127     101     123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6838  064051                                EM176:
      064051     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      064124     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 442, TO 500.\
6839  064206     120     117     127  EM177:  .ASCIZ  'POWER MONITOR BIT FOUND SET'
6840  064242                                EM200:
      064242     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      064315     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 121.\
6841  064377                                EM201:
      064377     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      064452     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 101.\
6842  064534                                EM202:
      064534     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      064607     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 042, TO 101.\
6843  064671                                EM203:
      064671     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      064744     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 141.\
6844  065026                                EM204:
      065026     101     104     104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
      065101     104     111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 042, TO 141.\
6845  065163                                EM205:
      065163     124     110     105          .ASCIZ  \THE FPS WAS BAD AFTER SUBD (R0),AC0.\
6846  065230                                EM206:
      065230     123     125     102          .ASCIZ  /SUBD (R0),AC0 PRODUCED A BAD RESULT./
6847  065275     123     125     102  EM207:  .ASCII  'SUBD (R0),AC0 PRODUCED A BAD RESULT.'
6848  065341     200     124     110          .ASCIZ  <CRLF>'THE XOR OF THE SIGN BIT FAILED IN STATE 024.'
6849  065417     101     104     104  EM210:  .ASCIZ  'ADDD (R0),AC0 FAILED IN THE NORMALIZE FLOWS.'
6850          045560                 EM211=EM5
6851          045614                 EM212=EM6
6852          045646                 EM213=EM7
6853  065474                         EM214:
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     065474     101    104     104          .ASCII  'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
     065547     104    111     104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 042, TO 121.\
                                            .SBTTL  DATA HEADERS
     065633     040    040     124  DH1:    .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     065671     011    127     122          .ASCIZ  <TAB>'WROTE.'<TAB>'READ.'<TAB>'EXPECTED.'
     065721     040    040     124  DH2:    .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     065761     101    116     104          .ASCIZ  'AND BAD DATA.'<TAB>'OR BAD DATA.'
     066014     040    040     124  DH3:    .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     066054     011    122     105          .ASCIZ  <TAB>'READ PSW.'<TAB>'EXPECTED PSW.'
     066105     040    040     124  DH4:    .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     066145     011    127     122          .ASCIZ  <TAB>'WROTE FPS.'<TAB>'FPS AFTER CFCC.'
     066201     040    040     124  DH5:    .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
            066201                  DH6=DH5
            066201                  DH7=DH5
            066201                  DH10=DH5
            066201                  DH11=DH5
            000000                  DH12=0
            000000                  DH13=0
            066201                  DH14=DH5
            066201                  DH15=DH5
     066241     040    040     124  DH16:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     066301     011    117     120          .ASCIZ  <TAB>'OP CODE.  FPS.'
     066321     040    040     124  DH17:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     066361     011    107     117          .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
     066411     040    040     124  DH20:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
     066450     011    120     103          .ASCIZ  <TAB>'PC OF STST.'<TAB>'READ FEC.'
            066201                  DH21=DH5
     066477     106    101     111  DH22:   .ASCIZ  'FAILED TO CORRECTLY SET FPS.'
     066534     106    101     111  DH23:   .ASCII  'FAILED TO CORRECTLY SET FEC TO 000002.'<CRLF>
     066603     040    040     124          .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     066643     011    120     103          .ASCIZ  <TAB>'PC OF STST.'<TAB>'READ FEC.'
     066672     124    122     101  DH24:   .ASCII  'TRAPPED TO 244. FLOW WENT FROM STATE 554 TO STATE 430.'
     066760     200    111     116          .ASCIZ  <CRLF>'INSTEAD OF FROM STATE 554 TO STATE 432.'
     067031     040    040     124  DH25:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
     067073     040    040     124  DH26:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     067133     011    107     117          .ASCIZ  <TAB>'GOT RO.'<TAB>'EXPECTED RO.'
            067073                  DH27=DH26
            000000                  DH30=0
            067073                  DH31=DH26
            067073                  DH32=DH26
     067161     040    040     124  DH33:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     067221     011    122     060          .ASCIZ  <TAB>'RO (TARGET LOCATIONS FOR OUTPUT).'
            067161                  DH34=DH33
            067161                  DH35=DH33
            067161                  DH36=DH33
            067161                  DH37=DH33
            067161                  DH40=DH33
            000000                  DH41=0
     067264     040    040     124  DH42:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
     067323     011    122     060          .ASCIZ  <TAB>'RO (TARGET LOCATIONS FOR OUTPUT).'
            067264                  DH43=DH42
            000000                  DH44=0
     067366     105    122     122  DH45:   .ASCIZ  'ERROR SUMMARY.'
     067405     040    040     124  DH46:   .ASCIZ  '  TEST.'<TAB>'CALL AT PC.'
            067366                  DH47=DH45
     067431     040    040     124  DH50:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
     067471     011    127     111          .ASCIZ  <TAB>'WITH FD.'
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               067431                          DH51=DH50
               066201                          DH52=DH5
               067073                          DH53=DH26
       067503     040      040      124        DH54:    .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
               066201                          DH55=DH5
               067073                          DH56-DH26
               067503                          DH57=DH54
               067073                          DH60=DH26
               067503                          DH61=DH54
               067503                          DH62=DH54
               067503                          DH63=DH54
       067544     122      105      123        DH65:    .ASCII  'RESULTING IN AN ODD ADDRESS TRAP TO 4.'
       067612     200                                   .ASCII  <CRLF>
       067613     040      040      124        DH64:    .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
       067653     011      107      117                 .ASCIZ  <TAB>'GOT PC.'<TAB>'EXPECTED PC.'
               067503                          DH66=DH54
               066201                          DH67=DH5
               066201                          DH70=DH5
               067031                          DH71=DH25
               067073                          DH72=DH26
               067503                          DH73=DH54
               066201                          DH74=DH5
               066201                          DH75=DH5
               067031                          DH76=DH25
               067073                          DH77=DH26
               067503                          DH100=DH54
               066201                          DH101=DH5
               067073                          DH102=DH26
               067031                          DH103=DH25
               067503                          DH104=DH54
               066201                          DH105=DH5
               067073                          DH106=DH26
               067031                          DH107=DH25
               067503                          DH110=DH54
               067031                          DH111=DH25
       067701     124      110      105        DH112:   .ASCII  'THE (BUT FSRC) FORK FAILED.'<CRLF>
       067735     103      117      116                 .ASCII  'CONTROL WENT FROM STATE 762 TO STATE 627.'
       070006     200      111      116                 .ASCII  <CRLF>'INSTEAD OF FROM STATE 762 TO STATE 637.'<CRLF>
       070057     040      040      124                 .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
               067031                          DH113=DH25
               067701                          DH114=DH112
       070120     124      110      105        DH115:   .ASCII  'THE (BUT FSRC) FORK FAILED RESULTING IN AN ODD ADDRESS TRAP TO 4.'
       070221     200      103      117                 .ASCII  <CRLF>'CONTROL WENT FROM STATE 762 TO STATE 627.'<CRLF>
       070274     111      116      123                 .ASCII  'INSTEAD OF FROM STATE 762 TO STATE 627.'<CRLF>
       070344     040      040      124                 .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
               070120                          DH116=DH115
               066321                          DH117=DH17
       070404     040      040      124        DH120:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
       070444     011      107      117                 .ASCIZ  <TAB>'GOT FEC.'<TAB>'EXPECTED FEC.'
               066201                          DH121=DH5
               067431                          DH122=DH50
               067431                          DH123=DH50
               066321                          DH124=DH17
               066321                          DH125=DH17
               066201                          DH126=DH5
               067503                          DH127=DH54
               070404                          DH130=DH120
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          067503                      DH131=DH54
          067503                      DH132=DH54
070474    106       101      111      DH133:  .ASCII  'FAILED TO PRODUCE THE CORRECT RESULTS.'<CRLF>
070543    040       040      124              .ASCIZ  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
          070474                      DH134=DH133
          070474                      DH135=DH133
          070474                      DH136=DH133
070604    120       122      117      DH137:  .ASCII  'PRODUCED THE CORRECT RESULT BUT FAILED TO SET THE FPS CORRECTLY.'
070704    040       040      124              .ASCII  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
070744    011       107      117              .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
          070604                      DH140=DH137
          070604                      DH141=DH137
          070604                      DH142=DH137
          070474                      DH143=DH133
          070474                      DH144=DH133
          070604                      DH145=DH137
          070604                      DH146=DH137
          067503                      DH147=DH54
070774    130       117      122      DH150:  .ASCII  'XOR OF SIGN BIT FAILED.'<CRLF>
071024    040       040      124              .ASCIZ  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
          070604                      DH151=DH137
          070474                      DH152=DH133
          070604                      DH153=DH137
071065    040       040      124      DH154:  .ASCIZ  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
          071065                      DH155=DH154
          067503                      DH156=DH54
          067503                      DH157=DH54
          067503                      DH160=DH54
          067503                      DH161=DH54
          067503                      DH162=DH54
          067503                      DH163=DH54
          066321                      DH164=DH17
          066321                      DH165=DH17
          067503                      DH166=DH54
          067503                      DH167=DH54
          067503                      DH170=DH54
          067503                      DH171=DH54
          067503                      DH172=DH54
          067503                      DH173=DH54
          067503                      DH174=DH54
          067503                      DH175=DH54
          067503                      DH176=DH54
071125    040       040      124      DH177:  .ASCIZ  '   TEST.  ERR PC  CPU ERROR REGISTER'
          067503                      DH200=DH54
          067503                      DH201=DH54
          067503                      DH202=DH54
          067503                      DH203=DH54
          067503                      DH204=DH54
          066321                      DH205=DH17
          067503                      DH206=DH54
          067503                      DH207=DH54
          067503                      DH210=DH54
071171    040       040      124      DH211:  .ASCIZ  '   TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FEC.'
          066201                      DH212=DH5
          066201                      DH213=DH5
          067503                      DH214=DH54
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7022                                                    .SBTTL  DATA FORMATS
7023 071236     004     000     005     DF1:    .BYTE   4,0,5,0,5,0,0,0
7024 071246     004     000     005     DF2:    .BYTE   4,0,5,4,5,0,5,0
7025 071256     004     000     005     DF3:    .BYTE   4,0,5,0,5,0,5,0
7026            071256                  DF4=DF3
7027 071266     004     000     005     DF5:    .BYTE   4,0,5,0,5,0,5,11,5,0,5,0
7028            071266                  DF6=DF5
7029            071266                  DF7=DF5
7030            071266                  DF10=DF5
7031            071266                  DF11=DF5
7032 071302     005     011     005     DF12:   .BYTE   5,11,5,5,5,4,5,4,5,5,4,5,4,5,11,5,11,5,5,4,0,5,0,5,0,0
7033 071334     005     011     005     DF13:   .BYTE   5,11,5,5,5,4,0,5,0,5,0,0
7034            071266                  DF14=DF6
7035            071266                  DF15=DF6
7036 071350     004     000     005     DF16:   .BYTE   4,0,5,0,5,0,0
7037            071256                  DF17=DF3
7038 071357     004     000     005     DF20:   .BYTE   4,0,5,0,5,0,5,0
7039 071367     004     000     005     DF21:   .BYTE   4,0,5,0
7040 071373     005     005     004     DF22:   .BYTE   5,5,4,0,5,0,5,0,5,0
7041 071405     004     000     005     DF23:   .BYTE   4,0,5,0,5,0,5,0
7042 071415     005     004     000     DF24:   .BYTE   5,4,0,5,0,5,0
7043 071424     004     000     005     DF25:   .BYTE   4,0,5,0,5,5,5,0,5,0,5,0,5,0,5,5,5,0,5,0,5,0
7044 071450     004     000     005     DF26:   .BYTE   4,0,5,0,5,0,0,5,5,5,5,4,5,4,5,5,5,5,4,5,4
7045 071475     004     000     005     DF27:   .BYTE   4,0,5,0,5,0,0,5,5,5,5,4,5,4,5,5
7046 071515     005     011     005     DF30:   .BYTE   5,11,5,5,5,4,0,5,0,5,0,0
7047            071450                  DF31=DF26
7048            071475                  DF32=DF27
7049 071531     004     000     005     DF33:   .BYTE   4,0,5,0,5,0,5,5,5,0,5,0,5,12,5,5,5,0,5,0,5,12
7050 071557     004     000     005     DF34:   .BYTE   4,0,5,0,5,0,5,5,5,5,4,5,4,5,5,5,5,4,5,4
7051            071557                  DF35=DF34
7052            071557                  DF36=DF34
7053            071557                  DF37=DF34
7054 071603     004     000     005     DF40:   .BYTE   4,0,5,0,5,0,5,5,5,0,5,0,5,3,5,5,5,0,5,0,5,3
7055 071631     011     005     005     DF41:   .BYTE   11,5,5,5,4,0,5,0,5,0,5,0
7056 071645     004     000     005     DF42:   .BYTE   4,0,5,0,5,0,5,5,5,5,4,5,4,11,4,5,5,5,5,4,5,4
7057            071645                  DF43=DF42
7058 071673     005     011     005     DF44:   .BYTE   5,11,5,5,5,4,0,5,0,5,5,5,5,3,5,5,5,5,3
7059 071716     005     011     005     DF45:   .BYTE   5,11,5,5,5,4,0,5,0,5,4,5,5,5,5,3,5,5,5,5,3
7060 071743     004     000     005     DF46:   .BYTE   4,0,5,5,5,3,5,3,5,3,5,3,5,3,5,3,5,5,5,3,5,3,5,3,5,3,5,3,5,3,5,3
7061 071775     004     000     005     DF47:   .BYTE   4,0,5,0,5,5,5,4,5,4,5,5
7062 072012     004     000     005     DF50:   .BYTE   4,0,5,0,5,11,5,5,5,5,4,5,4,5,5,5,5,4,5,4
7063 072036     004     000     005     DF51:   .BYTE   4,0,5,0,5,11,5,5,5,3,5,5,5,3
7064            071775                  DF52=DF47
7065 072054     004     000     005     DF53:   .BYTE   4,0,5,0,5,0,0
7066 072063     004     000     005     DF54:   .BYTE   4,0,5,0,5,5,5,5,3,5,5,5,5,3
7067            071775                  DF55=DF47
7068            072054                  DF56=DF53
7069            072063                  DF57=DF54
7070            072054                  DF60=DF53
7071            072063                  DF61=DF54
7072            072063                  DF62=DF54
7073            072063                  DF63=DF54
7074 072101     004     000     005     DF64:   .BYTE   4,0,5,0,5,0,0
7075            072101                  DF65=DF64
7076            072063                  DF66=DF54
7077            071367                  DF67=DF21
7078 072110     004     000     005     DF70:   .BYTE   4,0,5,0,5,5,5,5,4,5,4,5,5,5,5,4,5,4
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        072110                 DF71=DF70
072132     004    000    005   DF72:    .BYTE   4,0,5,0,5,0,0
        072063                 DF73=DF54
        071367                 DF74=DF21
        072110                 DF75=DF70
        072110                 DF76-DF70
        072132                 DF77=DF72
        072063                 DF100=DF54
        072110                 DF101=DF70
        072132                 DF102=DF72
        072110                 DF103=DF70
        072063                 DF104=DF54
        072110                 DF105=DF70
        072132                 DF106=DF72
        072110                 DF107=DF70
        072063                 DF110=DF54
072141     004    000    005   DF111:   .BYTE   4,0,5,0
        072141                 DF112=DF111
        072141                 DF113=DF111
        072141                 DF114=DF111
        072141                 DF115=DF111
        072141                 DF116=DF111
        071256                 DF117=DF3
        071256                 DF120=DF3
        071775                 DF121=DF47
        072012                 DF122=DF50
        072036                 DF123=DF51
072145     004    000    005   DF124:   .BYTE   4,0,5,0,5,0,0,5,5,5,5,4,5,4,5,5,5,5,4,5,4,5,5,5,3
        072145                 DF125=DF124
        072141                 DF126=DF111
        072141                 DF127=DF111
        071256                 DF130=DF3
072176     004    000    005   DF131:   .BYTE   4,0,5,0,5,5,5,3,5,5,5,3,5,5,5,3
        072176                 DF132=DF131
072216     004    000    005   DF133:   .BYTE   4,0,5,0,5,5,5,3,5,5,5,3,5,5,5,3,5,5,5,3
        072216                 DF134=DF133
        072216                 DF135=DF133
        072216                 DF136=DF133
072242     004    000    005   DF137:   .BYTE   4,0,5,0,5,0,5,0
        072242                 DF140=DF137
        072242                 DF141=DF137
        072242                 DF142=DF137
        072216                 DF143=DF137
        072216                 DF144=DF133
        072242                 DF145=DF137
        072242                 DF146=DF137
        072216                 DF147=DF133
        072216                 DF150=DF133
        072242                 DF151=DF137
        072216                 DF152=DF133
        072242                 DF153=DF137
072252     004    000    005   DF154:   .BYTE   4,0,5,0
        072252                 DF155=DF154
        072216                 DF156=DF133
        072216                 DF157=DF133
        072216                 DF160-DF133
072256     004    000    005   DF161:   .BYTE   4,0,5,0,5,5,5,2,5,5,5,2,5,5,5,2,5,5,5,2
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               072216                          DF162=DF133
               072256                          DF163=DF161
               071256                          DF164=DF3
               071256                          DF165=DF3
               072216                          DF166=DF133
               072216                          DF167=DF133
               072256                          DF170=DF161
               072256                          DF171=DF161
               072216                          DF172=DF133
               072216                          DF173=DF133
               072256                          DF174=DF161
               072256                          DF175=DF161
               072216                          DF176=DF133
        072302    004        000       000     DF177:   .BYTE   4,0,0
               072216                          DF200=DF133
               072216                          DF201=DF133
               072216                          DF202=DF133
               072216                          DF203=DF133
               072216                          DF204=DF133
               071256                          DF205=DF3
               072216                          DF206=DF133
               072216                          DF207=DF133
               072216                          DF210=DF133
        072305    004        000       005     DF211:   .BYTE   4,0,5,0,5,0
               072305                          DF212=DF211
               072305                          DF213=DF211
               072216                          DF214=DF133
                                               .EVEN
```

```
                                                .SBTTL  DATA TABLES
7165 072314  001232  001234  042740  DT1:      .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7166 072330  001242  001244  000000            .WORD   $TMP4,$TMP5,0
7167 072336  001232  001234  042740  DT2:      .WORD   $TMP0,$TMP1,$TAB,AERFLG,$TAB,$TMP2,$TAB,$TMP3,0
7168 072360  001232  001234  042740  DT3:      .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7169 072374  042740  001242  000000            .WORD   $TAB,$TMP4,0
7170         072360                  DT4=DT3
7171 072402  001232  001234  042740  DT5:      .WORD   $TMP0,$TMP1,$TAB,$TMP2,LFIEX1,$TMP21,LFIEX2
7172 072420  001272  043057  001240            .WORD   $TMP20,FPSMS,$TMP3,FECMS,$TMP4,0
7173 072434  001232  001234  042740  DT6:      .WORD   $TMP0,$TMP1,$TAB,$TMP2,LFIEX1,$TMP21,LFIEX2,$TMP20,0
7174         072434                  DT7=DT6
7175         072434                  DT10=DT6
7176         072434                  DT11=DT6
7177 072456  043134  001252  043141  DT12:     .WORD   $THE,$TMP10,NOOP1,NOOP15,NOOP2,$TMP5
7178 072472  043302  001246  043314            .WORD   NOOP3,$TMP6,NOOP4,NOOP2,$TMP5,NOOP3,$TMP7,NOOP5,$TMP11
7179 072514  043357  001252  043377            .WORD   NOOP6,$TMP10,NOOP7,NOOP10,$TMP0,$TMP1,$TAB,$TMP2
7180 072534  042740  001240  001242            .WORD   $TAB,$TMP3,$TMP4,0
7181 072544  043134  001252  043141  DT13:     .WORD   $THE,$TMP10,NOOP1,NOOP11,NOOP10,$TMP0,$TMP1,$TAB
7182 072564  001236  042740  001240            .WORD   $TMP2,$TAB,$TMP3,$TMP4,0
7183         072434                  DT14=DT6
7184         072434                  DT15=DT6
7185 072576  001232  001234  042740  DT16:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP5,$TMP3,0
7186         072360                  DT17=DT3
7187 072616  001232  001234  042740  DT20:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7188 072632  042740  001242  000000            .WORD   $TAB,$TMP4,0
7189 072640  001232  001234  042740  DT21:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
7190 072652  066014  001313          DT22:     .WORD   DH3,$CRLF
7191 072656  001232  001234  042740            .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7192 072672  042740  001242  000000            .WORD   $TAB,$TMP4,0
7193 072700  001232  001234  042740  DT23:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7194 072714  042740  001242  000000            .WORD   $TAB,$TMP4,0
7195 072722  044033                  DT24:     .WORD   ILLMS
7196 072724  001232  001234  042740            .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7197 072740  042740  001242  000000            .WORD   $TAB,$TMP4,0
7198 072746  001232  001234  042740  DT25:     .WORD   $TMP0,$TMP1,$TAB,$CRLF,MS1,MS3,$TMP3,MS4,$TMP4,$CRLF
7199 072772  001242  001313  044113            .WORD   $TMP4,$CRLF,MS2,MS3,$TMP5,MS4,$TMP6,$CRLF,$TMP5,0
7200 073016  001232  001234  042740  DT26:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,$CRLF
7201 073036  044223  001313  044241            .WORD   MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
7202 073054  044270  001313  044241            .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
7203 073072  001232  001234  042740  DT27:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7204 073106  001242  001313  044315            .WORD   $TMP4,$CRLF,MS12,$CRLF,MS7,$TMP5,MS10,$TMP7,$CRLF,MS13,0
7205 073134  044456  001272  001313  DT30:     .WORD   MS15,$TMP20,$CRLF,MS14,$CRLF
7206 073146  001232  001234  042740            .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7207 073162  001242  000000                    .WORD   $TMP4,0
7208         073016                  DT31=DT26
7209         073072                  DT32=DT27
7210 073166  001232  001234  042740  DT33:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7211 073202  001313  044101  044120            .WORD   $CRLF,MS1,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP6,$CRLF
7212 073224  044113  044120  001242            .WORD   MS2,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP4,0
7213 073244  001232  001234  042740  DT34:     .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7214 073260  001313  044223  001313            .WORD   $CRLF,MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
7215 073300  044270  001313  044241            .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
7216         073244                  DT35=DT34
7217         073244                  DT36=DT34
7218         073244                  DT37=DT34
7219         073166                  DT40=DT33
7220 073316  001272  001313  066014  DT41:     .WORD   $TMP20,$CRLF,DH3,$CRLF
```

```
073326  001232  001234  042740                  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
073342  042740  001242  000000                  .WORD   $TAB,$TMP4,0
073350  001232  001234  042740          DT42:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
073364  001313  044223  001313                  .WORD   $CRLF,MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$TMP15,$TMP10
073406  001313  044270  001313                  .WORD   $CRLF,MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
        073350                          DT43=DT42
073426  044510  001244  001313          DT44:   .WORD   MS17,$TMP5,$CRLF,MS20,$CRLF,$TMP0,$TMP1,$TAB,$TMP2
073450  001313  044101  044641                  .WORD   $CRLF,MS1,MS21,$CRLF,$TMP3,$CRLF,MS2,MS21,$CRLF,$TMP4,0
073476  044510  001244  001313          DT45:   .WORD   MS17,$TMP5,$CRLF,MS24,$CRLF,$TMP0,$TMP1,$TAB,$TMP2,$TAB
073522  001246  001313  044700                  .WORD   $TMP6,$CRLF,MS22,MS21,$CRLF,$TMP3,$CRLF
073540  044730  044641  001313                  .WORD   MS23,MS21,$CRLF,$TMP4,0
073552  001232  001234  001313          DT46:   .WORD   $TMP0,$TMP1,$CRLF,MS25,MS30,$TMP2,MS31,$TMP3
073572  045136  001242  045145                  .WORD   MS32,$TMP4,MS33,$TMP5,MS34,$TMP6,$CRLF,MS26
073612  045120  001250  045127                  .WORD   MS30,$TMP7,MS31,$TMP10
073622  045136  001254  045145                  .WORD   MS32,$TMP11,MS33,$TMP12,MS34,$TMP13,0
073640  001232  001234  042740          DT47:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS12,MS7,$TMP3,MS10
073662  001242  001313  044353                  .WORD   $TMP4,$CRLF,MS13,0
        073244                          DT50=DT34
073672  001232  001234  042740          DT51:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
073706  001313  045052  045111                  .WORD   $CRLF,MS25,MS27,$TMP4,$CRLF,MS26,MS27,$TMP5,0
        073640                          DT52=DT47
073730  001232  001234  042740          DT53:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
073744  001242  000000                          .WORD   $TMP4,0
073750  001232  001234  042740          DT54:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS1,MS21,$CRLF,$TMP3
073772  001313  044113  044641                  .WORD   $CRLF,MS2,MS21,$CRLF,$TMP3,0
        073640                          DT55=DT47
        073730                          DT56=DT53
        073750                          DT57=DT54
        073730                          DT60=DT53
        073750                          DT61=DT54
        073750                          DT62=DT54
        073750                          DT63=DT54
074006  001232  001234  042740          DT64:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
074022  001242  000000                          .WORD   $TMP4,0
        074006                          DT65=DT64
        073750                          DT66=DT54
        072640                          DT67=DT21
074026  001232  001234  042740          DT70:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS6,$CRLF,MS7,$TMP5
074050  044255  001246  001313                  .WORD   MS10,$TMP6,$CRLF,MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
        074026                          DT71=DT70
074074  001232  001234  042740          DT72:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,0
        073750                          DT73=DT54
        072640                          DT74=DT21
        074026                          DT75=DT70
        074026                          DT76=DT70
        074074                          DT77=DT72
        073750                          DT100=DT54
        074026                          DT101=DT70
        074026                          DT102=DT71
        074026                          DT103=DT70
        073750                          DT104=DT54
        074026                          DT105=DT70
        074074                          DT106=DT72
        074026                          DT107=DT70
        073750                          DT110=DT54
074114  001232  001234  042740          DT111:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
        074114                          DT112=DT111
```

```
        074114                          DT113=DT111
        074114                          DT114=DT111
        074114                          DT115=DT111
        074114                          DT116=DT111
        072360                          DT117=DT3
        072360                          DT120=DT3
        073640                          DT121=DT47
        073244                          DT122=DT34
        073672                          DT123=DT51
074126  001232  001234  042740          DT124:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,$CRLF
074146  044223  001313  044241                  .WORD   MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
074164  044270  001313  044241                  .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,$CRLF,MS37,$CRLF,$TMP10,0
        074126                          DT125=DT124
        074114                          DT126=DT111
        074114                          DT127=DT111
        072360                          DT130=DT3
074212  001232  001234  042740          DT131:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS37,$CRLF,$TMP3
074232  001313  045215  001313                  .WORD   $CRLF,MS40,$CRLF,$TMP4,$CRLF,MS415,$CRLF,$TMP5,0
        074212                          DT132=DT131
074254  001232  001234  042740          DT133:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS41,$CRLF,$TMP3
074274  001313  045275  001313                  .WORD   $CRLF,MS42,$CRLF,$TMP4,$CRLF,MS43,$CRLF,$TMP5
074314  001313  045330  001313                  .WORD   $CRLF,MS44,$CRLF,$TMP6,0
        074254                          DT134=DT133
        074254                          DT135=DT133
        074254                          DT136=DT133
074326  001232  001234  042740          DT137:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TMP10,$TAB,$TMP11,0
        074326                          DT140=DT137
        074326                          DT141=DT137
        074326                          DT142=DT137
        074254                          DT143=DT133
        074254                          DT144=DT133
        074326                          DT145=DT137
        074326                          DT146=DT137
        074254                          DT147=DT133
        074254                          DT150=DT133
        074326                          DT151=DT137
        074254                          DT152=DT133
        074326                          DT153=DT137
074346  001232  001234  042740          DT154:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
        074346                          DT155=DT154
        074254                          DT156=DT133
        074254                          DT157=DT133
        074254                          DT160=DT133
        074254                          DT161=DT133
        074254                          DT162=DT133
        074254                          DT163=DT133
        072360                          DT164=DT3
        072360                          DT165=DT3
        074254                          DT166=DT133
        074254                          DT167=DT133
        074254                          DT170=DT133
        074254                          DT171=DT133
        074254                          DT172=DT133
        074254                          DT173=DT133
        074254                          DT174=DT133
        074254                          DT175=DT133
        074254                          DT176=DT133
```

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7335 074360  001232  001234  037142  DT177:  .WORD   $TMP0,$TMP1,CPSAVE,0
7336         074254                  DT200=DT133
7337         074254                  DT201=DT133
7338         074254                  DT202=DT133
7339         074254                  DT203=DT133
7340         074254                  DT204=DT133
7341         072360                  DT205=DT3
7342         074254                  DT206=DT133
7343         074254                  DT207=DT133
7344         074254                  DT210=DT133
7345 074370  001232  001234  042740  DT211:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,0
7346 074406  001232  001234  042740  DT212:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
7347         074406                  DT213=DT212
7348         074254                  DT214=DT133
7349         000001                          .END
```

```
AADATO  027404
AADONE  027504
AAERR0  027036
AAERR1  027124
AAERR2  027160
AAERR3  027214
AAERR4  027224
AAERR5  027260
AAERR6  027314
AAERR7  027350
AAER10  027132
AAPAT0  027414
AAPAT1  027424
AAPAT2  027434
AAPAT3  027444
AAPAT4  027454
AAPAT5  027464
AAPAT6  027474
AA1     026442
AA10    026562
AA11    026616
AA12    026620
AA13    026636
AA14    026656
AA15    026676
AA16    026704
AA17    026710
AA2     026504
AA20    026714
AA21    026716
AA22    026754
AA23    026756
AA24    026776
AA25    027016
AA26    027024
AA27    027030
AA3     026506
AA4     026524
AA5     026544
AA6     026552
AA7     026560
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
ADONE   005046
AENV  = 000000
AENVM = 000000
AERFLG  004736
AERR1   004740
AERR2   004752
AERR3   005004
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
A05     004654
A1      004526
A11     004526
A12     004542
A2      004600
A3      004604
A4      004652
A5      004656
A6      004704
A7      004730
BBDATO  032526
BBDONE  032656
BBER0   032214
BBER1   032254
BBER10  032234
BBER11  032270
BBER2   032312
BBER3   032330
BBER4   032364
BBER40  032400
BBER5   032420
BBER6   032436
BBER7   032472
BBER8   032510
BBPAT0  032536
BBPAT1  032546
BBPAT2  032556
BBPAT3  032566
BBPAT4  032576
BBPAT5  032606
BBPAT6  032616
BBP10   032636
BBP11   032646
BBP7    032626
BB1     031326
BB10    031512
BB11    031532
BB12    031542
BB13    031550
BB14    031562
BB15    031616
BB16    031642
BB17    031652
BB2     031370
BB20    031664
BB21    031720
BB22    031744
BB23    031764
BB24    031774
BB25    032002
BB26    032014
BB27    032050
BB3     031374
BB30    032072
BB31    032102
BB32    032114
BB33    032150
BB34    032172
BB35    032202
BB4     031412
BB5     031422
BB6     031434
BB7     031470
BDONE   005154
BERR    005110
BERR1   005140
BITSTS  014250
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
B1      005064
B2      005066
B3      005104
CCDATO  031162
CCDONE  031322
CCER0   030524
CCER1   030560
CCER10  031072
CCER11  031110
CCER12  031126
CCER13  031144
CCER2   030616
CCER22  030632
CCER3   030654
CCER4   030672
CCER44  030706
CCER5   030730
CCER50  030574
CCER55  030744
CCER6   030764
CCER7   031020
CCER8   031036
CCER90  030542
CCP0    031172
CCP1    031202
CCP10   031272
CCP11   031302
CCP12   031312
CCP2    031212
CCP3    031222
CCP4    031232
CCP5    031242
CCP6    031252
CCP7    031262
CC1     027510
CC10    027734
CC11    027744
CC12    027752
CC13    027764
CC14    030020
CC15    030044
CC16    030064
CC17    030074
CC18    030102
CC19    030114
CC2     027544
CC20    030150
CC21    030174
CC22    030214
CC23    030224
CC24    030232
CC25    030244
CC26    030300
CC27    030322
CC28    030342
CC29    030352
CC3     027566
CC30    030360
CC31    030372
CC32    030426
CC33    030450
CC34    030470
CC35    030500
CC36    030506
CC37    030520
CC4     027606
CC5     027616
CC6     027624
CC7     027636
CC8     027672
CC9     027714
CDONE   006120
CERR1   005654
CERR2   005752
CERR3   006052
CERR4   006074
CFCC1   043671
CHPNUM  014150
CKSWR = 104407
CNT   = 000214
CPC     006116
CPSAVE  037142
CPSPUR  042566
CPTWO   042604
CR    = 000015
```

SYMBOL TABLE

```
CRLF  = 000200    DD21    033340    DF130 = 071256    DF212 = 072305    DH101 = 066201
C1      005174    DD22    033352    DF131   072176    DF213 = 072305    DH102 = 067073
C15     005222    DD23    033406    DF132 = 072176    DF214 = 072216    DH103 = 067031
C2      005246    DD24    033430    DF133   072216    DF22    071373    DH104 = 067503
C25     005262    DD25    033450    DF134 = 072216    DF23    071405    DH105 = 066201
C3      005310    DD26    033460    DF135 = 072216    DF24    071415    DH106 = 067073
C35     005340    DD27    033466    DF136 = 072216    DF25    071424    DH107 = 067031
C4      005366    DD3     032740    DF137   072242    DF26    071450    DH11  = 066201
C45     005400    DD30    033500    DF14  = 071266    DF27    071475    DH110 = 067503
C5      005426    DD31    033534    DF140 = 072242    DF3     071256    DH111 = 067031
C55     005454    DD32    033556    DF141 = 072242    DF30    071515    DH112   067701
C6      005500    DD33    033576    DF142 = 072242    DF31  = 071450    DH113 = 067031
C65     005514    DD34    033606    DF143 = 072216    DF32  = 071475    DH114 = 067701
C7      005542    DD35    033614    DF144 = 072216    DF33    071531    DH115   070120
C75     005572    DD36    033632    DF145 = 072242    DF34    071557    DH116 = 070120
C8      005620    DD37    033666    DF146 = 072242    DF35  = 071557    DH117 = 066321
C85     005632    DD38    033710    DF147 = 072216    DF36  = 071557    DH12  = 000000
DDDATO  034556    DD39    033730    DF15  = 071266    DF37  = 071557    DH120   070404
DDDONE  034706    DD4     032760    DF150 = 072216    DF4   = 071256    DH121 = 066201
DDER0   033770    DD40    033740    DF151 = 072242    DF40    071603    DH122 = 067431
DDER1   034006    DD41    033746    DF152 = 072216    DF41    071631    DH123 = 067431
DDER10  034424    DD42    033764    DF153 = 072242    DF42    071645    DH124 = 066321
DDER11  034462    DD5     032770    DF154   072252    DF43  = 071645    DH125 = 066321
DDER12  034520    DD6     032776    DF155 = 072252    DF44    071673    DH126 = 066201
DDER2   034044    DD7     033014    DF156 = 072216    DF45    071716    DH127 = 067503
DDER3   034102    DD8     033050    DF157 = 072216    DF46    071743    DH13  = 000000
DDER4   034140    DERR1   006246    DF16    071350    DF47    071775    DH130 = 070404
DDER5   034176    DERR2   006342    DF160 = 072216    DF5     071266    DH131 = 067503
DDER6   034234    DF1     071236    DF161   072256    DF50    072012    DH132 = 067503
DDER7   034272    DF10  = 071266    DF162 = 072216    DF51    072036    DH133   070474
DDER8   034330    DF100 = 072063    DF163 = 072256    DF52  = 071775    DH134 = 070474
DDER9   034366    DF101 = 072110    DF164 = 071256    DF53    072054    DH135 = 070474
DDISP = 177570    DF102 = 072132    DF165 = 071256    DF54    072063    DH136 = 070474
DDONE   006366    DF103 = 072110    DF166 = 072216    DF55  = 071775    DH137   070604
DDP0    034566    DF104 = 072063    DF167 = 072216    DF56  = 072054    DH14  = 066201
DDP1    034576    DF105 = 072110    DF17  = 071256    DF57  = 072063    DH140 = 070604
DDP2    034606    DF106 = 072132    DF170 = 072256    DF6   = 071266    DH141 = 070604
DDP3    034616    DF107 = 072110    DF171 = 072256    DF60  = 072054    DH142 = 070604
DDP4    034626    DF11  = 071266    DF172 = 072216    DF61  = 072063    DH143 = 070474
DDP5    034636    DF110 = 072063    DF173 = 072216    DF62  = 072063    DH144 = 070474
DDP6    034646    DF111   072141    DF174 = 072256    DF63  = 072063    DH145 = 070604
DDP7    034656    DF112 = 072141    DF175 = 072256    DF64    072101    DH146 = 070604
DDP8    034666    DF113 = 072141    DF176 = 072216    DF65  = 072101    DH147 = 067503
DDP9    034676    DF114 = 072141    DF177   072302    DF66  = 072063    DH15  = 066201
DD1     032662    DF115 = 072141    DF2     071246    DF67  = 071367    DH150   070774
DD10    033072    DF116 = 072141    DF20    071357    DF7   = 071266    DH151 = 070604
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DD13    033154    DF120 = 071256    DF202 = 072216    DF72    072132    DH154   071065
DD14    033176    DF121 = 071775    DF203 = 072216    DF73  = 072063    DH155 = 071065
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DD16    033224    DF123 = 072036    DF205 = 071256    DF75  = 072110    DH157 = 067503
DD17    033260    DF124   072145    DF206 = 072216    DF76  = 072110    DH16    066241
DD18    033302    DF125 = 072145    DF207 = 072216    DF77  = 072132    DH160 = 067503
DD19    033322    DF126 = 072141    DF21    071367    DH1     065631    DH161 = 067503
DD2     032716    DF127 = 072141    DF210 = 072216    DH10  = 066201    DH162 = 067503
DD20    033332    DF13    071334    DF211   072305    DH100 = 067503    DH163 = 067503
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SYMBOL TABLE

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DH164 = 066321
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DH166 = 067503
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DH175 = 067503
DH176 = 067503
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DH204 = 067503
DH205 = 066321
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DH207 = 067503
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DH212 = 066201
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DH214 = 067503
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DH23    066534
DH24    066672
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DH26    067073
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DH43  = 067264
DH44  = 000000
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DH46    067405
DH47  = 067366
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DH50    067431
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DH54    067503
DH55  = 066201
DH56  = 067073
DH57  = 067503
DH6   = 066201
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DH62  = 067503
DH63  = 067503
DH64    067613
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DH66  = 067503
DH67  = 066201
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DH73  = 067503
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DH77  = 067073
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DISPRE  000174
DPAT3   017500
DSWR  = 177570
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DT10  = 072434
DT100 = 073750
DT101 = 074026
DT102 = 074026
DT103 = 074026
DT104 = 073750
DT105 = 074026
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DT122 = 073244
DT123 = 073672
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DT127 = 074114
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DT131   074212
DT132 = 074212
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DT135 = 074254
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DT137   074326
DT14  = 072434
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DT141 = 074326
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DT162 = 074254
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DT166 = 074254
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DT202 = 074254
DT203 = 074254
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DT206 = 074254
DT207 = 074254
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DT211   074370
DT212   074406
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DT27    073072
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DT37  = 073244
DT4   = 072360
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DT44    073426
DT45    073476
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DT47    073640
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DT50  = 073244
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DT54    073750
DT55  = 073640
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DT57  = 073750
DT6     072434
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DT7   = 072434
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DT71  = 074026
DT72    074074
DT73  = 073750
DT74  = 072640
DT75  = 074026
DT76  = 074026
DT77  = 074074
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D2      006176
D3      006200
D4      006204
D5      006216
D6      006232
D7      006242
D8      006312
D9      006324
EDONE   006532
EEDATO  035410
EEDONE  035472
EEER0   035202
EEER1   035220
EEER2   035256
EEER3   035314
EEER4   035352
EEP0    035420
EEP1    035432
EEP2    035442
EEP3    035452
EEP4    035462
EERR0   006450
EERR1   006466
EERR2   006502
EE1     034712
EE10    035142
EE11    035152
EE12    035160
EE13    035176
EE2     034746
EE3     034770
EE4     035010
EE5     035020
EE6     035026
EE7     035044
EE8     035100
EE9     035122
EMTVEC= 000030
EM1     045352
EM10  = 045560
EM100   054462
EM101   054522
EM102   054646
EM103   054720
EM104   055023
EM105   055064
EM106   055211
EM107   055264
EM11    045701
EM110   055370
EM111   055432
EM112 = 055432
EM113   055534
EM114 = 055534
EM115 = 055432
EM116 = 055534
EM117   055636
EM12  = 000000
EM120   055772
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EM121	056126	EM203	064671	EM73	053670	FFP0	036010	GFLAG1	015132
EM122	056245	EM204	065026	EM74	053730	FFP1	036020	GFLAG2	015134
EM123	056344	EM205	065163	EM75	054161	FFP2	036030	GOR0	015166
EM124	056405	EM206	065230	EM76	054304	FFP3	036040	GOR1	015170
EM125	056500	EM207	065275	EM77	054406	FFP4	036050	GOR2	015172
EM126	056570	EM21	046712	EPENDS	036512	FF1	035476	GOR3	015174
EM127	056777	EM210	065417	ERM10	037502	FF10	035656	GPAT00	015136
EM13 =	000000	EM211 =	045560	ERROR =	104000	FF11	035666	GPAT01	015140
EM130	057272	EM212 =	045614	ERRVEC=	000004	FF2	035532	GPAT02	015142
EM131	057312	EM213 =	045646	ERTYPE	042010	FF3	035554	GPAT03	015144
EM132	057352	EM214	065474	ERT1	042174	FF4	035562	GPAT10	015146
EM133	057412	EM22	047043	ERT2	042360	FF5	035572	GPAT11	015150
EM134	057451	EM23 =	047043	ERT3	042364	FF6	035626	GPAT12	015152
EM135	057510	EM24 =	047043	ERT4	042374	FF7	035650	GPAT13	015154
EM136	057547	EM25	047130	ERT5	042406	FPSMS	043057	GRESET	014346
EM137 =	057412	EM26	047243	E1	006406	FPSPUR	042534	GSETUP	014270
EM14	045762	EM27 =	047243	E2	006412	FPVECT=	000244	GSUM	014500
EM140 =	057451	EM3	045453	E3	006422	FXDAT0	010416	GS1	014320
EM141 =	057510	EM30	047311	E4	006424	FXDAT1	010420	GTSWR =	104406
EM142 =	057547	EM31	047363	FDATI0	010352	FXDAT2	010422	G1	012176
EM143	057606	EM32 =	047363	FDATI1	010354	FXDAT3	010424	G10	012504
EM144	057641	EM33	047431	FDATI2	010356	FXDAT4	010426	G11	012506
EM145 =	057606	EM34	047472	FDATI3	010360	FXDAT5	010430	G12	012600
EM146 =	057641	EM35	047574	FDATI4	010362	FXDAT6	010432	G13	012632
EM147	057674	EM36	047676	FDATI5	010364	FXDAT7	010434	G14	012634
EM15	046105	EM37	047777	FDATI6	010366	F1	006536	G15	012726
EM150	057674	EM4	045520	FDATI7	010370	F10	006760	G16	012760
EM151	057674	EM40	050100	FDATO0	010374	F11	006762	G17	012762
EM152	057726	EM41	050251	FDATO1	010376	F12	007000	G2	012230
EM153	057726	EM42	050306	FDATO2	010400	F13	007032	G20	013054
EM154	057760	EM43	050427	FDATO3	010402	F135	007012	G21	013106
EM155	060212	EM44	050550	FDATO4	010404	F14	007042	G22	013110
EM156	060445	EM45 =	050550	FDATO5	010406	F15	007052	G23	013202
EM157	060662	EM46	050613	FDATO6	010410	F16	007062	G24	013234
EM16	046230	EM47	050671	FDATO7	010412	F17	007072	G25	013236
EM160	061101	EM5	045560	FDONE	010436	F2	006574	G26	013330
EM161	061306	EM50	051007	FECMS	043123	F20	007102	G27	013362
EM162	061513	EM51	051105	FERR0	007144	F21	007112	G3	012232
EM163	061560	EM52	051146	FERR1	007202	F22	007122	G30	013364
EM164	061625	EM53	051267	FERR10	007762	F23	007140	G31	013456
EM165	061672	EM54	051464	FERR11	010016	F3	006614	G32	013510
EM166	061737	EM55	051530	FERR2	007300	F4	006616	G33	013512
EM167	062047	EM56	051651	FERR20	010036	F5	006634	G34	013604
EM17	046301	EM57	052046	FERR21	010154	F6	006710	G35	013636
EM170	062306	EM6	045614	FERR25	010204	F7	006740	G36	013640
EM171	062416	EM60	052112	FERR26	010322	GADR	015206	G37	013732
EM172	062655	EM61	052307	FERR3	007340	GAND0	015156	G4	012324
EM173	063114	EM62	052353	FERR4	007332	GAND1	015160	G40	013764
EM174	063353	EM63	052545	FERR5	007436	GAND2	015162	G41	013766
EM175	063612	EM64	052737	FERR6	007472	GAND3	015164	G42	014060
EM176	064051	EM65 =	052737	FERR7	007626	GCMP	014366	G43	014112
EM177	064206	EM66	053073	FER2	007304	GDATO0	015176	G44	014114
EM2	045407	EM67	053136	FFDATO	036000	GDATO1	015200	G5	012356
EM20	046534	EM7	045646	FFDONE	036060	GDATO2	015202	G6	012360
EM200	064242	EM70	053367	FFERO	035670	GDATO3	015204	G7	012452
EM201	064377	EM71	053512	FFER1	035704	GDONE	015210	HADR	015744
EM202	064534	EM72	053614	FFER2	035742	GERR1	014414	HAIR	016020

HA1W	015750	IPAT13	011256	KBUF3	017460	MDAT00	020350	MS44	045330
HA2R	016030	IPAT20	011260	KDATI0	017442	MDAT01	020352	MS5	044161
HA2W	015760	IPAT21	011262	KDATI1	017444	MDAT02	020354	MS6	044223
HA3R	016040	IPAT22	011264	KDATI2	017446	MDAT03	020356	MS7	044241
HA3W	015770	IPAT23	011266	KDATI3	017450	MDONE	020360	M1	020034
HA4R	016050	I1	010450	KDAT00	017462	MERR0	020204	M15	020054
HA4W	016000	I10	010632	KDAT01	017464	MERR1	020242	M2	020060
HA5R	016060	I105	010640	KDAT02	017466	MERR2	020156	M3	020062
HA5W	016010	I106	010634	KDAT03	017470	MERR3	020270	M4	020064
HCLR	015674	I11	010642	KDONE	017502	MNUMBE=	000214	M5	020120
HCLR1	015704	I12	010650	KERR0	017324	MNUM0	044535	M6	020124
HCMP	015636	I13	010664	KERR1	017370	MNUM1	044543	M7	020134
HCMP1	015656	I14	010726	KERR2	017414	MNUM2	044550	M8	020144
HCMP2	015666	I15	010730	KPAT0	017472	MNUM3	044555	M9	020154
HDAT1	016070	I16	010732	KPAT1	017474	MNUM4	044564	NDATI0	021056
HDAT2	016100	I17	010750	KPAT2	017476	MNUM5	044572	NDATI1	021060
HDAT3	016110	I2	010466	K1	017216	MPAT10	020330	NDATI2	021062
HDAT4	016120	I20	011010	K10	017344	MPAT11	020332	NDATI3	021064
HDAT5	016130	I21	011024	K2	017242	MPAT12	020334	NDAT00	021014
HDONE	016140	I22	011030	K3	017244	MPAT13	020336	NDAT01	021016
HERROR	015712	I23	011044	K4	017246	MPAT20	020340	NDAT02	021020
HFLAG	015746	I3	010534	K5	017302	MPAT21	020342	NDAT03	021022
HSTD	015560	I4	010536	K6	017310	MPAT22	020344	NDONE	021066
HT =	000011	I5	010540	K7	017322	MPAT23	020346	NERR0	020556
H1	015222	I6	010564	LDATI0	020006	MS1	044101	NERR1	020656
H10	015464	I7	010600	LDATI1	020010	MS10	044255	NERR10	020610
H11	015516	JBUF0	017144	LDATI2	020012	MS11	044270	NERR11	020622
H12	015550	JBUF1	017146	LDATI3	020014	MS12	044315	NERR2	020712
H2	015242	JBUF2	017150	LDAT00	020020	MS13	044353	NERR20	020664
H3	015252	JBUF3	017152	LDAT01	020022	MS14	044370	NERR3	020722
H4	015324	JDATI0	017154	LDAT02	020024	MS15	044456	NERR4	020732
H5	015346	JDATI1	017156	LDAT03	020026	MS16	044503	NERR5	020742
H6	015400	JDATI2	017160	LDONE	020030	MS17	044510	NERR6	020766
H7	015432	JDATI3	017162	LD1	043567	MS2	044113	NOOP1	043141
IBSAVE	037144	JDAT00	017164	LD2	043617	MS20	044600	NOOP10	043417
IDATI0	011300	JDAT0	017174	LERR1	017642	MS21	044641	NOOP11	043510
IDATI1	011302	JDAT01	017166	LERR2	017714	MS22	044700	NOOP15	043170
IDATI2	011304	JDAT02	017170	LERR3	017666	MS23	044730	NOOP2	043265
IDATI3	011306	JDAT03	017172	LF =	000012	MS24	044757	NOOP3	043302
IDAT00	011270	JDAT1	017176	LFIEX1	042745	MS25	045052	NOOP4	043314
IDAT01	011272	JDAT2	017200	LFIEX2	043015	MS26	045074	NOOP5	043331
IDAT02	011274	JDAT3	017202	LFPS1	043554	MS27	045111	NOOP6	043357
IDAT03	011276	JDONE	017204	LOOP	004456	MS3	044120	NOOP7	043377
IDONE	011310	JERR0	017024	LPAT10	017764	MS30	045120	NPAT10	021046
IERR0	011050	JERR1	017072	LPAT11	017766	MS31	045127	NPAT11	021050
IERR1	011132	JERR2	017116	LPAT12	017770	MS32	045136	NPAT12	021052
IERR2	011152	J1	016716	LPAT13	017772	MS33	045145	NPAT13	021054
IERR25	011174	J10	017044	LPAT20	017774	MS34	045154	NPAT20	021034
IERR3	011224	J2	016742	LPAT21	017776	MS35	045163	NPAT21	021036
IERR4	011200	J3	016744	LPAT22	020000	MS36	045170	NPAT22	021040
ILLMS	044033	J4	016746	LPAT23	020002	MS37	045177	NPAT23	021042
ILL1	043727	J5	017002	L1	017514	MS4	044147	NULL	042737
ILL2	043772	J6	017010	L2	017554	MS40	045215	N1	020364
IOTVEC=	000020	J7	017022	L3	017556	MS41	045251	N10	020516
IPAT10	011250	KBUF0	017452	L4	017560	MS415	045231	N11	020526
IPAT11	011252	KBUF1	017454	L5	017630	MS42	045275	N12	020530
IPAT12	011254	KBUF2	017456	L6	017636	MS43	045313	N13	020544

SYMBOL TABLE

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%2      020410      PDAT03  022244      QERR0   022414      SERR7   016562      TAB    = 000011
%3      020412      PDONE   022246      QERR1   022660      SETD1   043705      TBITVE= 000014
%4      020414      PERR0   021714      QERR11  022424      SETF1   043677      TDATI0  012116
%5      020432      PERR1   022134      QERR12  022442      SETI1   043713      TDATI1  012120
%6      020442      PERR10  021734      QERR13  022460      SETL1   043721      TDATI2  012122
%7      020452      PERR11  021744      QERR14  022476      SPACE   042742      TDATI3  012124
%8      020470      PERR12  021762      QERR15  022514      SPAT10  016664      TDATO0  012106
%9      020502      PERR13  022000      QERR16  022524      SPAT11  016666      TDATO1  012110
ODATI0  021562      PERR14  022016      QERR17  022532      SPAT12  016670      TDATO2  012112
ODATI1  021564      PERR15  022034      QERR2   022614      SPAT13  016672      TDATO3  012114
ODATI2  021566      PERR16  022044      QERR20  022560      STACK = 001100      TDONE   012126
ODATI3  021570      PERR17  022052      QERR21  022570      START   003616      TERR0   011674
ODATO0  021520      PERR2   022162      QERR22  022576      STFS1   043630      TERR1   011756
ODATO1  021522      PERR20  022100      QERR3   022624      STKLMT= 177774      TERR2   011776
ODATO2  021524      PERR21  022110      QERR4   022632      STST1   043760      TERR25  012012
ODATO3  021526      PERR22  022116      QPAT10  022706      ST1     043643      TERR3   012042
ODONE   021572      PFECAD  042506      QPAT11  022710      ST2     043660      TERR4   012024
OERR0   021262      PFECDH  042456      QPAT12  022712      SWR     001140      TKVEC = 000060
OERR1   021362      PFECEM  042422      QPAT13  022714      SWREG   000176      TOCTNM  042522
OERR10  021314      PFECFT  042516      QPAT20  022716      SW0   = 000001      TPAT10  012066
OERR11  021326      PFECWS  042412      QPAT21  022720      SW00  = 000001      TPAT11  012070
OERR2   021416      PIRQ   = 177772      QPAT22  022722      SW01  = 000002      TPAT12  012072
OERR20  021370      PIRQVE= 000240      QPAT23  022724      SW02  = 000004      TPAT13  012074
OERR3   021426      POWERM  042672      Q1      022252      SW03  = 000010      TPAT20  012076
OERR4   021436      PPAT10  022216      Q10     022410      SW04  = 000020      TPAT21  012100
OERR5   021446      PPAT11  022220      Q2      022274      SW05  = 000040      TPAT22  012102
OERR6   021472      PPAT12  022222      Q3    = 022276      SW06  = 000100      TPAT23  012104
OPAT10  021552      PPAT13  022224      Q4      022300      SW07  = 000200      TPVEC = 000064
OPAT11  021554      PROGNU= 000001      Q5      022322      SW08  = 000400      TRAPVE= 000034
OPAT12  021556      PR0    = 000000      Q6      022344      SW09  = 001000      TRTVEC= 000014
OPAT13  021560      PR1    = 000040      Q7      022354      SW1   = 000002      TST1    004456
OPAT20  021536      PR2    = 000100      Q8      022366      SW10  = 002000      TST10   011312
OPAT21  021540      PR3    = 000140      Q9      022402      SW11  = 004000      TST11   012130
OPAT22  021542      PR4    = 000200      RDCHR = 104410      SW12  = 010000      TST12   015212
OPAT23  021544      PR5    = 000240      RESREG= 104412      SW13  = 020000      TST13   016142
OPAT24  021546      PR6    = 000300      RESVEC= 000010      SW14  = 040000      TST14   016706
01      021072      PR7    = 000340      RSETUP= 104413      SW15  = 100000      TST15   017206
010     021222      PS     = 177776      R6     =%000006     SW2   = 000004      TST16   017504
011     021232      PSW    = 177776      R7     =%000007     SW3   = 000010      TST17   020032
012     021234      PWRVEC= 000024      SADR    016660      SW4   = 000020      TST2    005050
013     021250      P1      021576      SAVREG= 104411      SW5   = 000040      TST20   020362
014     021260      P2      021620      SCOPE  = 000004      SW6   = 000100      TST21   021070
02      021116      P3     = 021622      SDATO0  016674      SW7   = 000200      TST22   021574
03      021120      P4      021624      SDATO1  016676      SW8   = 000400      TST23   022250
04      021122      P5      021646      SDATO2  016700      SW9   = 001000      TST24   022750
05      021140      P6      021670      SDATO3  016702      S1      016144      TST25   024110
06      021150      P7      021700      SDONE   016704      S10     016322      TST26   024706
07      021160      P8      021710      SERR0   016364      S11     016346      TST27   025522
08      021174      QDATI0  022736      SERR1   016574      S12     016356      TST3    005156
09      021206      QDATI1  022740      SERR10  016404      S2      016204      TST30   026132
PDATI0  022226      QDATI2  022742      SERR15  016464      S3      016206      TST31   026440
PDATI1  022230      QDATI3  022744      SERR2   016524      S4      016212      TST32   027506
PDATI2  022232      QDATO0  022726      SERR20  016504      S5      016236      TST33   031324
PDATI3  022234      QDATO1  022730      SERR3   016550      S6      016246      TST34   032660
PDATO0  022236      QDATO2  022732      SERR4   016442      S7      016254      TST35   034710
PDATO1  022240      QDATO3  022734      SERR5   016626      S8      016314      TST36   035474
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TST6	006534	UPAT43	024072	XPAT00	025470	Y5	025702	$DDW1	001404
TST7	010440	UROM1	024102	XPAT01	025472	Y6	025704	$DDW10	001426
TYPDS =	104405	UROM2	024104	XPAT02	025474	Y7	025720	$DDW11	001430
TYPE =	104401	UROM3	024106	XPAT03	025476	ZDAT00	026376	$DDW12	001432
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TYPON =	104404	UTMP2	024100	XPAT12	025504	ZDAT02	026402	$DDW14	001436
TYPOS =	104403	U0	022766	XPAT13	025506	ZDAT03	026404	$DDW15	001440
T1	011314	U1	023016	XPAT20	025510	ZDONE	026436	$DDW2	001406
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T105	011470	U11	023376	XPAT22	025514	ZERR2	026344	$DDW4	001412
T11	011472	U12	023430	XPAT23	025516	ZFLAG	026370	$DDW5	001414
T12	011500	U13	023446	XTMP	025456	ZPAT00	026406	$DDW6	001416
T13	011514	U14	023500	X1	024710	ZPAT01	026410	$DDW7	001420
T14	011556	U15	023534	X10	025112	ZPAT02	026412	$DDW8	001422
T15	011560	U16	023536	X11	025126	ZPAT03	026414	$DDW9	001424
T16	011562	U2	023066	X12	025166	ZPAT10	026416	$DEVCT	001326
T17	011600	U3	023120	X13	025212	ZPAT11	026420	$DEVM	001374
T2	011340	U4	023170	X14	025220	ZPAT12	026422	$DIAGN	036442
T20	011640	U5	023222	X15	025234	ZPAT13	026424	$DTBL	040604
T21	011654	U6	023272	X16	025274	ZPAT20	026426	$ENDAD	036432
T22	011656	U7	023324	X17	025320	ZPAT21	026430	$ENDCT	036124
T23	011670	WDAP00	024674	X2	024750	ZPAT22	026432	$ENULL	036506
T3	011406	WDAT01	024676	X20	025326	ZPAT23	026434	$ENV	001336
T4	011410	WDAT02	024700	X21	025342	ZTMP1	026372	$ENVM	001337
T5	011412	WDAT03	024702	X3	024774	ZTMP2	026374	$EOP	036060
T6	011436	WDONE	024704	X4	025002	Z1	026154	$EOPCT	036112
T7	011452	WPAT00	024664	X5	025020	Z2	026202	$ERFLG	001103
UDONE	024110	WPAT01	024666	X6	025060	Z3	026226	$ERMAX	001115
UERR0	023554	WPAT02	024670	X7	025104	Z4	026234	$ERROR	037146
UERR1	023600	WPAT03	024672	YDAT00	026070	Z5	026246	$ERRPC	001116
UERR10	023606	WSETUP	024632	YDAT01	026072	Z6	026300	$ERRTB	001442
UERR11	023650	W1	024112	YDAT02	026074	$APTHD	003602	$ERTTL	001112
UERR2	023664	W10	024334	YDAT03	026076	$ATYC	040650	$ESCAP	001304
UERR20	023672	W11	024362	YDONE	026130	$ATY1	040624	$ETABL	001336
UERR21	023734	W12	024416	YERR1	025730	$ATY3	040632	$ETEND	001442
UERR3	023750	W13	024442	YERR2	025772	$ATY4	040642	$FATAL	001320
UERR4	024000	W14	024456	YERR3	026034	$AUTOB	001134	$FFLG	041070
UFLAG	024074	W15	024504	YFLAG	026060	$BASE	001372	$FILLC	001156
UPAT00	024024	W16	024544	YPAT00	026100	$BDADR	001122	$FILLS	001155
UPAT01	024026	W17	024570	YPAT01	026102	$BDDAT	001126	$GDADR	001120
UPAT02	024030	W2	024146	YPAT02	026104	$BELL	001306	$GDDAT	001124
UPAT03	024032	W20	024604	YPAT03	026106	$CDW1	001376	$GET42	036404
UPAT10	024034	W3	024172	YPAT10	026110	$CDW2	001400	$GTSWR	041142
UPAT11	024036	W4	024210	YPAT11	026112	$CHARC	040140	$HD =	000003
UPAT12	024040	W5	024240	YPAT12	026114	$CKSWR	041072	$HIBTS	003602
UPAT13	024042	W6	024300	YPAT13	026116	$CLR.T	036422	$ICNT	001104
UPAT20	024044	W7	024324	YPAT20	026120	$CMTAG	001100	$ILLUP	042002
UPAT21	024046	XAPT11	025502	YPAT21	026122	$CM1 =	000024	$INTAG	001135
UPAT22	024050	XDAT00	025460	YPAT22	026124	$CM2 =	000050	$ITEMB	001114
UPAT23	024052	XDAT01	025462	YPAT23	026126	$CM3 =	000024	$LF	001314
UPAT30	024054	XDAT02	025464	YTMP1	026062	$CM4 =	000024	$LFLG	041067
UPAT31	024056	XDAT03	025466	YTMP2	026064	$CNTLG	041511	$LOOP	036500
UPAT32	024060	XDONE	025520	YTMP3	026066	$CNTLU	041504	$LPADR	001106
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SYMBOL TABLE

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$MADR3  001360     $PASTM  003610     $REG5   001174     $TMP1   001234     $TRP  = 000014
$MADR4  001364     $PWRAD  041764     $REG6   001176     $TMP10  001252     $TRPAD  041574
$MAIL   001316     $PWRDN  041624     $REG7   001200     $TMP11  001254     $TSTM   003606
$MAMS1  001346     $PWRMG  041760     $RESRE  037542     $TMP12  001256     $TSTNM  001102
$MAMS2  001352     $PWRUP  041676     $RTNAD  036502     $TMP13  001260     $TYPDS  040400
$MAMS3  001356     $QUES   001312     $RTRN   036476     $TMP14  001262     $TYPE   037600
$MAMS4  001362     $RDCHR  041354     $SAVRE  037504     $TMP15  001264     $TYPEC  040012
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$MFLG   041066     $REGAD  001160     $SCOPE  036516     $TMP17  001270     $TYPOC  040170
$MNEW   041527     $REG0   001162     $SETUP= 000137     $TMP2   001236     $TYPON  040204
$MSGAD  001332     $REG1   001164     $STUP = 177777     $TMP20  001272     $TYPOS  040144
$MSGLG  001334     $REG10  001202     $SVLAD  037070     $TMP21  001274     $UNIT   001330
$MSGTY  001316     $REG11  001204     $SVPC = 003602     $TMP22  001276     $UNITM  003612
$MSWR   041516     $REG12  001206     $SWR  = 177400     $TMP23  001300     $USWR   001342
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$MTYP2  001353     $REG14  001212     $SWRMK= 000000     $TMP4   001242     $VECT2  001370
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$MXCNT  037140     $REG17  001220     $TBIT   036504     $TMP7   001250     $XTSTR  036642
$NULL   001154     $REG2   001166     $TERM = 000030     $TN   = 000037     $$GET4= 000001
$NWTST= 000001     $REG20  001222     $TESTN  001322     $TPB    001152     $OFILL  040375
$OCNT   040374     $REG21  001224     $THE    043134     $TPFLG  001157     .RSET   042622
$OMCDE  040376     $REG22  001226     $TIMES  001302     $TPS    001150     .$X   = 003602
$OVER   037124     $REG23  001230     $TKB    001146

. ABS.  074420     000
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VIRTUAL MEMORY USED:  59424 WORDS  ( 233 PAGES)
DYNAMIC MEMORY:  20034 WORDS  ( 77 PAGES)
ELAPSED TIME:  02:44:50
CKFPAD.BIN,CKFPAD/CR/-SP/NL:TOC=CKFPAD.MLB/ML,CKFPAD.P11
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SYMBOL CROSS REFERENCE

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AADONE	027504	49-5342	49-5362	49-5374	49-5380	49-5388	49-5394	49-5400	49-5406	#49-5415
AAERRC	027036	49-5254	#49-5346							
AAERR1	027124	49-5273	#49-5369							
AAERR2	027160	49-5275	#49-5375							
AAERR3	027214	49-5305	#49-5381							
AAERR4	027224	49-5307	#49-5383							
AAERR5	027260	49-5307	#49-5389							
AAERR6	027314	49-5338	#49-5395							
AAERR7	027350	49-5340	#49-5401							
AAER10	027132	#49-5370	49-5382							
AAPATC	027414	49-5255	49-5283	49-5317	49-5370	49-5376	49-5384	49-5390	49-5396	49-5402
		#49-5408								
AAPAT1	027424	49-5259	49-5286	49-5371	49-5377	49-5385	49-5391	#49-5409		
AAPAT2	027434	49-5264	49-5295	49-5333	49-5369	49-5375	#49-5410			
AAPAT3	027444	49-5268	49-5291	49-5381	49-5383	49-5389	#49-5411			
AAPAT4	027454	49-5300	#49-5412							
AAPAT5	027464	49-5321	49-5395	49-5401	#49-5413					
AAPAT6	027474	49-5329	49-5398	49-5404	#49-5414					
AA1	026442	#49-5251								
AA10	026562	#49-5280								
AA11	026616	49-5285	#49-5287							
AA12	026620	#49-5289								
AA13	026636	#49-5293	49-5310							
AA14	026656	#49-5298	49-5308							
AA15	026676	#49-5303	49-5306							
AA16	026704	49-5304	#49-5306							
AA17	026710	49-5299	#49-5308							
AA2	026504	49-5258	#49-5260							
AA20	026714	49-5294	#49-5310							
AA21	026716	#49-5314								
AA22	026754	49-5320	#49-5322							
AA23	026756	#49-5324								
AA24	026776	#49-5331	49-5341							
AA25	027016	#49-5336	49-5339							
AA26	027024	49-5337	#49-5339							
AA27	027030	49-5332	#49-5341							
AA3	026506	#49-5262								
AA4	026524	#49-5266	49-5276							
AA5	026544	#49-5271	49-5274							
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AA7	026560	49-5267	#49-5276							
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		*32-2894	32-2903	*32-2937	32-2946	*33-3182	33-3182	*33-3182	33-3182	*33-3182
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SYMBOL CROSS REFERENCE

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		*41-4174	41-4179	*42-4307	*42-4313	42-4317	*43-4428	*43-4436	43-4440	*44-4584
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		*48-5178	*48-5180	48-5184	*49-5257	*49-5260	49-5263	*49-5284	*49-5287	49-5290
		*49-5318	*49-5322	49-5328	*50-5433	*50-5435	50-5438	*50-5461	*50-5463	50-5466
		*50-5487	*50-5491	50-5495	*50-5516	*50-5520	50-5524	*50-5547	*50-5549	50-5552
		*50-5575	*50-5577	50-5580	*51-5693	*51-5695	51-5698	*51-5715	*51-5717	51-5720
		*51-5741	*51-5746	51-5750	*51-5764	*51-5768	51-5772	*51-5795	*51-5797	51-5800
		*51-5816	*51-5818	51-5821	*52-5903	*52-5905	52-5908	*52-5932	*52-5934	52-5937
		*52-5954	*52-5956	52-5959	*52-5976	*52-5978	52-5981	*52-6004	*52-6006	52-6009
		*52-6032	*52-6034	52-6037	*52-6061	*52-6063	52-6066	*53-6127	*53-6129	53-6132
		*53-6156	*53-6158	53-6161	*54-6211	*54-6213	54-6216	*54-6233	*54-6235	54-6238
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		*32-2946	32-2960	*33-3184	33-3184	*33-3185	33-3185	*34-3371	*34-3381	34-3396
AC2	%000002	#19-1787	*33-3186	33-3186	*33-3187	33-3187	*34-3372	*34-3382	34-3397	
AC3	-%000003	#19-1788	*33-3188	33-3188	*33-3189	33-3189	*34-3373	*34-3383	34-3398	
AC4	-%000004	#19-1789	*33-3190	33-3190	*33-3191	33-3191	*34-3374	*34-3384	34-3399	
AC5	%000005	#19-1790	*33-3192	33-3192	*33-3193	33-3193	*34-3375	*34-3385	34-3400	
AC6	=%000006	#19-1791	35-3507							
AC7	-%000007	#19-1792	35-3477							
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ADDW1	- 000000	20-1795	20-1795							
ADDW10	= 000000	20-1795	20-1795							
ADDW11	= 000000	20-1795	20-1795							
ADDW12	= 000000	20-1795	20-1795							
ADDW13	000000	20-1795	20-1795							
ADDW14	= 000000	20-1795	20-1795							
ADDW15	= 000000	20-1795	20-1795							
ADDW2	= 000000	20-1795	20-1795							
ADDW3	= 000000	20-1795	20-1795							
ADDW4	= 000000	20-1795	20-1795							
ADDW5	- 000000	20-1795	20-1795							
ADDW6	= 000000	20-1795	20-1795							
ADDW7	= 000000	20-1795	20-1795							
ADDW8	= 000000	20-1795	20-1795							
ADDW9	= 000000	20-1795	20-1795							
ADEVCT	= 000000	20-1795	20-1795							
ADEVM	= 000000	20-1795	20-1795							
ADONE	005046	25-1886	25-1890	25-1898	25-1906	25-1919	25-1932	#25-1938		
AENV	= 000000	20-1795	20-1795							
AENVM	- 000000	20-1795	20-1795							
AERFLG	004736	*25-1836	*25-1867	25-1873	25-1885	#25-1900	75-7167			

SYMBOL CROSS REFERENCE
SYMBOL VALUE REFERENCES

AERR1	004740	25-1839	#25-1903							
AERR2	004752	25-1840	#25-1909							
AERR3	005004	25-1844	#25-1922							
AFATAL =	000000	20-1795	20-1795							
AMADR1 =	000000	20-1795	20-1795							
AMADR2	000000	20-1795	20-1795							
AMADR3 =	000000	20-1795	20-1795							
AMADR4 =	000000	20-1795	20-1795							
AMAMS1 =	000000	20-1795	20-1795							
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AMAMS3 =	000000	20-1795	20-1795							
AMAMS4 =	000000	20-1795	20-1795							
AMSGAD	000000	20-1795	20-1795							
AMSGLG	000000	20-1795	20-1795							
AMSGTY =	000000	20-1795	20-1795							
AMTYP1 =	000000	20-1795	20-1795							
AMTYP2 =	000000	20-1795	20-1795							
AMTYP3 =	000000	20-1795	20-1795							
AMTYP4 =	000000	20-1795	20-1795							
APASS =	000000	20-1795	20-1795							
APRIOR =	000000	20-1795								
APTCSU =	000040	59-6277	#62-6283							
APTENV =	000001	57-6273	59-6277	62-6283	#62-6283					
APTSIZ =	000200	24-1811	#62-6283							
APTSPO =	000100	59-6277	62-6283	#62-6283						
ASWREG =	000000	20-1795	20-1795							
ATESTN =	000000	20-1795	20-1795							
AUNIT =	000000	20-1795	20-1795							
AUSWR =	000000	20-1795	20-1795							
AVECT1 =	000000	20-1795	20-1795							
AVECT2 =	000000	20-1795	20-1795							
A05	004654	25-1874	#25-1883							
A1	004526	25-1837	#25-1848	25-1864	25-1877					
A11	004526	#25-1849	25-1909	25-1922						
A12	004542	#25-1854	25-1911	25-1924						
A2	004600	#25-1864	25-1883							
A3	004604	25-1862	#25-1867							
A4	004652	#25-1881								
A5	004656	25-1865	#25-1885							
A6	004704	25-1888	#25-1892							
A7	004730	25-1895	#25-1897							
BBDATO	032526	51-5697	51-5719	51-5725	51-5749	51-5771	51-5777	51-5799	51-5820	51-5844
		51-5853	51-5859	51-5868	#51-5877					
BBDONE	032656	51-5830	51-5835	51-5840	51-5846	51-5855	51-5861	51-5870	#51-5888	
BBER0	032214	51-5689	51-5702	51-5736	51-5809	51-5829	#51-5831			
BBER1	032254	51-5703	#51-5841							
BBER10	032234	51-5759	51-5788	#51-5836						
BBER11	032270	#51-5843	51-5849	51-5873	51-5876					
BBER2	032312	51-5730	#51-5847							
BBER3	032330	51-5732	#51-5850							
BBER4	032364	51-5755	#51-5856							
BBER40	032400	#51-5858	51-5864							

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
BBER5	032420	51-5782	#51-5862							
BBER6	032436	51-5784	#51-5865							
BBER7	032472	51-5805	#51-5871							
BBER8	032510	51-5826	#51-5874							
BBPAT0	032536	51-5740	51-5751	51-5856	51-5857	#51-5878				
BBPAT1	032546	51-5694	51-5716	51-5745	51-5767	51-5796	51-5817	51-5843	51-5852	51-5858
		51-5867	51-5872	#51-5879						
BBPAT2	032556	51-5692	51-5699	51-5841	51-5842	#51-5880				
BBPAT3	032566	51-5763	51-5778	51-5862	51-5865	#51-5881				
BBPAT4	032576	51-5714	51-5726	51-5847	51-5850	#51-5882				
BBPAT5	032606	51-5794	51-5871	#51-5883						
BBPAT6	032616	51-5815	51-5822	51-5874	51-5875	#51-5884				
BBP10	032636	51-5721	51-5848	51-5851	#51-5886					
BBP11	032646	51-5801	#51-5887							
BBP7	032626	51-5773	51-5863	51-5866	#51-5885					
BB1	031326	#51-5686								
BB10	031512	#51-5723	51-5733							
BB11	031532	#51-5728	51-5731							
BB12	031542	51-5729	#51-5731							
BB13	031550	51-5724	#51-5733							
BB14	031562	51-5735	#51-5738							
BB15	031616	51-5739	#51-5746							
BB16	031642	#51-5753	51-5756							
BB17	031652	51-5754	#51-5756							
BB2	031370	51-5690	#51-5695							
BB20	031664	51-5758	#51-5761							
BB21	031720	51-5762	#51-5768							
BB22	031744	#51-5775	51-5785							
BB23	031764	#51-5780	51-5783							
BB24	031774	51-5781	#51-5783							
BB25	032002	51-5776	#51-5785							
BB26	032014	51-5787	#51-5790							
BB27	032050	51-5791	#51-5797							
BB3	031374	#51-5697								
BB30	032072	#51-5803	51-5806							
BB31	032102	51-5804	#51-5806							
BB32	032114	51-5808	#51-5811							
BB33	032150	51-5812	#51-5818							
BB34	032172	#51-5824	51-5827							
BB35	032202	51-5825	#51-5827							
BB4	031412	#51-5701	51-5704							
BB5	031422	51-5702	#51-5704							
BB6	031434	51-5707	#51-5710							
BB7	031470	51-5713	#51-5717							
BDONE	005154	26-1962	#26-1981							
BERR	005110	26-1959	#26-1964							
BERR1	005140	26-1968	#26-1975							
BITSTS	014250	#33-3205	33-3285	33-3293	33-3309	33-3311				
BIT0	= 000001	#19-1783								
BIT00	= 000001	#19-1783	19-1783	56-6271	56-6271	57-6273	57-6273			
BIT01	= 000002	#19-1783	19-1783							
BIT02	= 000004	#19-1783	19-1783							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
BIT03	= 000010	#19-1783	19-1783							
BIT04	= 000020	#19-1783	19-1783							
BIT05	= 000040	#19-1783	19-1783							
BIT06	= 000100	#19-1783	19-1783							
BIT07	= 000200	#19-1783	19-1783							
BIT08	= 000400	#19-1783	19-1783	56-6271						
BIT09	= 001000	#19-1783	19-1783	56-6271	57-6273	57-6273				
BIT1	= 000002	#19-1783								
BIT10	= 002000	#19-1783	57-6273							
BIT11	= 004000	#19-1783	56-6271							
BIT12	= 010000	#19-1783	55-6269							
BIT13	= 020000	#19-1783	57-6273							
BIT14	= 040000	#19-1783	56-6271							
BIT15	= 100000	#19-1783								
BIT2	= 000004	#19-1783								
BIT3	= 000010	#19-1783								
BIT4	= 000020	#19-1783								
BIT5	= 000040	#19-1783								
BIT6	= 000100	#19-1783								
BIT7	= 000200	#19-1783								
BIT8	= 000400	#19-1783								
BIT9	= 001000	#19-1783								
BPTVEC	= 000014	#19-1783								
B1	005064	26-1947	#26-1950	26-1961						
B2	005066	#26-1953	26-1966							
B3	005104	#26-1961	26-1973	26-1979						
CCDATO	031162	50-5437	50-5443	50-5465	50-5471	50-5494	50-5500	50-5523	50-5529	50-5551
		50-5557	50-5579	50-5585	50-5609	50-5615	50-5624	50-5630	50-5636	50-5644
		#50-5660								
CCDONE	031322	50-5597	50-5601	50-5605	50-5611	50-5617	50-5626	50-5632	50-5638	50-5647
		#50-5672								
CCER0	030524	50-5454	50-5482	50-5568	50-5596	#50-5598				
CCER1	030560	50-5448	#50-5606							
CCER10	031072	50-5562	#50-5648							
CCER11	031110	50-5564	#50-5651							
CCER12	031126	50-5570	#50-5654							
CCER13	031144	50-5592	#50-5657							
CCER2	030616	50-5450	#50-5612							
CCER22	030632	#50-5614	50-5659							
CCER3	030654	50-5476	#50-5618							
CCER4	030672	50-5478	#50-5621							
CCER44	030706	#50-5623	50-5653							
CCER5	030730	50-5505	#50-5627							
CCER50	030574	#50-5608	50-5620	50-5650	50-5656					
CCER55	030744	#50-5629	50-5641							
CCER6	030764	50-5507	#50-5633							
CCER7	031020	50-5534	#50-5639							
CCER8	031036	50-5536	#50-5642							
CCER90	030542	50-5511	50-5540	#50-5602						
CCP0	031172	50-5432	50-5444	50-5460	50-5486	50-5546	50-5574	50-5608	50-5614	50-5623
		50-5629	50-5635	50-5645	#50-5661					
CCP1	031202	50-5462	50-5472	50-5618	50-5621	#50-5662				

CREPAD CREATED BY MACRO ON 20-OCT-81 AT 09:38 PAGE 6
SEQUENCE 193

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
CCP10	031272	50-5525	50-5640	50-5643	#50-5669				
CCP11	031302	50-5553	50-5649	50-5652	#50-5670				
CCP12	031312	#50-5671							
CCP2	031212	50-5434	50-5439	50-5606	50-5607	50-5612	50-5613	#50-5663	
CCP3	031222	50-5501	50-5515	50-5548	50-5558	50-5648	50-5651	#50-5664	
CCP4	031232	50-5576	50-5581	50-5586	50-5654	50-5655	50-5657	50-5658	#50-5665
CCP5	031242	50-5519	50-5530	50-5639	50-5642	#50-5666			
CCP6	031252	50-5490	50-5496	50-5627	50-5628	50-5633	50-5634	#50-5667	
CCP7	031262	50-5467	50-5619	50-5622	#50-5668				
CC1	027510	#50-5428							
CC10	027734	#50-5474	50-5477						
CC11	027744	50-5475	#50-5477						
CC12	027752	50-5470	#50-5479						
CC13	027764	50-5481	#50-5484						
CC14	030020	50-5485	#50-5491						
CC15	030044	#50-5498	50-5508						
CC16	030064	#50-5503	50-5506						
CC17	030074	50-5504	#50-5506						
CC18	030102	50-5499	#50-5508						
CC19	030114	50-5510	#50-5513						
CC2	027544	50-5431	#50-5435						
CC20	030150	50-5514	#50-5520						
CC21	030174	#50-5527	50-5537						
CC22	030214	#50-5532	50-5535						
CC23	030224	50-5533	#50-5535						
CC24	030232	50-5528	#50-5537						
CC25	030244	50-5539	#50-5542						
CC26	030300	50-5545	#50-5549						
CC27	030322	#50-5555	50-5565						
CC28	030342	#50-5560	50-5563						
CC29	030352	50-5561	#50-5563						
CC3	027566	#50-5441	50-5451						
CC30	030360	50-5556	#50-5565						
CC31	030372	50-5567	#50-5570						
CC32	030426	50-5573	#50-5577						
CC33	030450	#50-5583	50-5593						
CC34	030470	#50-5588	50-5591						
CC35	030500	50-5589	#50-5591						
CC36	030506	50-5584	#50-5593						
CC37	030520	50-5595	#50-5597						
CC4	027606	#50-5446	50-5449						
CC5	027616	50-5447	#50-5449						
CC6	027624	50-5442	#50-5451						
CC7	027636	50-5453	#50-5456						
CC8	027672	50-5459	#50-5463						
CC9	027714	#50-5469	50-5479						
CDONE	006120	27-2107	#27-2173						
CERR1	005654	27-2007	27-2048	27-2064	27-2105	#27-2110			
CERR2	005752	27-2020	27-2035	27-2077	27-2092	#27-2132			
CERR3	006052	27-2124	27-2130	27-2148	27-2154	#27-2157			
CERR4	006074	27-2113	27-2137	#27-2164					
CFCC1	043671	#71-6522							

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SYMBOL  VALUE             REFERENCES
CHPNUM    014150         #33-3203    33-3279    33-3298
CKSWR   = 104407          56-6271    57-6273    57-6273   #64-6287    70-6483
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CPC       006116         *27-2160    27-2162   *27-2167    27-2169   #27-2171
CPSAVE    037142         *56-6271    56-6271   #56-6271   *57-6273    57-6273    66-6431    75-7335
CPSPUR    042566          25-1858    25-1926    28-2257    30-2616    30-2653    31-2819    32-2990    35-3583    35-3594
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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
		36-3665	37-3764	39-3987	40-4089	40-4092	41-4229	41-4232	42-4341	43-4473
		#68-6457	70-6488							
CPTWO	042604	25-1859	25-1913	#69-6466	70-6489					
CR	= 000015	#19-1783	59-6277	59-6277						
CRLF	= 000200	#19-1782	#19-1783	24-1812	24-1812	24-1813	24-1814	33-3325	33-3325	56-6271
		56-6271	56-6271	56-6271	59-6277	59-6277	71-6496	71-6496	71-6500	71-6501
		71-6502	71-6503	71-6505	71-6507	71-6509	71-6510	71-6512	71-6514	71-6515
		71-6530	71-6561	71-6562	71-6563	71-6564	71-6565	71-6566	72-6590	72-6593
		72-6596	72-6597	72-6601	72-6604	72-6611	72-6612	72-6617	72-6620	72-6623
		72-6625	72-6627	72-6629	72-6631	72-6637	72-6638	72-6660	72-6660	72-6660
		72-6663	72-6663	72-6663	72-6665	72-6665	72-6665	72-6668	72-6668	72-6669
		72-6672	72-6672	72-6673	72-6676	72-6700	72-6700	72-6700	72-6701	72-6703
		72-6705	72-6705	72-6705	72-6706	72-6708	72-6710	72-6711	72-6714	72-6715
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		72-6751	72-6752	72-6755	72-6755	72-6757	72-6759	72-6820	72-6820	72-6820
		72-6821	72-6821	72-6821	72-6822	72-6822	72-6822	72-6823	72-6823	72-6823
		72-6824	72-6824	72-6825	72-6825	72-6830	72-6831	72-6831	72-6832	72-6833
		72-6833	72-6834	72-6834	72-6835	72-6835	72-6836	72-6836	72-6837	72-6837
		72-6838	72-6840	72-6841	72-6842	72-6843	72-6844	72-6848	73-6853	73-6880
		73-6884	73-6921	73-6944	73-6946	73-6946	73-6951	73-6951	73-6952	73-6968
		73-6984								
C1	005174	27-1992	#27-1994							
C15	005222	27-1999	#27-2001							
C2	005246	27-2009	#27-2010							
C25	005262	27-2013	#27-2014							
C3	005310	27-2022	#27-2023							
C35	005340	27-2028	#27-2029							
C4	005366	27-2037	#27-2038							
C45	005400	27-2040	#27-2042							
C5	005426	27-2050	#27-2051							
C55	005454	27-2056	#27-2058							
C6	005500	27-2066	#27-2067							
C65	005514	27-2069	#27-2071							
C7	005542	27-2079	#27-2080							
C75	005572	27-2084	#27-2086							
C8	005620	27-2094	#27-2095							
C85	005632	27-2097	#27-2099							
DDDATO	034556	52-5907	52-5913	52-5936	52-5958	52-5980	52-5986	52-6008	52-6014	52-6036
		52-6042	52-6065	52-6071	52-6089	52-6090	52-6091	52-6092	52-6093	52-6094
		52-6095	52-6096	52-6097	52-6098	52-6099	52-6100	#52-6101		
DDDONE	034706	52-6084	52-6088	52-6089	52-6090	52-6091	52-6092	52-6093	52-6094	52-6095
		52-6096	52-6097	52-6098	52-6099	52-6100	#52-6112			
DDER0	033770	52-5925	52-5947	52-5969	52-5997	52-6025	52-6054	52-6083	#52-6085	
DDER1	034006	52-5918	#52-6089							
DDER10	034424	52-6049	#52-6098							
DDER11	034462	52-6076	#52-6099							
DDER12	034520	52-6078	#52-6100							
DDER2	034044	52-5920	#52-6090							
DDER3	034102	52-5942	#52-6091							
DDER4	034140	52-5964	#52-6092							
DDER5	034176	52-5991	#52-6093							
DDER6	034234	52-5993	#52-6094							

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SYMBOL   VALUE          REFERENCES
DDER7    034272          52-6019   #52-6095
DDER8    034330          52-6021   #52-6096
DDER9    034366          52-6047   #52-6097
DDISP  = 177570         #19-1783    20-1795    24-1811
DDONE    006366          28-2223   #28-2265
DDP0     034566          52-5938    52-5960    52-6091    52-6092   #52-6102
DDP1     034576          52-5902    52-5904    52-5933    52-5953    52-6089    52-6089    52-6090    52-6090    52-6091
                         52-6092   #52-6103
DDP2     034606          52-5931    52-5955    52-6091    52-6092   #52-6104
DDP3     034616          52-5975    52-6005    52-6093    52-6094    52-6095    52-6096   #52-6105
DDP4     034626          52-5914    52-6031    52-6062    52-6097    52-6098    52-6099    52-6100   #52-6106
DDP5     034636          52-6033    52-6060    52-6097    52-6098    52-6099    52-6100   #52-6107
DDP6     034646          52-5977    52-6003    52-6093    52-6094    52-6095    52-6096   #52-6108
DDP7     034656          52-5982    52-6010    52-6043    52-6072    52-6093    52-6094    52-6095    52-6096   #52-6109
DDP8     034666          52-5987    52-6015    52-6038    52-6067    52-6097    52-6098    52-6099    52-6100   #52-6110
DDP9     034676          52-5909    52-6089    52-6090   #52-6111
DD1      032662         #52-5898
DD10     033072         #52-5940    52-5943
DD11     033102          52-5941   #52-5943
DD12     033120          52-5946   #52-5949
DD13     033154          52-5952   #52-5956
DD14     033176         #52-5962    52-5965
DD15     033206          52-5963   #52-5965
DD16     033224          52-5968   #52-5971
DD17     033260          52-5974   #52-5978
DD18     033302         #52-5984    52-5994
DD19     033322         #52-5989    52-5992
DD2      032716          52-5901   #52-5905
DD20     033332          52-5990   #52-5992
DD21     033340          52-5985   #52-5994
DD22     033352          52-5996   #52-5999
DD23     033406          52-6002   #52-6006
DD24     033430         #52-6012    52-6022
DD25     033450         #52-6017    52-6020
DD26     033460          52-6018   #52-6020
DD27     033466          52-6013   #52-6022
DD3      032740         #52-5911    52-5921
DD30     033500          52-6024   #52-6027
DD31     033534          52-6030   #52-6034
DD32     033556         #52-6040    52-6050
DD33     033576         #52-6045    52-6048
DD34     033606          52-6046   #52-6048
DD35     033614          52-6041   #52-6050
DD36     033632          52-6053   #52-6056
DD37     033666          52-6059   #52-6063
DD38     033710         #52-6069    52-6079
DD39     033730         #52-6074    52-6077
DD4      032760         #52-5916    52-5919
DD40     033740          52-6075   #52-6077
DD41     033746          52-6070   #52-6079
DD42     033764          52-6082   #52-6084
DD5      032770          52-5917   #52-5919
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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
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DD7	033014	52-5924	#52-5927						
DD8	033050	52-5930	#52-5934						
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DERR2	006342	28-2198	#28-2255						
DF1	071236	21-1802	#74-7023						
DF10	- 071266	21-1802	#74-7030						
DF100	= 072063	21-1802	#74-7086						
DF101	= 072110	21-1802	#74-7087						
DF102	= 072132	21-1802	#74-7088						
DF103	= 072110	21-1802	#74-7089						
DF104	- 072063	21-1802	#74-7090						
DF105	= 072110	21-1802	#74-7091						
DF106	= 072132	21-1802	#74-7092						
DF107	= 072110	21-1802	#74-7093						
DF11	= 071266	21-1802	#74-7031						
DF110	= 072063	21-1802	#74-7094						
DF111	072141	21-1802	#74-7095	74-7096	74-7097	74-7098	74-7099	74-7100	74-7108	74-7109
DF112	= 072141	21-1802	#74-7096						
DF113	= 072141	21-1802	#74-7097						
DF114	= 072141	21-1802	#74-7098						
DF115	= 072141	21-1802	#74-7099						
DF116	- 072141	21-1802	#74-7100						
DF117	= 071256	21-1802	#74-7101						
DF12	071302	21-1802	#74-7032						
DF120	= 071256	21-1802	#74-7102						
DF121	071775	21-1802	#74-7103						
DF122	- 072012	21-1802	#74-7104						
DF123	072036	21-1802	#74-7105						
DF124	072145	21-1802	#74-7106	74-7107					
DF125	- 072145	21-1802	#74-7107						
DF126	072141	21-1802	#74-7108						
DF127	= 072141	21-1802	#74-7109						
DF13	071334	21-1802	#74-7033						
DF130	= 071256	21-1802	#74-7110						
DF131	072176	21-1802	#74-7111	74-7112					
DF132	- 072176	21-1802	#74-7112						
DF133	072216	21-1802	#74-7113	74-7114	74-7115	74-7116	74-7121	74-7122	74-7125	74-7126
		74-7128	74-7132	74-7133	74-7134	74-7136	74-7140	74-7141	74-7144	74-7145
		74-7148	74-7150	74-7151	74-7152	74-7153	74-7154	74-7156	74-7157	74-7158
		74-7162								
DF134	= 072216	21-1802	#74-7114						
DF135	= 072216	21-1802	#74-7115						
DF136	= 072216	21-1802	#74-7116						
DF137	072242	21-1802	#74-7117	74-7118	74-7119	74-7120	74-7123	74-7124	74-7127	74-7129
DF14	= 071266	21-1802	#74-7034						
DF140	= 072242	21-1802	#74-7118						
DF141	= 072242	21-1802	#74-7119						
DF142	= 072242	21-1802	#74-7120						
DF143	= 072216	21-1802	#74-7121						
DF144	= 072216	21-1802	#74-7122						
DF145	= 072242	21-1802	#74-7123						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
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DF147	= 072216	21-1802	#74-7125						
DF15	= 071266	21-1802	#74-7035						
DF150	= 072216	21-1802	#74-7126						
DF151	= 072242	21-1802	#74-7127						
DF152	= 072216	21-1802	#74-7128						
DF153	= 072242	21-1802	#74-7129						
DF154	072252	21-1802	#74-7130	74-7131					
DF155	= 072252	21-1802	#74-7131						
DF156	= 072216	21-1802	#74-7132						
DF157	= 072216	21-1802	#74-7133						
DF16	071350	21-1802	#74-7036						
DF160	= 072216	21-1802	#74-7134						
DF161	072256	21-1802	#74-7135	74-7137	74-7142	74-7143	74-7146	74-7147	
DF162	= 072216	21-1802	#74-7136						
DF163	= 072256	21-1802	#74-7137						
DF164	= 071256	21-1802	#74-7138						
DF165	= 071256	21-1802	#74-7139						
DF166	= 072216	21-1802	#74-7140						
DF167	= 072216	21-1802	#74-7141						
DF17	= 071256	21-1802	#74-7037						
DF170	= 072256	21-1802	#74-7142						
DF171	= 072256	21-1802	#74-7143						
DF172	= 072216	21-1802	#74-7144						
DF173	= 072216	21-1802	#74-7145						
DF174	= 072256	21-1802	#74-7146						
DF175	= 072256	21-1802	#74-7147						
DF176	= 072216	21-1802	#74-7148						
DF177	072302	21-1802	#74-7149						
DF2	071246	21-1802	#74-7024						
DF20	071357	21-1802	#74-7038						
DF200	= 072216	21-1802	#74-7150						
DF201	= 072216	21-1802	#74-7151						
DF202	= 072216	21-1802	#74-7152						
DF203	= 072216	21-1802	#74-7153						
DF204	= 072216	21-1802	#74-7154						
DF205	= 071256	21-1802	#74-7155						
DF206	= 072216	21-1802	#74-7156						
DF207	= 072216	21-1802	#74-7157						
DF21	071367	21-1802	#74-7039	74-7077	74-7082				
DF210	= 072216	21-1802	#74-7158						
DF211	072305	21-1802	#74-7159	74-7160	74-7161				
DF212	= 072305	21-1802	#74-7160						
DF213	= 072305	21-1802	#74-7161						
DF214	072216	21-1802	#74-7162						
DF22	071373	21-1802	#74-7040						
DF23	071405	21-1802	#74-7041						
DF24	071415	21-1802	#74-7042						
DF25	071424	21-1802	#74-7043						
DF26	071450	21-1802	#74-7044	74-7047					
DF27	071475	21-1802	#74-7045	74-7048					
DF3	071256	21-1802	#74-7025	74-7026	74-7037	74-7101	74-7102	74-7110	74-7138	74-7139

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES							
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DF31	=	071450	21-1802	#74-7047						
DF32	=	071475	21-1802	#74-7048						
DF33		071531	21-1802	#74-7049						
DF34		071557	21-1802	#74-7050	74-7051	74-7052	74-7053			
DF35	=	071557	21-1802	#74-7051						
DF36	=	071557	21-1802	#74-7052						
DF37	=	071557	21-1802	#74-7053						
DF4	=	071256	21-1802	#74-7026						
DF40		071603	21-1802	#74-7054						
DF41		071631	21-1802	#74-7055						
DF42		071645	21-1802	#74-7056	74-7057					
DF43	=	071645	21-1802	#74-7057						
DF44		071673	21-1802	#74-7058						
DF45		071716	21-1802	#74-7059						
DF46		071743	21-1802	#74-7060						
DF47		071775	21-1802	#74-7061	74-7064	74-7067	74-7103			
DF5		071266	21-1802	#74-7027	74-7028	74-7029	74-7030	74-7031		
DF50		072012	21-1802	#74-7062	74-7104					
DF51		072036	21-1802	#74-7063	74-7105					
DF52	=	071775	21-1802	#74-7064						
DF53		072054	21-1802	#74-7065	74-7068	74-7070				
DF54		072063	21-1802	#74-7066	74-7069	74-7071	74-7072	74-7073	74-7076	74-7081	74-7086
			74-7090	74-7094						
DF55	=	071775	21-1802	#74-7067						
DF56	=	072054	21-1802	#74-7068						
DF57	=	072063	21-1802	#74-7069						
DF6	=	071266	21-1802	#74-7028	74-7034	74-7035				
DF60	=	072054	21-1802	#74-7070						
DF61		072063	21-1802	#74-7071						
DF62	=	072063	21-1802	#74-7072						
DF63	=	072063	21-1802	#74-7073						
DF64		072101	21-1802	#74-7074	74-7075					
DF65	=	072101	21-1802	#74-7075						
DF66	=	072063	21-1802	#74-7076						
DF67	=	071367	21-1802	#74-7077						
DF7	=	071266	21-1802	#74-7029						
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DF71	=	072110	21-1802	#74-7079						
DF72		072132	21-1802	#74-7080	74-7085	74-7088	74-7092			
DF73	=	072063	21-1802	#74-7081						
DF74	=	071367	21-1802	#74-7082						
DF75	=	072110	21-1802	#74-7083						
DF76	=	072110	21-1802	#74-7084						
DF77	=	072132	21-1802	#74-7085						
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DH100	=	067503	21-1802	#73-6934						
DH101	=	066201	21-1802	#73-6935						
DH102	=	067073	21-1802	#73-6936						
DH103	=	067031	21-1802	#73-6937						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
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DH107	= 067031	21-1802	#73-6941						
DH11	= 066201	21-1802	#73-6867						
DH110	= 067503	21-1802	#73-6942						
DH111	= 067031	21-1802	#73-6943						
DH112	067701	21-1802	#73-6944	73-6949					
DH113	= 067031	21-1802	#73-6948						
DH114	= 067701	21-1802	#73-6949						
DH115	070120	21-1802	#73-6950	73-6954					
DH116	= 070120	21-1802	#73-6954						
DH117	= 066321	21-1802	#73-6955						
DH12	= 000000	21-1802	#73-6868						
DH120	070404	21-1802	#73-6956	73-6965					
DH121	= 066201	21-1802	#73-6958						
DH122	= 067431	21-1802	#73-6959						
DH123	= 067431	21-1802	#73-6960						
DH124	= 066321	21-1802	#73-6961						
DH125	= 066321	21-1802	#73-6962						
DH126	= 066201	21-1802	#73-6963						
DH127	= 067503	21-1802	#73-6964						
DH13	= 000000	21-1802	#73-6869						
DH130	- 070404	21-1802	#73-6965						
DH131	= 067503	21-1802	#73-6966						
DH132	= 067503	21-1802	#73-6967						
DH133	070474	21-1802	#73-6968	73-6970	73-6971	73-6972	73-6979	73-6980	73-6987
DH134	= 070474	21-1802	#73-6970						
DH135	= 070474	21-1802	#73-6971						
DH136	= 070474	21-1802	#73-6972						
DH137	070604	21-1802	#73-6973	73-6976	73-6977	73-6978	73-6981	73-6982	73-6986	73-6988
DH14	- 066201	21-1802	#73-6870						
DH140	= 070604	21-1802	#73-6976						
DH141	- 070604	21-1802	#73-6977						
DH142	= 070604	21-1802	#73-6978						
DH143	= 070474	21-1802	#73-6979						
DH144	= 070474	21-1802	#73-6980						
DH145	- 070604	21-1802	#73-6981						
DH146	= 070604	21-1802	#73-6982						
DH147	= 067503	21-1802	#73-6983						
DH15	= 066201	21-1802	#73-6871						
DH150	070774	21-1802	#73-6984						
DH151	- 070604	21-1802	#73-6986						
DH152	= 070474	21-1802	#73-6987						
DH153	= 070604	21-1802	#73-6988						
DH154	071065	21-1802	#73-6989	73-6990					
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DH157	= 067503	21-1802	#73-6992						
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DH160	- 067503	21-1802	#73-6993						
DH161	- 067503	21-1802	#73-6994						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
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DH165	= 066321	21-1802	#73-6998						
DH166	= 067503	21-1802	#73-6999						
DH167	= 067503	21-1802	#73-7000						
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DH171	= 067503	21-1802	#73-7002						
DH172	= 067503	21-1802	#73-7003						
DH173	= 067503	21-1802	#73-7004						
DH174	= 067503	21-1802	#73-7005						
DH175	= 067503	21-1802	#73-7006						
DH176	= 067503	21-1802	#73-7007						
DH177	071125	21-1802	#73-7008						
DH2	065721	21-1802	#73-6857						
DH20	066411	21-1802	#73-6876						
DH200	= 067503	21-1802	#73-7009						
DH201	= 067503	21-1802	#73-7010						
DH202	= 067503	21-1802	#73-7011						
DH203	= 067503	21-1802	#73-7012						
DH204	= 067503	21-1802	#73-7013						
DH205	= 066321	21-1802	#73-7014						
DH206	= 067503	21-1802	#73-7015						
DH207	= 067503	21-1802	#73-7016						
DH21	= 066201	21-1802	#73-6878						
DH210	= 067503	21-1802	#73-7017						
DH211	071171	21-1802	#73-7018						
DH212	= 066201	21-1802	#73-7019						
DH213	= 066201	21-1802	#73-7020						
DH214	= 067503	21-1802	#73-7021						
DH22	066477	21-1802	#73-6879						
DH23	066534	21-1802	#73-6880						
DH24	066672	21-1802	#73-6883						
DH25	067031	21-1802	#73-6885	73-6927	73-6932	73-6937	73-6941	73-6943	73-6948
DH26	067073	21-1802	#73-6886	73-6888	73-6890	73-6891	73-6911	73-6914	73-6916
		73-6933	73-6936	73-6940					73-6928
DH27	= 067073	21-1802	#73-6888						
DH3	066014	21-1802	#73-6859	75-7190	75-7220				
DH30	= 000000	21-1802	#73-6889						
DH31	= 067073	21-1802	#73-6890						
DH32	= 067073	21-1802	#73-6891						
DH33	067161	21-1802	#73-6892	73-6894	73-6895	73-6896	73-6897	73-6898	
DH34	= 067161	21-1802	#73-6894						
DH35	= 067161	21-1802	#73-6895						
DH36	= 067161	21-1802	#73-6896						
DH37	= 067161	21-1802	#73-6897						
DH4	066105	21-1802	#73-6861						
DH40	= 067161	21-1802	#73-6898						
DH41	= 000000	21-1802	#73-6899						
DH42	067264	21-1802	#73-6900	73-6902					
DH43	= 067264	21-1802	#73-6902						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
DH44	= 000000	21-1802	#73-6903							
DH45	067366	21-1802	#73-6904	73-6906						
DH46	067405	21-1802	#73-6905							
DH47	= 067366	21-1802	#73-6906							
DH5	066201	21-1802	#73-6863	73-6864	73-6865	73-6866	73-6867	73-6870	73-6871	73-6878
		73-6910	73-6913	73-6925	73-6926	73-6930	73-6931	73-6935	73-6939	73-6958
		73-6963	73-7019	73-7020						
DH50	067431	21-1802	#73-6907	73-6909	73-6959	73-6960				
DH51	- 067431	21-1802	#73-6909							
DH52	- 066201	21-1802	#73-6910							
DH53	= 067073	21-1802	#73-6911							
DH54	067503	21-1802	#73-6912	73-6915	73-6917	73-6918	73-6919	73-6924	73-6929	73-6934
		73-6938	73-6942	73-6964	73-6966	73-6967	73-6983	73-6991	73-6992	73-6993
		73-6994	73-6995	73-6996	73-6999	73-7000	73-7001	73-7002	73-7003	73-7004
		73-7005	73-7006	73-7007	73-7009	73-7010	73-7011	73-7012	73-7013	73-7015
		73-7016	73-7017	73-7021						
DH55	066201	21-1802	#73-691[illegible]							
DH56	= 067073	21-1802	#73-6914							
DH57	= 067503	21-1802	#73-6915							
DH6	= 066201	21-1802	#73-6864							
DH60	= 067073	21-1802	#73-6916							
DH61	= 067503	21-1802	#73-6917							
DH62	- 067503	21-1802	#73-6918							
DH63	= 067503	21-1802	#7[illegible]-6919							
DH64	067613	21-1802	#7[illegible]-6922							
DH65	067544	21-1802	#73-6920							
DH66	- 067503	21-1802	#73-6924							
DH67	= 066201	21-1802	#73-6925							
DH7	= 066201	21-1802	#73-6865							
DH70	= 066201	21-1802	#73-6926							
DH71	= 067031	21-1802	#73-6927							
DH72	= 067073	21-1802	#73-6928							
DH73	- 067503	21-1802	#73-6929							
DH74	= 066201	21-1802	#73-6930							
DH75	= 066201	21-1802	#73-6931							
DH76	- 067031	21-1802	#73-6932							
DH77	= 067073	21-1802	#73-6933							
DISPLA	001142	#20-1795	*24-1811	*24-1811	56-6271	57-6273				
DISPRE	000174	#19-1794	24-1811							
DPAT3	017500	#37-3806								
DSWR	- 177570	#19-1783	20-1795	24-1811						
DT1	072314	21-1802	#75-7165							
DT10	= 072434	21-1802	#75-7175							
DT100	= 073750	21-1802	#75-7267							
DT101	= 074026	21-1802	#75-7268							
DT102	= 074026	21-1802	#75-7269							
DT103	= 074026	21-1802	#75-7270							
DT104	= 073750	21-1802	#75-7271							
DT105	= 074026	21-1802	#75-7272							
DT106	= 074074	21-1802	#75-7273							
DT107	= 074026	21-1802	#75-7274							
DT11	= 072434	21-1802	#75-7176							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
DT110	= 073750	21-1802	#75-7275						
DT111	074114	21-1802	#75-7276	75-7277	75-7278	75-7279	75-7280	75-7281	75-7291	75-7292
DT112	= 074114	21-1802	#75-7277							
DT113	= 074114	21-1802	#75-7278							
DT114	= 074114	21-1802	#75-7279							
DT115	= 074114	21-1802	#75-7280							
DT116	= 074114	21-1802	#75-7281							
DT117	= 072360	21-1802	#75-7282							
DT12	072456	21-1802	#75-7177							
DT120	= 072360	21-1802	#75-7283							
DT121	= 073640	21-1802	#75-7284							
DT122	= 073244	21-1802	#75-7285							
DT123	= 073672	21-1802	#75-7286							
DT124	074126	21-1802	#75-7287	75-7290						
DT125	= 074126	21-1802	#75-7290							
DT126	= 074114	21-1802	#75-7291							
DT127	= 074114	21-1802	#75-7292							
DT13	072544	21-1802	#75-7181							
DT130	= 072360	21-1802	#75-7293							
DT131	074212	21-1802	#75-7294	75-7296						
DT132	= 074212	21-1802	#75-7296							
DT133	074254	21-1802	#75-7297	75-7300	75-7301	75-7302	75-7307	75-7308	75-7311	75-7312
		75-7314	75-7318	75-7319	75-7320	75-7321	75-7322	75-7323	75-7326	75-7327
		75-7328	75-7329	75-7330	75-7331	75-7332	75-7333	75-7334	75-7336	75-7337
		75-7338	75-7339	75-7340	75-7342	75-7343	75-7344	75-7348		
DT134	= 074254	21-1802	#75-7300							
DT135	= 074254	21-1802	#75-7301							
DT136	= 074254	21-1802	#75-7302							
DT137	074326	21-1802	#75-7303	75-7304	75-7305	75-7306	75-7309	75-7310	75-7313	75-7315
DT14	= 072434	21-1802	#75-7183							
DT140	= 074326	21-1802	#75-7304							
DT141	= 074326	21-1802	#75-7305							
DT142	= 074326	21-1802	#75-7306							
DT143	= 074254	21-1802	#75-7307							
DT144	= 074254	21-1802	#75-7308							
DT145	= 074326	21-1802	#75-7309							
DT146	= 074326	21-1802	#75-7310							
DT147	= 074254	21-1802	#75-7311							
DT15	= 072434	21-1802	#75-7184							
DT150	= 074254	21-1802	#75-7312							
DT151	= 074326	21-1802	#75-7313							
DT152	= 074254	21-1802	#75-7314							
DT153	= 074326	21-1802	#75-7315							
DT154	074346	21-1802	#75-7316	75-7317						
DT155	= 074346	21-1802	#75-7317							
DT156	= 074254	21-1802	#75-7318							
DT157	= 074254	21-1802	#75-7319							
DT16	072576	21-1802	#75-7185							
DT160	= 074254	21-1802	#75-7320							
DT161	= 074254	21-1802	#75-7321							
DT162	= 074254	21-1802	#75-7322							
DT163	= 074254	21-1802	#75-7323							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
DT164	= 072360	21-1802	#75-7324							
DT165	= 072360	21-1802	#75-7325							
DT166	= 074254	21-1802	#75-7326							
DT167	= 074254	21-1802	#75-7327							
DT17	= 072360	21-1802	#75-7186							
DT170	= 074254	21-1802	#75-7328							
DT171	= 074254	21-1802	#75-7329							
DT172	= 074254	21-1802	#75-7330							
DT173	= 074254	21-1802	#75-7331							
DT174	= 074254	21-1802	#75-7332							
DT175	= 074254	21-1802	#75-7333							
DT176	= 074254	21-1802	#75-7334							
DT177	074360	21-1802	#75-7335							
DT2	072336	21-1802	#75-7167							
DT20	072616	21-1802	#75-7187							
DT200	= 074254	21-1802	#75-7336							
DT201	= 074254	21-1802	#75-7337							
DT202	= 074254	21-1802	#75-7338							
DT203	= 074254	21-1802	#75-7339							
DT204	= 074254	21-1802	#75-7340							
DT205	= 072360	21-1802	#75-7341							
DT206	= 074254	21-1802	#75-7342							
DT207	= 074254	21-1802	#75-7343							
DT21	072640	21-1802	#75-7189	75-7257	75-7263					
DT210	= 074254	21-1802	#75-7344							
DT211	074370	21-1802	#75-7345							
DT212	074406	21-1802	#75-7346	75-7347						
DT213	= 074406	21-1802	#75-7347							
DT214	= 074254	21-1802	#75-7348							
DT22	072652	21-1802	#75-7190							
DT23	072700	21-1802	#75-7193							
DT24	072722	21-1802	#75-7195							
DT25	072746	21-1802	#75-7198							
DT26	073016	21-1802	#75-7200	75-7208						
DT27	073072	21-1802	#75-7203	75-7209						
DT3	072360	21-1802 75-7341	#75-7168	75-7170	75-7186	75-7282	75-7283	75-7293	75-7324	75-7325
DT30	073134	21-1802	#75-7205							
DT31	= 073016	21-1802	#75-7208							
DT32	= 073072	21-1802	#75-7209							
DT33	073166	21-1802	#75-7210	75-7219						
DT34	073244	21-1802	#75-7213	75-7216	75-7217	75-7218	75-7238	75-7285		
DT35	= 073244	21-1802	#75-7216							
DT36	= 073244	21-1802	#75-7217							
DT37	= 073244	21-1802	#75-7218							
DT4	= 072360	21-1802	#75-7170							
DT40	= 073166	21-1802	#75-7219							
DT41	073316	21-1802	#75-7220							
DT42	073350	21-1802	#75-7223	75-7226						
DT43	= 073350	21-1802	#75-7226							
DT44	073426	21-1802	#75-7227							
DT45	073476	21-1802	#75-7229							

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
DT46	073552	21-1802	#75-7232						
DT47	073640	21-1802	#75-7236	75-7241	75-7246	75-7284			
DT5	072402	21-1802	#75-7171						
DT50	= 073244	21-1802	#75-7238						
DT51	073672	21-1802	#75-7239	75-7286					
DT52	- 073640	21-1802	#75-7241						
DT53	073730	21-1802	#75-7242	75-7247	75-7249				
DT54	073750	21-1802	#75-7244	75-7248	75-7250	75-7251	75-7252	75-7256	75-7262	75-7267
		75-7271	75-7275						
DT55	= 073640	21-1802	#75-7246						
DT56	= 073730	21-1802	#75-7247						
DT57	= 073750	21-1802	#75-7248						
DT6	072434	21-1802	#75-7173	75-7174	75-7175	75-7176	75-7183	75-7184	
DT60	= 073730	21-1802	#75-7249						
DT61	= 073750	21-1802	#75-7250						
DT62	= 073750	21-1802	#75-7251						
DT63	= 073750	21-1802	#75-7252						
DT64	074006	21-1802	#75-7253	75-7255					
DT65	= 074006	21-1802	#75-7255						
DT66	= 073750	21-1802	#75-7256						
DT67	= 072640	21-1802	#75-7257						
DT7	= 072434	21-1802	#75-7174						
DT70	074026	21-1802	#75-7258	75-7260	75-7264	75-7265	75-7268	75-7270	75-7272	75-7274
DT71	= 074026	21-1802	#75-7260	75-7269					
DT72	074074	21-1802	#75-7261	75-7266	75-7273				
DT73	= 073750	21-1802	#75-7262						
DT74	= 072640	21-1802	#75-7263						
DT75	= 074026	21-1802	#75-7264						
DT76	= 074026	21-1802	#75-7265						
DT77	= 074074	21-1802	#75-7266						
D1	006152	28-2196	#28-2201	28-2219	28-2225				
D10	006354	28-2256	#28-2259						
D2	006176	*28-2204	28-2206	#28-2207					
D3	006200	#28-2208	28-2227						
D4	006204	#28-2210							
D5	006216	#28-2216	28-2247	28-2253	28-2263				
D6	006232	28-2217	#28-2221						
D7	006242	28-2222	#28-2224						
D8	006312	#28-2241	28-2250	28-2255					
D9	006324	28-2246	#28-2249						
EDONE	006532	29-2293	29-2299	29-2305	#29-2318				
EEDATO	035410	53-6131	53-6137	53-6160	53-6166	53-6184	53-6185	53-6186	53-6187	#53-6188
EEDONE	035472	53-6179	53-6183	53-6184	53-6185	53-6186	53-6187	#53-6194		
EEER0	035202	53-6149	53-6178	#53-6180						
EEER1	035220	53-6142	#53-6184							
EEER2	035256	53-6144	#53-6185							
EEER3	035314	53-6171	#53-6186							
EEER4	035352	53-6173	#53-6187							
EEP0	035420	53-6133	53-6162	53-6184	53-6185	53-6186	53-6187	#53-6189		
EEP1	035432	53-6126	53-6128	53-6184	53-6184	53-6185	53-6185	#53-6190		
EEP2	035442	53-6138	#53-6191							
EEP3	035452	53-6155	53-6157	53-6186	53-6186	53-6187	53-6187	#53-6192		

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES			
EEP4		035462	53-6167	#53-6193		
EERR0		006450	29-2288	#29-2295		
EERR1		006466	29-2292	#29-2301		
EERR2		006502	29-2277	#29-2307		
EE1		034712	#53-6122			
EE10		035142	#53-6169	53-6172		
EE11		035152	53-6170	#53-6172		
EE12		035160	53-6165	#53-6174		
EE13		035176	53-6177	#53-6179		
EE2		034746	53-6125	#53-6129		
EE3		034770	#53-6135	53-6145		
EE4		035010	#53-6140	53-6143		
EE5		035020	53-6141	#53-6143		
EE6		035026	53-6136	#53-6145		
EE7		035044	53-6148	#53-6151		
EE8		035100	53-6154	#53-6158		
EE9		035122	#53-6164	53-6174		
EMTVEC	=	000030	#19-1783	*24-1811	*24-1811	
EM1		045352	21-1802	#72-6577		
EM10	=	045560	21-1802	#72-6584		
EM100		054462	21-1802	#72-6709		
EM101		054522	21-1802	#72-6710		
EM102		054646	21-1802	#72-6711		
EM103		054720	21-1802	#72-6712		
EM104		055023	21-1802	#72-6713		
EM105		055064	21-1802	#72-6714		
EM106		055211	21-1802	#72-6715		
EM107		055264	21-1802	#72-6716		
EM11		045701	21-1802	#72-6585		
EM110		055370	21-1802	#72-6717		
EM111		055432	21-1802	#72-6733	72-6734	72-6737
EM112	=	055432	21-1802	#72-6734		
EM113		055534	21-1802	#72-6735	72-6736	72-6738
EM114	=	055534	21-1802	#72-6736		
EM115	=	055432	21-1802	#72-6737		
EM116	=	055534	21-1802	#72-6738		
EM117		055636	21-1802	#72-6739		
EM12	=	000000	21-1802	#72-6586		
EM120		055772	21-1802	#72-6740		
EM121		056126	21-1802	#72-6741		
EM122		056245	21-1802	#72-6743		
EM123		056344	21-1802	#72-6745		
EM124		056405	21-1802	#72-6746		
EM125		056500	21-1802	#72-6747		
EM126		056570	21-1802	#72-6748		
EM127		056777	21-1802	#72-6753		
EM13	=	000000	21-1802	#72-6587		
EM130		057212	21-1802	#72-6758		
EM131		057312	21-1802	#72-6761		
EM132		057352	21-1802	#72-6762		
EM133		057412	21-1802	#72-6803	72-6807	
EM134		057451	21-1802	#72-6804	72-6808	

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES			
EM135	057510	21-1802	#72-6805	72-6809	
EM136	057547	21-1802	#72-6806	72-6810	
EM137	= 057412	21-1802	#72-6807		
EM14	045762	21-1802	#72-6588		
EM140	= 057451	21-1802	#72-6808		
EM141	= 057510	21-1802	#72-6809		
EM142	= 057547	21-1802	#72-6810		
EM143	057606	21-1802	#72-6811	72-6813	
EM144	057641	21-1802	#72-6812	72-6814	
EM145	= 057606	21-1802	#72-6813		
EM146	= 057641	21-1802	#72-6814		
EM147	057674	21-1802	#72-6815	72-6816	72-6817
EM15	046105	21-1802	#72-6591		
EM150	= 057674	21-1802	#72-6816		
EM151	= 057674	21-1802	#72-6817		
EM152	057726	21-1802	#72-6818	72-6819	
EM153	= 057726	21-1802	#72-6819		
EM154	057760	21-1802	#72-6820		
EM155	060212	21-1802	#72-6821		
EM156	060445	21-1802	#72-6822		
EM157	060662	21-1802	#72-6823		
EM16	046230	21-1802	#72-6594		
EM160	061101	21-1802	#72-6824		
EM161	061306	21-1802	#72-6825		
EM162	061513	21-1802	#72-6826		
EM163	061560	21-1802	#72-6827		
EM164	061625	21-1802	#72-6828		
EM165	061672	21-1802	#72-6829		
EM166	061737	21-1802	#72-6830		
EM167	062047	21-1802	#72-6831		
EM17	046301	21-1802	#72-6595		
EM170	062306	21-1802	#72-6832		
EM171	062416	21-1802	#72-6833		
EM172	062655	21-1802	#72-6834		
EM173	063114	21-1802	#72-6835		
EM174	063353	21-1802	#72-6836		
EM175	063612	21-1802	#72-6837		
EM176	064051	21-1802	#72-6838		
EM177	064206	21-1802	#72-6839		
EM2	045407	21-1802	#72-6578		
EM20	046534	21-1802	#72-6599		
EM200	064242	21-1802	#72-6840		
EM201	064377	21-1802	#72-6841		
EM202	064534	21-1802	#72-6842		
EM203	064671	21-1802	#72-6843		
EM204	065026	21-1802	#72-6844		
EM205	065163	21-1802	#72-6845		
EM206	065230	21-1802	#72-6846		
EM207	065275	21-1802	#72-6847		
EM21	046712	21-1802	#72-6603		
EM210	065417	21-1802	#72-6849		
EM211	= 045560	21-1802	#72-6850		

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES			
EM212	= 045614	21-1802	#72-6851		
EM213	= 045646	21-1802	#72-6852		
EM214	065474	21-1802	#72-6853		
EM22	047043	21-1802	#72-6606	72-6608	72-6609
EM23	= 047043	21-1802	#72-6608		
EM24	= 047043	21-1802	#72-6609		
EM25	047130	21-1802	#72-6610		
EM26	047243	21-1802	#72-6612	72-6614	
EM27	= 047243	21-1802	#72-6614		
EM3	045453	21-1802	#72-6579		
EM30	047311	21-1802	#72-6615		
EM31	047363	21-1802	#72-6617	72-6619	
EM32	= 047363	21-1802	#72-6619		
EM33	047431	21-1802	#72-6620		
EM34	047472	21-1802	#72-6622		
EM35	047574	21-1802	#72-6624		
EM36	047676	21-1802	#72-6626		
EM37	047777	21-1802	#72-6628		
EM4	045520	21-1802	#72-6580		
EM40	050100	21-1802	#72-6630		
EM41	050251	21-1802	#72-6632		
EM42	050306	21-1802	#72-6637		
EM43	050427	21-1802	#72-6638		
EM44	050550	21-1802	#72-6639	72-6640	
EM45	= 050550	21-1802	#72-6640		
EM46	050613	21-1802	#72-6641		
EM47	050671	21-1802	#72-6646		
EM5	045560	21-1802	#72-6581	72-6584	72-6850
EM50	051007	21-1802	#72-6647		
EM51	051105	21-1802	#72-6649		
EM52	051146	21-1802	#72-6659		
EM53	051267	21-1802	#72-6660		
EM54	051464	21-1802	#72-6661		
EM55	051530	21-1802	#72-6662		
EM56	051651	21-1802	#72-6663		
EM57	052046	21-1802	#72-6664		
EM6	045614	21-1802	#72-6582	72-6851	
EM60	052112	21-1802	#72-6665		
EM61	052307	21-1802	#72-6666		
EM62	052353	21-1802	#72-6667		
EM63	052545	21-1802	#72-6671		
EM64	052737	21-1802	#72-6675	72-6677	
EM65	= 052737	21-1802	#72-6677		
EM66	053073	21-1802	#72-6678		
EM67	053136	21-1802	#72-6700		
EM7	045646	21-1802	#72-6583	72-6852	
EM70	053367	21-1802	#72-6701		
EM71	053512	21-1802	#72-6702		
EM72	053614	21-1802	#72-6703		
EM73	053670	21-1802	#72-6704		
EM74	053730	21-1802	#72-6705		
EM75	054161	21-1802	#72-6706		

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
EM76	054304	21-1802	#72-6707							
EM77	054406	21-1802	#72-6708							
EPENDS	036512	*24-1815	55-6269	#55-6269	56-6271	*56-6271	*56-6271			
ERM10	037502	57-6273	57-6273	#57-6273						
ERROR	= 104000	#19-1783	25-1881	25-1905	25-1918	25-1931	25-1936	26-1972	26-1978	27-2161
		27-2168	28-2217	28-2238	28-2252	28-2262	29-2298	29-2304	29-2316	30-2450
		30-2469	30-2473	30-2483	30-2505	30-2509	30-2517	30-2532	30-2548	30-2563
		30-2578	30-2586	30-2592	30-2611	30-2621	30-2629	30-2648	30-2658	30-2666
		31-2825	31-2832	31-2840	31-2852	32-2996	32-3003	32-3010	32-3021	33-3257
		34-3429	35-3553	35-3559	35-3565	35-3568	35-3572	35-3575	35-3587	35-3598
		36-3671	36-3678	36-3687	37-3769	37-3776	37-3785	38-3867	38-3874	38-3886
		39-3965	39-3975	39-3982	39-3993	40-4097	40-4105	40-4111	40-4123	40-4130
		41-4237	41-4245	41-4252	41-4264	41-4271	42-4370	42-4380	42-4387	42-4395
		43-4502	43-4512	43-4522	43-4529	44-4681	44-4690	44-4708	44-4723	44-4739
		45-4801	45-4809	45-4829	45-4837	45-4857	45-4865	45-4887	45-4895	46-5024
		46-5030	46-5038	46-5043	47-5119	47-5127	47-5133	48-5207	48-5213	49-5361
		49-5365	49-5373	49-5379	49-5387	49-5393	49-5399	49-5405	50-5600	50-5604
		50-5610	50-5616	50-5625	50-5631	50-5637	50-5646	51-5833	51-5838	51-5845
		51-5854	51-5860	51-5869	52-6087	52-6089	52-6090	52-6091	52-6092	52-6093
		52-6094	52-6095	52-6096	52-6097	52-6098	52-6099	52-6100	53-6182	53-6184
		53-6185	53-6186	53-6187	54-6252	54-6255	54-6257	56-6271	57-6273	67-6450
		68-6459	69-6468							
ERRVEC	= 000004	#19-1783	24-1811	*24-1811	*24-1811	*25-1844	*25-1858	*28-2198	*30-2348	*30-2387
		*31-2723	*32-2900	*35-3474	*35-3504	*36-3632	*37-3731	*39-3926	*40-4030	*41-4170
		*42-4309	*43-4430	56-6271	*56-6271	*56-6271	*56-6271	*70-6488		
ERTYPE	042010	25-1897	33-3275	57-6273	#66-6301					
ERT1	042174	#66-6349	66-6416							
ERT2	042360	66-6354	66-6362	66-6371	66-6380	66-6404	#66-6408			
ERT3	042364	66-6388	66-6395	#66-6413						
ERT4	042374	66-6346	66-6415	#66-6418						
ERT5	042406	66-6313	#66-6423							
E1	006406	29-2276	#29-2279							
E2	006422	#29-2282								
E3	006422	29-2281	#29-2283							
E4	006424	#29-2284	29-2307							
FDATI0	010352	30-2340	30-2364	30-2448	30-2449	30-2458	#30-2669			
FDATI1	010354	#30-2670								
FDATI2	010356	#30-2671								
FDATI3	010360	30-2605	#30-2672							
FDATI4	010362	30-2347	30-2356	30-2453	30-2463	30-2598	#30-2673			
FDATI5	010364	30-2614	#30-2674							
FDATI6	010366	#30-2675								
FDATI7	010370	#30-2676								
FDATO0	010374	30-2382	30-2403	30-2494	30-2514	#30-2678				
FDATO1	010376	#30-2679								
FDATO2	010400	#30-2680								
FDATO3	010402	30-2642	#30-2681							
FDATO4	010404	30-2386	30-2395	30-2489	30-2499	30-2583	30-2634	#30-2682		
FDATO5	010406	30-2520	30-2535	30-2651	#30-2683					
FDATO6	010410	30-2551	30-2566	#30-2684						
FDATO7	010412	30-2515	30-2584	#30-2685						
FDONE	010436	30-2443	30-2451	30-2470	30-2474	30-2484	30-2506	30-2510	30-2518	30-2533

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		30-2549	30-2564	30-2579	30-2587	30-2593	30-2612	30-2622	30-2630	30-2649
		30-2659	30-2667	#30-2697						
FECMS	043123	#71-6503	75-7172							
FERR0	007144	30-2369	#30-2445							
FERR1	007202	30-2358	#30-2453							
FERR10	007762	30-2424	30-2436	30-2539	30-2570	#30-2581				
FERR11	010016	30-2375	30-2442	#30-2589						
FERR2	007300	30-2362	#30-2476							
FERR20	010036	30-2348	#30-2595							
FERR21	010154	30-2603	#30-2624							
FERR25	010204	30-2387	#30-2632							
FERR26	010322	30-2640	#30-2661							
FERR3	007340	30-2397	#30-2489							
FERR4	007332	30-2401	#30-2486							
FERR5	007436	30-2408	30-2412	30-2416	30-2420	#30-2512				
FERR6	007472	30-2428	#30-2520							
FERR7	007626	30-2432	#30-2551							
FER2	007304	#30-2478	30-2487							
FFDAT0	036000	54-6215	54-6237	54-6255	54-6257	#54-6260				
FFDONE	036060	54-6248	54-6253	54-6255	54-6257	#54-6266				
FFER0	035670	54-6225	54-6247	#54-6250						
FFER1	035704	54-6243	#54-6255							
FFER2	035742	54-6221	#54-6257							
FFP0	036010	54-6232	54-6255	#54-6261						
FFP1	036020	54-6234	54-6255	#54-6262						
FFP2	036030	54-6210	54-6257	#54-6263						
FFP3	036040	54-6212	54-6257	#54-6264						
FFP4	036050	54-6217	54-6239	54-6255	54-6257	#54-6265				
FF1	035476	#54-6206								
FF10	035656	54-6242	#54-6244							
FF11	035666	54-6246	#54-6248							
FF2	035532	54-6209	#54-6213							
FF3	035554	#54-6219	54-6222							
FF4	035562	54-6220	#54-6222							
FF5	035572	54-6224	#54-6228							
FF6	035626	54-6231	#54-6235							
FF7	035650	#54-6241	54-6244							
FPSMS	043057	#71-6502	75-7172							
FPSPUR	042534	25-1855	28-2229	29-2309	35-3527	35-3546	44-4687	44-4729	49-5350	#67-6444
		70-6487								
FPVECT	= 000244	#19-1778	*25-1839	*25-1855	*28-2199	*29-2277	*35-3469	*35-3502	*44-4579	*44-4670
		*49-5254	*51-5689	*70-6487						
FXDAT0	010416	30-2341	30-2365	30-2404	30-2446	30-2447	30-2516	#30-2687		
FXDAT1	010420	#30-2688								
FXDAT2	010422	#30-2689								
FXDAT3	010424	#30-2690								
FXDAT4	010426	30-2585	#30-2691							
FXDAT5	010430	#30-2692								
FXDAT6	010432	#30-2693								
FXDAT7	010434	#30-2694								
F1	006536	#30-2335	30-2335							
F10	006760	30-2378	#30-2391	30-2639						

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES								
F11		006762	#30-2392	30-2486							
F12		007000	30-2396	#30-2399							
F13		007032	30-2407	#30-2410							
F135		007012	30-2400	#30-2403							
F14		007042	30-2411	#30-2414							
F15		007052	30-2415	#30-2418							
F16		007062	30-2419	#30-2422							
F17		007072	30-2423	#30-2426							
F2		006574	#30-2344	30-2345							
F20		007102	30-2427	#30-2430							
F21		007112	30-2431	#30-2434							
F22		007122	30-2435	#30-2438							
F23		007140	30-2441	#30-2443							
F3		006614	30-2336	#30-2352							
F4		006616	#30-2353	30-2476	30-2602						
F5		006634	30-2357	#30-2360							
F6		006710	30-2374	#30-2377							
F7		006740	#30-2383	30-2384							
GADR		015206	*33-3244	33-3258	*33-3272	33-3322	#33-3350				
GAND0		015156	33-3246	33-3270	33-3280	33-3296	33-3313	#33-3338			
GAND1		015160	#33-3339								
GAND2		015162	#33-3340								
GAND3		015164	#33-3341								
GCMP		014366	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
			33-3191	33-3192	33-3193	#33-3234					
GDAT00		015176	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
			33-3191	33-3192	33-3193	33-3221	33-3227	33-3234	33-3256	#33-3346	
GDAT01		015200	#33-3347								
GDAT02		015202	#33-3348								
GDAT03		015204	#33-3349								
GDONE		015210	33-3195	#33-3351							
GERR1		014414	33-3239	#33-3244							
GFLAG1		015132	33-3182	*33-3182	33-3183	*33-3183	33-3184	*33-3184	33-3185	*33-3185	33-3186
			*33-3186	33-3187	*33-3187	33-3188	*33-3188	33-3189	*33-3189	33-3190	*33-3190
			33-3191	*33-3191	33-3192	*33-3192	33-3193	*33-3193	33-3207	#33-3328	
GFLAG2		015134	*33-3254	33-3262	33-3269	#33-3329					
GNS	=	******	19-1794	19-1794	24-1812	24-1813	24-1814	55-6269	55-6269	55-6269	55-6269
			56-6271	56-6271	64-6287	64-6287	64-6287	64-6287	64-6287	64-6287	64-6287
			64-6287	64-6287	64-6287	64-6287	64-6287	64-6287	64-6287	64-6287	64-6287
			64-6287	64-6287	64-6287	64-6287	64-6288	64-6288			
GOR0		015166	33-3271	33-3299	#33-3342						
GOR1		015170	#33-3343								
GOR2		015172	#33-3344								
GOR3		015174	#33-3345								
GPAT00		015136	33-3182	33-3184	33-3186	33-3188	33-3190	33-3192	33-3217	#33-3330	
GPAT01		015140	#33-3331								
GPAT02		015142	#33-3332								
GPAT03		015144	#33-3333								
GPAT10		015146	33-3183	33-3185	33-3187	33-3189	33-3191	33-3193	33-3212	#33-3334	
GPAT11		015150	#33-3335								
GPAT12		015152	#33-3336								
GPAT13		015154	#33-3337								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
GRESET	014346	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3227					
GSETUP	014270	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3207					
GSUM	014500	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3262					
GS1	014320	#33-3217	33-3231							
GTSWR	= 104406	24-1812	#64-6287							
G1	012176	33-3182	33-3182	#33-3182	33-3182					
G10	012504	33-3184	#33-3184							
G11	012506	33-3184	#33-3184							
G12	012600	33-3185	33-3185	#33-3185	33-3185					
G13	012632	33-3185	#33-3185							
G14	012634	33-3185	#33-3185							
G15	012726	33-3186	33-3186	#33-3186	33-3186					
G16	012760	33-3186	#33-3186							
G17	012762	33-3186	#33-3186							
G2	012230	33-3182	#33-3182							
G20	013054	33-3187	33-3187	#33-3187	33-3187					
G21	013106	33-3187	#33-3187							
G22	013110	33-3187	#33-3187							
G23	013202	33-3188	33-3188	#33-3188	33-3188					
G24	013234	33-3188	#33-3188							
G25	013236	33-3188	#33-3188							
G26	013330	33-3189	33-3189	#33-3189	33-3189					
G27	013362	33-3189	#33-3189							
G3	012232	33-3182	#33-3182							
G30	013364	33-3189	#33-3189							
G31	013456	33-3190	33-3190	#33-3190	33-3190					
G32	013510	33-3190	#33-3190							
G33	013512	33-3190	#33-3190							
G34	013604	33-3191	33-3191	#33-3191	33-3191					
G35	013636	33-3191	#33-3191							
G36	013640	33-3191	#33-3191							
G37	013732	33-3192	33-3192	#33-3192	33-3192					
G4	012324	33-3183	33-3183	#33-3183	33-3183					
G40	013764	33-3192	#33-3192							
G41	013766	33-3192	#33-3192							
G42	014060	33-3193	33-3193	#33-3193	33-3193					
G43	014112	33-3193	#33-3193							
G44	014114	33-3193	#33-3193							
G5	012356	33-3183	#33-3183							
G6	012360	33-3183	#33-3183							
G7	012452	33-3184	33-3184	#33-3184	33-3184					
HADR	015744	*34-3404	34-3412	#34-3433						
HA1R	016020	34-3396	34-3406	34-3415	#34-3442					
HA1W	015750	34-3362	34-3371	34-3381	34-3405	34-3423	#34-3436			
HA2R	016030	34-3397	#34-3443							
HA2W	015760	34-3372	34-3382	#34-3437						
HA3R	016040	34-3398	#34-3444							
HA3W	015770	34-3373	34-3383	#34-3438						
HA4R	016050	34-3399	#34-3445							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
HA4W	016000	34-3374	34-3384	#34-3439					
HA5R	016060	34-3400	#34-3446						
HA5W	016010	34-3375	34-3385	#34-3440					
HCLR	015674	34-3368	34-3395	#34-3415					
HCLR1	015704	#34-3417	34-3418						
HCMP	015636	34-3379	34-3381	34-3382	34-3383	34-3384	34-3385	#34-3404	
HCMP1	015656	#34-3408	34-3411						
HCMP2	015666	34-3409	#34-3411						
HDAT1	016070	34-3363	#34-3448						
HDAT2	016100	#34-3449							
HDAT3	016110	#34-3450							
HDAT4	016120	#34-3451							
HDAT5	016130	#34-3452							
HDONE	016140	34-3389	34-3430	#34-3453					
HERROR	015712	34-3410	#34-3422						
HFLAG	015746	*34-3361	34-3387	*34-3391	#34-3434				
HSTD	015560	34-3377	34-3381	34-3382	34-3383	34-3384	34-3385	#34-3395	
HT	= 000011	#19-1783	59-6277	59-6277					
H1	015222	34-3359	#34-3361						
H10	015464	#34-3384	34-3384						
H11	015516	#34-3385	34-3385						
H12	015550	34-3388	#34-3391						
H2	015242	#34-3365	34-3366						
H3	015252	#34-3370	34-3392						
H4	015324	#34-3377							
H5	015346	#34-3381	34-3381						
H6	015400	#34-3382	34-3382						
H7	015432	#34-3383	34-3383						
IBSAVE	037144	#57-6273	*57-6273	*57-6273	57-6273	57-6273	57-6273	57-6273	
IDATI0	011300	31-2710	31-2716	31-2734	31-2760	31-2765	31-2794	31-2830	#31-2871
IDATI1	011302	#31-2872							
IDATI2	011304	*31-2791	#31-2873						
IDATI3	011306	*31-2792	#31-2874						
IDATO0	011270	31-2730	31-2733	31-2788	31-2793	31-2831	#31-2866		
IDATO1	011272	#31-2867							
IDATO2	011274	31-2739	31-2744	31-2799	#31-2868				
IDATO3	011276	31-2802	#31-2869						
IDONE	011310	31-2808	31-2826	31-2833	31-2841	31-2853	#31-2876		
IERR0	011050	31-2723	#31-2811						
IERR1	011132	31-2748	31-2801	#31-2829					
IERR2	011152	31-2752	#31-2836						
IERR25	011174	#31-2839	31-2845						
IERR3	011224	31-2783	#31-2848						
IERR4	011200	31-2804	#31-2842						
ILLMS	044033	#71-6530	75-7195						
ILL1	043727	#71-6527							
ILL2	043772	#71-6529							
IOTVEC	= 000020	#19-1783	*24-1811	*24-1811					
IPAT10	011250	31-2711	31-2759	#31-2856					
IPAT11	011252	#31-2857							
IPAT12	011254	31-2799	#31-2858						
IPAT13	011256	31-2802	#31-2859						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES					
IPAT20	011260	31-2719	31-2768	#31-2861			
IPAT21	011262	#31-2862					
IPAT22	011264	#31-2863					
IPAT23	011266	#31-2864					
I1	010450	31-2706	#31-2708				
I10	010632	31-2742	#31-2751				
I105	010640	31-2737	#31-2754				
I106	010634	31-2750	#31-2752				
I11	010642	#31-2758					
I12	010650	31-2758	#31-2759				
I13	010664	#31-2762	31-2763				
I14	010726	31-2772	#31-2776	31-2849			
I15	010730	#31-2777	31-2815				
I16	010732	#31-2778	31-2817				
I17	010750	31-2782	#31-2785				
I2	010466	#31-2713	31-2714				
I20	011010	#31-2796	31-2806				
I21	011024	#31-2801	31-2803				
I22	011030	31-2800	#31-2802				
I23	011044	31-2797	#31-2806				
I3	010534	31-2724	#31-2726				
I4	010536	#31-2727	31-2811				
I5	010540	#31-2728	31-2813				
I6	010564	#31-2736	31-2754				
I7	010600	#31-2741	31-2751				
JBUF0	017144	36-3641	#36-3690				
JBUF1	017146	#36-3691					
JBUF2	017150	#36-3692					
JBUF3	017152	#36-3693					
JDATI0	017154	36-3630	36-3645	36-3653	36-3677	36-3685	#36-3695
JDATI1	017156	#36-3696					
JDATI2	017160	#36-3697					
JDATI3	017162	#36-3698					
JDAT00	017164	36-3638	36-3646	36-3686	#36-3700		
JDAT0	017174	36-3627	#36-3705				
JDAT01	017166	#36-3701					
JDAT02	017170	#36-3702					
JDAT03	017172	#36-3703					
JDAT1	017176	#36-3706					
JDAT2	017200	#36-3707					
JDAT3	017202	#36-3708					
JDONE	017204	36-3657	36-3672	36-3679	36-3688	#36-3711	
JERR0	017024	36-3632	#36-3661				
JERR1	017072	36-3643	36-3655	#36-3674			
JERR2	017116	36-3650	#36-3683				
J1	016716	36-3622	#36-3624				
J10	017044	36-3662	36-3664	#36-3667			
J2	016742	#36-3634	36-3675	36-3684			
J3	016744	#36-3635	36-3661				
J4	016746	#36-3636	36-3663				
J5	017002	#36-3648	36-3651				
J6	017010	36-3649	#36-3651				

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES					
J7	017022	36-3654	#36-3657				
KBUF0	017452	37-3729	37-3740	37-3752	#37-3793		
KBUF1	017454	#37-3794					
KBUF2	017456	#37-3795					
KBUF3	017460	#37-3796					
KDATI0	017442	37-3744	37-3775	37-3783	#37-3788		
KDATI1	017444	#37-3789					
KDATI2	017446	#37-3790					
KDATI3	017450	#37-3791					
KDATO0	017462	37-3737	37-3745	37-3784	#37-3798		
KDATO1	017464	#37-3799					
KDATO2	017466	#37-3800					
KDATO3	017470	#37-3801					
KDONE	017502	37-3756	37-3770	37-3777	37-3786	#37-3808	
KERR0	017324	37-3731	#37-3760				
KERR1	017370	37-3742	37-3754	#37-3772			
KERR2	017414	37-3749	#37-3781				
KPAT0	017472	37-3726	#37-3803				
KPAT1	017474	#37-3804					
KPAT2	017476	#37-3805					
K1	017216	37-3721	#37-3723				
K10	017344	37-3761	37-3763	#37-3766			
K2	017242	#37-3733	37-3773	37-3782			
K3	017244	#37-3734	37-3760				
K4	017246	#37-3735	37-3762				
K5	017302	#37-3747	37-3750				
K6	017310	37-3748	#37-3750				
K7	017322	37-3753	#37-3756				
LDATI0	020006	38-3826	38-3833	38-3852	38-3872	38-3884	#38-3898
LDATI1	020010	#38-3899					
LDATI2	020012	38-3846	*38-3850	38-3866	#38-3900		
LDATI3	020014	*38-3851	#38-3901				
LDATO0	020020	38-3843	38-3853	38-3873	38-3878	#38-3902	
LDATO1	020022	38-3885	#38-3903				
LDATO2	020024	#38-3904					
LDATO3	020026	#38-3905					
LDONE	020030	38-3861	38-3868	38-3875	38-3887	#38-3907	
LD1	043567	#71-6517					
LD2	043617	#71-6518					
LERR1	017642	38-3848	#38-3863				
LERR2	017714	38-3858	#38-3877				
LERR3	017666	#38-3870	38-3881				
LF =	000012	#19-1783	59-6277	59-6277			
LFIEX1	042745	#71-6500	75-7171	75-7173			
LFIEX2	043015	#71-6501	75-7171	75-7173			
LFPS1	043554	#71-6516					
LOOP	004456	#24-1816	55-6269				
LPAT10	017764	38-3823	#38-3889				
LPAT11	017766	#38-3890					
LPAT12	017770	#38-3891					
LPAT13	017772	#38-3892					
LPAT20	017774	38-3827	38-3877	#38-3894			

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
LPAT21	017776	#38-3895								
LPAT22	020000	#38-3896								
LPAT23	020002	#38-3897								
L1	017514	38-3818	#38-3820							
L2	017554	#38-3837	38-3864	38-3871	38-3883					
L3	017556	#38-3838								
L4	017560	#38-3840								
L5	017630	#38-3856	38-3859							
L6	017636	38-3857	#38-3859							
MDAT00	020350	39-3941	39-3944	39-3954	39-3964	39-3980	#39-4006			
MDAT01	020352	#39-4007								
MDAT02	020354	#39-4008								
MDAT03	020356	#39-4009								
MDONE	020360	39-3952	39-3966	39-3976	39-3983	39-3994	#39-4011			
MERR0	020204	39-3937	#39-3968							
MERR1	020242	39-3947	39-3958	#39-3978						
MERR2	020156	#39-3961								
MERR3	020270	39-3926	#39-3985							
MNUMBE	= 000214	#19-815	21-1799							
MNUM0	044535	33-3182	33-3183	#71-6547						
MNUM1	044543	33-3184	33-3185	#71-6548						
MNUM2	044550	33-3186	33-3187	#71-6549						
MNUM3	044555	33-3188	33-3189	#71-6550						
MNUM4	044564	33-3190	33-3191	#71-6551						
MNUM5	044572	33-3192	33-3193	#71-6552						
MPAT10	020330	39-3922	#39-3996							
MPAT11	020332	#39-3997								
MPAT12	020334	#39-3998								
MPAT13	020336	#39-3999								
MPAT20	020340	39-3963	39-3981	#39-4001						
MPAT21	020342	#39-4002								
MPAT22	020344	#39-4003								
MPAT23	020346	#39-4004								
MS1	044101	#71-6531	75-7198	75-7211	75-7228	75-7244				
MS10	044255	#71-6538	75-7201	75-7202	75-7204	75-7214	75-7215	75-7224	75-7225	75-7236
		75-7259	75-7259	75-7288	75-7289					
MS11	044270	#71-6539	75-7202	75-7215	75-7225	75-7259	75-7289			
MS12	044315	#71-6540	75-7204	75-7236						
MS13	044353	#71-6541	75-7204	75-7237						
MS14	044370	#71-6542	75-7205							
MS15	044456	#71-6544	75-7205							
MS16	044503	30-2626	30-2662	#71-6545						
MS17	044510	#71-6546	75-7227	75-7229						
MS2	044113	#71-6532	75-7199	75-7212	75-7228	75-7245				
MS20	044600	#71-6553	75-7227							
MS21	044641	#71-6554	75-7228	75-7228	75-7230	75-7231	75-7244	75-7245		
MS22	044700	#71-6555	75-7230							
MS23	044730	#71-6556	75-7231							
MS24	044757	#71-6557	75-7229							
MS25	045052	#71-6559	75-7232	75-7240						
MS26	045074	#71-6560	75-7233	75-7240						
MS27	045111	#71-6561	75-7240	75-7240						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
MS3	044120	#71-6533	75-7198	75-7199	75-7211	75-7212				
MS30	045120	#71-6562	75-7232	75-7234						
MS31	045127	#71-6563	75-7232	75-7234						
MS32	045136	#71-6564	75-7233	75-7235						
MS33	045145	#71-6565	75-7233	75-7235						
MS34	045154	#71-6566	75-7233	75-7235						
MS35	045163	31-2725	32-2902	#71-6567						
MS36	045170	31-2773	32-2944	#71-6568						
MS37	045177	#71-6569	75-7289	75-7294						
MS4	044147	#71-6534	75-7198	75-7199	75-7211	75-7212				
MS40	045215	#71-6570	75-7295							
MS41	045251	#71-6572	75-7297							
MS415	045231	#71-6571	75-7295							
MS42	045275	#71-6573	75-7298							
MS43	045313	#71-6574	75-7298							
MS44	045330	#71-6575	75-7299							
MS5	044161	#71-6535								
MS6	044223	#71-6536	75-7201	75-7214	75-7224	75-7258	75-7288			
MS7	044241	#71-6537	75-7201	75-7202	75-7204	75-7214	75-7215	75-7224	75-7225	75-7236
		75-7258	75-7259	75-7288	75-7289					
M1	020034	#39-3919								
M15	020054	#39-3928	39-3962	39-3974	39-3979	39-3991				
M2	020060	#39-3931	39-3968	39-3990						
M3	020062	#39-3932								
M4	020064	#39-3933								
M5	020120	39-3946	#39-3948							
M6	020124	#39-3949	39-3951							
M7	020134	39-3950	#39-3954							
M8	020144	#39-3956	39-3959							
M9	020154	39-3957	#39-3959							
NDATI0	021056	40-4072	40-4129	40-4137	#40-4146					
NDATI1	021060	#40-4147								
NDATI2	021062	#40-4148								
NDATI3	021064	#40-4149								
NDATO0	021014	40-4037	40-4054	40-4061	40-4071	40-4128	#40-4133			
NDATO1	021016	#40-4134					•			
NDATO2	021020	#40-4135								
NDATO3	021022	#40-4136								
NDONE	021066	40-4077	40-4098	40-4106	40-4112	40-4124	40-4131	#40-4151		
NERR0	020556	40-4030	#40-4085							
NERR1	020656	40-4045	#40-4107							
NERR10	020610	40-4086	#40-4094							
NERR11	020622	40-4091	#40-4100							
NERR2	020712	40-4049	#40-4113							
NERR20	020664	#40-4108	40-4114	40-4116	40-4118					
NERR3	020722	40-4059	#40-4115							
NERR4	020732	40-4067	#40-4117							
NERR5	020742	40-4069	#40-4120							
NERR6	020766	40-4079	#40-4126							
NOOP:	043141	#71-6505	75-7177	75-7181						
NOOP10	043417	#71-6513	75-7179	75-7181						
NOOP11	043510	#71-6515	75-7181							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
NOOP15	043170	#71-6506	75-7177							
NOOP2	043265	#71-6507	75-7177	75-7178						
NOOP3	043302	#71-6508	75-7178	75-7178						
NOOP4	043314	#71-6509	75-7178							
NOOP5	043331	#71-6510	75-7178							
NOOP6	043357	#71-6511	75-7179							
NOOP7	043377	#71-6512	75-7179							
NPAT10	021046	40-4025	#40-4141							
NPAT11	021050	#40-4142								
NPAT12	021052	#40-4143								
NPAT13	021054	#40-4144								
NPAT20	021034	40-4028	40-4040	40-4043	40-4047	40-4051	40-4062	40-4090	40-4121	#40-4137
NPAT21	021036	#40-4138								
NPAT22	021040	#40-4139								
NPAT23	021042	#40-4140								
NULL	042737	30-2595	30-2632	#71-6497						
N1	020364	#40-4022								
N10	020516	#40-4064	40-4066							
N11	020526	40-4052	40-4065	#40-4069						
N12	020530	40-4041	#40-4071							
N13	020544	#40-4074	40-4076							
N14	020554	40-4075	#40-4079							
N2	020410	#40-4033	40-4110	40-4122	40-4127					
N3	020412	#40-4034	40-4087							
N4	020414	#40-4035	40-4085							
N5	020432	#40-4043								
N6	020442	40-4044	#40-4047							
N7	020452	40-4048	#40-4051							
N8	020470	#40-4056	40-4058							
N9	020502	40-4057	#40-4061							
ODATI0	021562	41-4212	41-4270	41-4278	#41-4288					
ODATI1	021564	#41-4289								
ODATI2	021566	#41-4290								
ODATI3	021570	#41-4291								
ODATO0	021520	41-4178	41-4201	41-4211	41-4269	#41-4274				
ODATO1	021522	41-4194	#41-4275							
ODATO2	021524	#41-4276								
ODATO3	021526	#41-4277								
ODONE	021572	41-4217	41-4236	41-4246	41-4253	41-4265	41-4272	#41-4293		
OFRR0	021262	41-4170	#41-4225							
OERR1	021362	41-4186	41-4231	#41-4248						
OERR10	021314	41-4226	#41-4234							
OERR11	021326	#41-4240								
OERR2	021416	41-4190	#41-4254							
OERR20	021370	#41-4249	41-4255	41-4257	41-4259					
OERR3	021426	41-4199	#41-4256							
OERR4	021436	41-4207	#41-4258							
OERR5	021446	41-4209	#41-4261							
OERR6	021472	41-4219	#41-4267							
OPAT10	021552	41-4165	#41-4283							
OPAT11	021554	#41-4284								
OPAT12	021556	#41-4285								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
OPAT13	021560	#41-4286							
OPAT20	021536	41-4181	41-4262	#41-4278					
OPAT21	021540	41-4168	41-4184	41-4188	41-4192	41-4202	41-4230	#41-4279	
OPAT22	021542	#41-4280							
OPAT23	021544	#41-4281							
OPAT24	021546	#41-4282							
01	021072	#41-4162							
010	021222	#41-4204	41-4206						
011	021232	41-4205	#41-4209						
012	021234	41-4182	#41-4211						
013	021250	#41-4214	41-4216						
014	021260	41-4215	#41-4219						
02	021116	#41-4174	41-4251	41-4268					
03	021120	#41-4175	41-4227						
04	021122	#41-4176	41-4225	41-4263					
05	021140	#41-4184							
06	021150	41-4185	#41-4188						
07	021160	41-4189	#41-4192						
08	021174	#41-4196	41-4198						
09	021206	41-4197	#41-4201						
PDATI0	022226	42-4311	42-4319	42-4324	42-4345	42-4349	42-4353	42-4357	42-4361	42-4379
		42-4385	#42-4403						
PDATI1	022230	#42-4404							
PDATI2	022232	#42-4405							
PDATI3	022234	#42-4406							
PDATO0	022236	42-4316	42-4320	42-4329	42-4386	#42-4408			
PDATO1	022240	#42-4409							
PDATO2	022242	#42-4410							
PDATO3	022244	#42-4411							
PDONE	022246	42-4327	42-4371	42-4381	42-4388	42-4396	#42-4413		
PERR0	021714	42-4309	#42-4337						
PERR1	022134	42-4333	#42-4383						
PERR10	021734	42-4340	#42-4343						
PERR11	021744	42-4338	#42-4345						
PERR12	021762	42-4346	#42-4349						
PERR13	022000	42-4350	#42-4353						
PERR14	022016	42-4354	#42-4357						
PERR15	022034	42-4358	#42-4361						
PERR16	022044	42-4362	#42-4364						
PERR17	022052	42-4344	42-4348	42-4352	42-4356	42-4360	#42-4366		
PERR2	022162	42-4335	#42-4390						
PERR20	022100	42-4363	#42-4373						
PERR21	022110	42-4326	#42-4376						
PERR22	022116	42-4375	#42-4377						
PFECAD	042506	66-6427	#66-6431						
PFECDH	042456	66-6427	#66-6429						
PFECEM	042422	66-6427	#66-6428						
PFECFT	042516	66-6427	#66-6432						
PFECWS	042412	#66-6427							
PIRQ	= 177772	#19-1783							
PIRQVE	= 000240	#19-1783							
POWERM	042672	65-6291	#71-6496						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
PPAT10	022216	42-4306	#42-4398						
PPAT11	022220	#42-4399							
PPAT12	022222	#42-4400							
PPAT13	022224	#42-4401							
PROGNU	= 000001	#19-816	24-1812						
PR0	= 000000	#19-1783							
PR1	= 000040	#19-1783							
PR2	= 000100	#19-1783							
PR3	= 000140	#19-1783							
PR4	= 000200	#19-1783							
PR5	= 000240	#19-1783							
PR6	= 000300	#19-1783							
PR7	= 000340	#19-1783							
PS	= 177776	#19-1783	19-1783						
PSW	= 177776	#19-1783	26-1956						
PWRVEC	= 000024	#19-1783	*24-1811	*24-1811	*65-6291	*65-6291	*65-6291	*65-6291	*65-6291	*65-6291
P1	021576	#42-4303							
P2	021620	#42-4313	42-4314	42-4376	42-4384	42-4391			
P3	= 021622	#42-4314	42-4337	43-4472					
P4	021624	#42-4316	42-4339						
P5	021646	#42-4321	42-4323						
P6	021670	42-4322	#42-4329						
P7	021700	#42-4331	42-4334						
P8	021710	42-4332	#42-4334						
QDATI0	022736	43-4444	43-4527	43-4537	#43-4547				
QDATI1	022740	#43-4548							
QDATI2	022742	#43-4549							
QDATI3	022744	#43-4550							
QDATO0	022726	43-4439	43-4443	43-4454	43-4462	43-4528	#43-4542		
QDATO1	022730	#43-4543							
QDATO2	022732	#43-4544							
QDATO3	022734	#43-4545							
QDONE	022746	43-4452	43-4503	43-4513	43-4523	43-4530	#43-4552		
QERR0	022414	43-4430	#43-4472						
QERR1	022660	43-4466	#43-4525						
QERR11	022424	#43-4475							
QERR12	022442	43-4476	#43-4479						
QERR13	022460	43-4480	#43-4483						
QERR14	022476	43-4484	#43-4487						
QERR15	022514	43-4488	#43-4492						
QERR16	022524	43-4493	#43-4496						
QERR17	022532	43-4478	43-4482	43-4486	43-4490	#43-4498			
QERR2	022614	43-4459	#43-4515						
QERR20	022560	43-4494	#43-4505						
QERR21	022570	43-4451	#43-4508						
QERR22	022576	43-4507	#43-4509						
QERR3	022624	43-4468	#43-4517						
QERR4	022632	43-4516	#43-4519						
QPAT10	022706	43-4427	#43-4532						
QPAT11	022710	#43-4553							
QPAT12	022712	#43-4534							
QPAT13	022714	#43-4535							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
QPAT20	022716	43-4434	43-4449	43-4461	43-4475	43-4479	43-4483	43-4487	43-4492	43-4511
		#43-4537								
QPAT21	022720	#43-4538								
QPAT22	022722	#43-4539								
QPAT23	022724	#43-4540								
Q1	022252	#43-4424								
Q10	022410	43-4465	#43-4467							
Q2	022274	#43-4436	43-4437	43-4508	43-4521	43-4526				
Q3	= 022276	#43-4437								
Q4	022300	#43-4439								
Q5	022322	#43-4445	43-4447							
Q6	022344	43-4446	#43-4454							
Q7	022354	#43-4456	43-4458							
Q8	022366	43-4457	#43-4461							
Q9	022402	#43-4464	43-4467							
RDCHR	= 104410	#64-6287								
RESREG	= 104412	#64-6287								
RESVEC	= 000010	#19-1783	*24-1811	24-1811	*24-1811					
RSETUP	= 104413	25-1938	26-1981	27-2173	28-2265	29-2318	30-2697	31-2876	32-3044	33-3351
		34-3453	35-3613	36-3711	37-3808	38-3907	39-4011	40-4151	41-4293	42-4413
		43-4552	45-4915	46-5065	47-5161	48-5240	49-5415	50-5672	51-5834	51-5839
		51-5888	52-6112	53-6194	#64-6288	67-6451	68-6460	69-6469		
R6	=%000006	#19-1783	*24-1811	*24-1811	24-1811					
R7	=%000007	#19-1783								
SADR	016660	*35-3529	35-3542	*35-3547	35-3554	35-3560	#35-3601			
SAVREG	= 104411	#64-6287								
SCOPE	= 000004	#19-1783	25-1835	26-1946	27-1991	28-2195	29-2275	30-2333	31-2705	32-2884
		33-3180	34-3358	35-3463	36-3621	37-3720	38-3817	39-3917	40-4020	41-4160
		42-4301	43-4422	44-4570	45-4782	46-4924	47-5074	48-5170	49-5250	50-5426
		51-5684	52-5896	53-6120	54-6204	55-6269				
SDAT00	016674	35-3482	35-3485	35-3512	35-3515	#35-3608				
SDAT01	016676	#35-3609								
SDAT02	016700	#35-3610								
SDAT03	016702	#35-3611								
SDONE	016704	35-3547	35-3566	35-3569	35-3573	35-3576	35-3588	35-3599	#35-3613	
SERR0	016636	35-3469	#35-3525							
SERR1	016574	35-3474	#35-3579							
SERR10	016404	#35-3531	35-3548							
SERR15	016464	35-3536	#35-3551							
SERR2	016524	35-3490	#35-3564							
SERR20	016504	35-3541	#35-3557							
SERR3	016550	35-3493	#35-3571							
SERR4	016442	35-3502	#35-3544							
SERR5	016626	35-3504	#35-3590							
SERR6	016536	35-3520	#35-3567							
SERR7	016562	35-3522	#35-3574							
SETD1	043705	27-2024	27-2122	#71-6524						
SETF1	043677	27-1995	27-2146	#71-6523						
SETI1	043713	27-2052	27-2152	#71-6525						
SETL1	043721	27-2081	27-2128	#71-6526						
SPACE	042742	66-6436	#71-6499							
SPAT10	016664	35-3466	35-3486	35-3499	35-3516	#35-3603				

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
SPAT11	016666	#35-3604							
SPAT12	016670	#35-3605							
SPAT13	016672	#35-3606							
STACK =	001100	#19-1783	24-1811	70-6491					
START	003616	19-1794	#24-1811	65-6291					
STFS1	043630	#71-6519							
STKLMT =	177774	#19-1783							
STST1	043760	#71-6528							
ST1	043643	#71-6520							
ST2	043660	#71-6521							
SWR	001140	#20-1795	24-1811	*24-1811	24-1811	*24-1811	*24-1811	24-1812	25-1887	25-1889
		33-3264	33-3266	55-6269	56-6271	56-6271	56-6271	56-6271	56-6271	57-6273
		57-6273	57-6273	57-6273	57-6273	63-6285	63-6285	65-6291	65-6291	70-6480
SWREG	000176	#19-1794	24-1811	24-1812	63-6285	63-6285				
SW0 =	000001	#19-1783								
SW00 =	000001	#19-1783	19-1783							
SW01 =	000002	#19-1783	19-1783							
SW02 =	000004	#19-1783	19-1783							
SW03 =	000010	#19-1783	19-1783							
SW04 =	000020	#19-1783	19-1783							
SW05 =	000040	#19-1783	19-1783							
SW06 =	000100	#19-1783	19-1783							
SW07 =	000200	#19-1783	19-1783							
SW08 =	000400	#19-1783	19-1783							
SW09 =	001000	#19-1783	19-1783							
SW1 =	000002	#19-1783								
SW10 =	002000	#19-1783								
SW11 =	004000	#19-1783								
SW12 =	010000	#19-1783								
SW13 =	020000	#19-1783	25-1887	33-3264						
SW14 =	040000	#19-1783								
SW15 =	100000	#19-1783								
SW2 =	000004	#19-1783								
SW3 =	000010	#19-1783								
SW4 =	000020	#19-1783								
SW5 =	000040	#19-1783								
SW6 =	000100	#19-1783								
SW7 =	000200	#19-1783	25-1889	33-3266						
SW8 =	000400	#19-1783								
SW9 =	001000	#19-1783								
S1	016144	#35-3464								
S10	016322	#35-3510								
S11	016346	#35-3518	35-3521							
S12	016356	35-3519	#35-3521							
S2	016204	#35-3477	35-3564	35-3571						
S3	016206	#35-3478	35-3525	35-3579						
S4	016212	#35-3480	35-3581							
S5	016236	#35-3488	35-3491							
S6	016246	35-3489	#35-3491							
S7	016254	#35-3496	35-3529							
S8	016314	#35-3507	35-3567	35-3574	35-3590					
S9	016316	#35-3508	35-3544	35-3592						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
TAB	= 000011	#19-1781	71-6498	71-6500	71-6501	71-6505	71-6511	71-6512	71-6513	71-6513
		71-6513	71-6516	71-6516	71-6517	71-6517	71-6517	71-6518	71-6518	71-6519
		71-6519	71-6520	71-6520	71-6521	71-6521	71-6522	71-6523	71-6524	71-6525
		71-6526	71-6527	71-6528	71-6528	71-6529	71-6530	71-6530	71-6530	71-6542
		71-6542	71-6542	71-6543	71-6553	71-6553	71-6557	71-6557	71-6557	73-6855
		73-6855	73-6856	73-6856	73-6856	73-6857	73-6857	73-6858	73-6859	73-6859
		73-6860	73-6860	73-6861	73-6861	73-6862	73-6862	73-6863	73-6863	73-6872
		73-6872	73-6873	73-6874	73-6874	73-6875	73-6875	73-6876	73-6876	73-6877
		73-6877	73-6881	73-6881	73-6882	73-6882	73-6885	73-6885	73-6885	73-6886
		73-6886	73-6887	73-6887	73-6892	73-6892	73-6893	73-6900	73-6900	73-6901
		73-6905	73-6907	73-6907	73-6908	73-6912	73-6912	73-6922	73-6922	73-6923
		73-6923	73-6947	73-6947	73-6953	73-6953	73-6956	73-6956	73-6957	73-6957
		73-6969	73-6969	73-6974	73-6974	73-6975	73-6975	73-6985	73-6985	73-6989
		73-6989	73-7018	73-7018	73-7018					
TBITVE	= 000014	#19-1783	*24-1811	*24-1811						
TDATI0	012116	32-2888	32-2893	32-2911	32-2931	32-2936	32-2965	32-3001	#32-3039	
TDATI1	012120	#32-3040								
TDATI2	012122	*32-2962	#32-3041							
TDATI3	012124	*32-2963	#32-3042							
TDATO0	012106	32-2907	32-2910	32-2959	32-2964	32-3002	#32-3034			
TDATO1	012110	#32-3035								
TDATO2	012112	32-2916	32-2970	#32-3036						
TDATO3	012114	32-2973	#32-3037							
TDONE	012126	32-2978	32-2997	32-3004	32-3011	32-3022	#32-3044			
TERR0	011674	32-2900	#32-2982							
TERR1	011756	32-2920	32-2972	#32-3000						
TERR2	011776	32-2922	#32-3007							
TERR25	012012	#32-3009	32-3014							
TERR3	012042	32-2954	#32-3017							
TERR4	012024	32-2975	#32-3012							
TKVEC	= 000060	#19-1783								
TOCTNM	042522	66-6360	66-6361	66-6369	66-6402	#66-6434				
TPAT10	012066	32-2887	32-2930	#32-3024						
TPAT11	012070	#32-3025								
TPAT12	012072	32-2970	#32-3026							
TPAT13	012074	32-2973	#32-3027							
TPAT20	012076	32-2896	32-2939	#32-3029						
TPAT21	012100	#32-3030								
TPAT22	012102	#32-3031								
TPAT23	012104	#32-3032								
TPVEC	= 000064	#19-1783								
TRAPVE	= 000034	#19-1783	*24-1811	*24-1811						
TRTVEC	= 000014	#19-1783								
TST1	004456	#25-1835								
TST10	011312	#32-2884								
TST11	012130	#33-3180								
TST12	015212	#34-3358								
TST13	016142	#35-3463								
TST14	016706	#36-3621								
TST15	017206	#37-3720								
TST16	017504	#38-3817								
TST17	020032	#39-3917								

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES								
TST2		005050	#26-1946								
TST20		020362	#40-4020								
TST21		021070	#41-4160								
TST22		021574	#42-4301								
TST23		022250	#43-4422								
TST24		022750	#44-4570								
TST25		024110	#45-4782								
TST26		024706	#46-4924								
TST27		025522	#47-5074								
TST3		005156	#27-1991								
TST30		026132	#48-5170								
TST31		026440	#49-5250								
TST32		027506	#50-5426								
TST33		031324	#51-5684								
TST34		C32660	#52-5896								
TST35		034710	#53-6120								
TST36		035474	#54-6204								
TST37		036060	#54-6267								
TST4		006122	#28-2195								
TST5		006370	#29-2275								
TST6		006534	#30-2333								
TST7		010440	#31-2705								
TYPDS	=	104405	#64-6287								
TYPE	=	104401	24-1812	24-1813	24-1814	33-3284	33-3291	33-3307	33-3317	33-3318	55-6269
			55-6269	55-6269	55-6269	55-6269	56-6271	56-6271	57-6273	57-6273	59-6277
			60-6279	61-6281	63-6285	63-6285	63-6285	63-6285	63-6285	63-6285	#64-6287
			65-6291	66-6301	66-6329	66-6331	66-6336	66-6338	66-6386	66-6393	66-6408
			66-6418	66-6436							
TYPOC	=	104402	63-6285	#64-6287	66-6312	66-6353	66-6435				
TYPON	=	104404	#64-6287								
TYPOS	=	104403	55-6269	55-6269	55-6269	#64-6287	66-6377				
T1		011314	#32-2885								
T10		011462	32-2919	#32-2921							
T105		011470	32-2914	#32-2924							
T11		011472	#32-2928								
T12		011500	32-2928	#32-2930							
T13		011514	#32-2933	32-2934							
T14		011556	32-2943	#32-2946							
T15		011560	#32-2947	32-2986	32-3018						
T16		011562	#32-2948	32-2988							
T17		011600	32-2953	#32-2956							
T2		011340	#32-2890	32-2891							
T20		011640	#32-2967	32-2977							
T21		011654	#32-2972	32-2974							
T22		011656	32-2971	#32-2973							
T23		011670	32-2968	#32-2977							
T3		011406	32-2901	#32-2903							
T4		011410	#32-2904	32-2982							
T5		011412	#32-2905	32-2984							
T6		011436	#32-2913	32-2924							
T7		011452	#32-2918	32-2921							
UDONE		024110	44-4682	44-4691	44-4709	44-4724	44-4735	44-4740	#44-4772		

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
UERR0	023554	44-4579	#44-4685						
UERR1	023600	44-4599	44-4656	#44-4695					
UERR10	023606	#44-4697	44-4711						
UERR11	023650	#44-4706							
UERR2	023664	44-4620	44-4638	#44-4710					
UERR20	023672	44-4696	#44-4712						
UERR21	023734	#44-4721							
UERR3	023750	44-4670	#44-4727						
UERR4	024000	44-4734	#44-4736						
UFLAG	024074	*44-4571	44-4657	*44-4664	#44-4766				
UPAT00	024024	44-4572	44-4583	44-4605	44-4624	44-4642	44-4660	44-4673	#44-4741
UPAT01	024026	#44-4742							
UPAT02	024030	#44-4743							
UPAT03	024032	#44-4744							
UPAT10	024034	44-4589	#44-4746						
UPAT11	024036	#44-4747							
UPAT12	024040	#44-4748							
UPAT13	024042	#44-4749							
UPAT20	024044	44-4611	#44-4751						
UPAT21	024046	#44-4752							
UPAT22	024050	#44-4753							
UPAT23	024052	#44-4754							
UPAT30	024054	44-4629	#44-4756						
UPAT31	024056	#44-4757							
UPAT32	024060	#44-4758							
UPAT33	024062	#44-4759							
UPAT40	024064	44-4647	44-4675	#44-4761					
UPAT41	024066	#44-4762							
UPAT42	024070	#44-4763							
UPAT43	024072	#44-4764							
UROM1	024102	*44-4585	*44-4607	*44-4626	*44-4644	44-4712	#44-4769		
UROM2	024104	*44-4586	*44-4608	*44-4627	*44-4645	44-4713	#44-4770		
UROM3	024106	*44-4587	*44-4609	*44-4628	*44-4646	44-4698	#44-4771		
UTMP1	024076	*44-4577	44-4585	44-4644	*44-4665	#44-4767			
UTMP2	024100	*44-4578	44-4607	44-4626	*44-4666	#44-4768			
U0	022766	#44-4574	44-4575						
U1	023016	#44-4580	44-4667						
U10	023374	#44-4648	44-4651						
U11	023376	#44-4649	44-4685						
U12	023430	44-4655	#44-4657						
U13	023446	#44-4662	44-4663						
U14	023500	44-4658	#44-4668						
U15	023534	#44-4676	44-4679	44-4736					
U16	023536	#44-4677	44-4727						
U2	023066	#44-4590	44-4592						
U3	023120	44-4598	#44-4601						
U4	023170	#44-4613	44-4615						
U5	023222	44-4619	#44-4621						
U6	023272	#44-4631	44-4633						
U7	023324	44-4637	#44-4639						
WDAP00	024674	#45-4910							
WDAT01	024676	#45-4911							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
WDAT0	024700	#45-4912								
WDATC	024702	#45-4913								
WDONE	024704	45-4802	45-4810	45-4830	45-4838	45-4858	45-4866	45-4888	45-4891	45-4896
		#45-4915								
WPAT00	024664	45-4786	45-4789	45-4793	45-4795	45-4814	45-4819	45-4823	45-4825	45-4842
		45-4845	45-4849	45-4851	45-4870	45-4875	45-4879	45-4881	45-4900	45-4901
		45-4902	45-4903	#45-4905						
WPAT01	024666	#45-4906								
WPAT02	024670	#45-4907								
WPAT03	024672	#45-4908								
WSETUP	024632	45-4800	45-4856	45-4886	#45-4900					
W1	024112	#45-4783								
W10	024334	45-4828	#45-4831							
W11	024362	45-4833	#45-4839							
W12	024416	45-4844	#45-4846							
W13	024442	#45-4853	45-4859							
W14	024456	45-4854	#45-4859							
W15	024504	45-4861	#45-4867							
W16	024544	45-4872	#45-4876							
W17	024570	#45-4883	45-4889							
W2	024146	45-4788	#45-4790							
W20	024604	45-4884	#45-4889							
W3	024172	#45-4797	45-4803							
W4	024210	45-4798	#45-4803							
W5	024240	45-4805	#45-4811							
W6	024300	45-4816	#45-4820							
W7	024324	#45-4827	45-4831							
XAPT11	025502	#46-5057								
XDAT00	025460	46-4936	46-4959	46-4982	46-5005	46-5023	46-5028	#46-5046		
XDAT01	025462	#46-5047								
XDAT02	025464	#46-5048								
XDAT03	025466	#46-5049								
XDONE	025520	46-5017	46-5025	46-5031	46-5039	46-5044	#46-5065			
XERR1	025344	46-4942	46-4965	#46-5021						
XERR2	025426	46-4947	46-4970	#46-5035						
XERR3	025372	46-4988	46-5011	#46-5026						
XERR4	025442	46-4993	46-5016	#46-5040						
XPAT00	025470	46-4928	46-4938	46-4974	46-4984	#46-5051				
XPAT01	025472	#46-5052								
XPAT02	025474	#46-5053								
XPAT03	025476	#46-5054								
XPAT10	025500	46-4932	46-4955	46-4978	46-5001	46-5021	46-5026	#46-5056		
XPAT12	025504	#46-5058								
XPAT13	025506	#46-5059								
XPAT20	025510	46-4951	46-4961	46-4997	46-5007	#46-5060				
XPAT21	025512	#46-5061								
XPAT22	025514	#46-5062								
XPAT23	025516	#46-5063								
XTMP	025456	*46-4929	*46-4952	*46-4975	*46-4998	46-5022	46-5027	46-5029	#46-5045	
X1	024710	#46-4925								
X10	025112	46-4964	#46-4966							
X11	025126	46-4969	#46-4971							

SYMBOL	VALUE	REFERENCES						
X12	025166	46-4977	#46-4979					
X13	025212	#46-4986	46-4989					
X14	025220	46-4987	#46-4989					
X15	025234	46-4992	#46-4994					
X16	025274	46-5000	#46-5002					
X17	025320	#46-5009	46-5012					
X2	024750	46-4931	#46-4933					
X20	025326	46-5010	#46-5012					
X21	025342	46-5015	#46-5017					
X3	024774	#46-4940	46-4943					
X4	025002	46-4941	#46-4943					
X5	025020	46-4946	#46-4948					
X6	025060	46-4954	#46-4956					
X7	025104	#46-4963	46-4966					
YDAT00	026070	47-5088	47-5108	47-5117	47-5125	#47-5141		
YDAT01	026072	#47-5142						
YDAT02	026074	#47-5143						
YDAT03	026076	#47-5144						
YDONE	026130	47-5105	47-5120	47-5128	47-5134	#47-5161		
YERR1	025730	47-5110	#47-5113					
YERR2	025772	47-5112	#47-5121					
YERR3	026034	47-5097	#47-5129					
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YPAT03	026106	#47-5149						
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YPAT11	026112	#47-5152						
YPAT12	026114	#47-5153						
YPAT13	026116	#47-5154						
YPAT20	026120	47-5082	47-5116	47-5124	#47-5156			
YPAT21	026122	#47-5157						
YPAT22	026124	#47-5158						
YPAT23	026126	#47-5159						
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YTMP2	026064	*47-5077	47-5091	*47-5102	47-5118	47-5126	#47-5138	
YTMP3	026066	*47-5078	47-5095	*47-5103	47-5132	#47-5139		
Y1	025552	#47-5079	47-5104					
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Y3	025624	#47-5092	47-5094					
Y4	025642	47-5096	#47-5098					
Y5	025702	47-5099	#47-5105					
Y6	025704	47-5093	#47-5106					
Y7	025720	#47-5109	47-5111					
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ZDAT01	026400	#48-5221						
ZDAT02	026402	#48-5222						
ZDAT03	026404	#48-5223						
ZDONE	026436	48-5200	48-5208	48-5214	#48-5240			
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ZERR2	026344	48-5193	#48-5209					

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ZPAT03   026414          #48-5228
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ZPAT11   026420          #48-5231
ZPAT12   026422          #48-5232
ZPAT13   026424          #48-5233
ZPAT20   026426           48-5177   48-5204  #48-5235
ZPAT21   026430          #48-5236
ZPAT22   026432          #48-5237
ZPAT23   026434          #48-5238
ZTMP1    026372          *48-5172   48-5179   48-5186  *48-5197   48-5203   48-5206  #48-5217
ZTMP2    026374          *48-5173   48-5191  *48-5198   48-5212  #48-5218
Z1       026154          #48-5174   48-5199
Z2       026202          #48-5180   48-5202   48-5210
Z3       026226          #48-5187   48-5190
Z4       026234           48-5188  #48-5190
Z5       026246           48-5192  #48-5194
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$ATY3    040632           59-6277  #62-6283
$ATY4    040642           57-6273  #62-6283
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$BDDAT   001126          #20-1795
$BELL    001306          #20-1795   57-6273   57-6273   57-6273
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$CKSWR   041072          #63-6285   64-6287   64-6287
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$DDW9     001424          #20-1795
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$ERFLG    001103          #20-1795   56-6271   *56-6271    56-6271    56-6271   *56-6271    56-6271    56-6271   *57-6273
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$ERRTB	001442	#21-1795	66-6325							
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		*27-2066	*27-2079	*27-2094	*28-2196	*29-2276	*30-2335	*30-2377	*31-2706	*31-2758
		*32-2885	*32-2928	*33-3182	*33-3183	*33-3184	*33-3185	*33-3186	*33-3187	*33-3188
		*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	*34-3359	*35-3464	*35-3496	*36-3622
		*37-3721	*38-3818	*44-4580	*44-4601	*44-4621	*44-4639	*44-4668	*45-4783	*45-4811
		*45-4839	*45-4867	*46-4925	*46-4948	*46-4971	*46-4994	*47-5079	*48-5174	*49-5251
		*49-5280	*49-5314	*50-5428	*50-5456	*50-5484	*50-5513	*50-5542	*50-5570	*51-5686
		*51-5710	*51-5738	*51-5761	*51-5790	*51-5811	*52-5898	*52-5927	*52-5949	*52-5971
		*52-5999	*52-6027	*52-6056	*53-6122	*53-6151	*54-6206	*54-6228	56-6271	*56-6271
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SYMBOL CROSS REFERENCE CREF V01

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		#38-3817	38-3817	#38-3917	38-3917	#39-3917	39-3917	#39-4020	39-4020	#40-4020
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		#42-4422	42-4422	#43-4422	43-4422	#43-4570	43-4570	#44-4570	44-4570	#44-4782
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	..	#51-5896	51-5896	#52-5896	52-5896	#52-6120	52-6120	#53-6120	53-6120	#53-6204
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SYMBOL CROSS REFERENCE

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$TAB	042740	66-6409 #71-6498 75-7165 75-7165 75-7167 75-7167 75-7167 75-7168 75-7168 75-7169 75-7171 75-7173 75-7179 75-7180 75-7181 75-7182 75-7185 75-7185 75-7187 75-7187 75-7188 75-7189 75-7191 75-7191 75-7192 75-7193 75-7193 75-7194 75-7196 75-7196 75-7197 75-7198 75-7200 75-7200 75-7203 75-7203 75-7206 75-7206 75-7210 75-7210 75-7213 75-7213 75-7221 75-7221 75-7222 75-7223 75-7223 75-7227 75-7229 75-7229 75-7236 75-7239 75-7239 75-7242 75-7242 75-7244 75-7253 75-7253 75-7258 75-7261 75-7261 75-7276 75-7287 75-7287 75-7294 75-7297 75-7303 75-7303 75-7316 75-7345 75-7345 75-7346
$TBIT	036504	*24-1811 *55-6269 55-6269 55-6269 #55-6269 *65-6291
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$TESTN	001322	#20-1795 *56-6271 66-6431
$THE	043134	#71-6504 75-7177 75-7181
$TIMES	001302	#20-1795 *24-1811 *55-6269 *56-6271 56-6271 *56-6271 56-6271 56-6271
$TKB	001146	#20-1795 56-6271 59-6277 59-6277 59-6277 59-6277 63-6285 63-6285 63-6285 63-6285 63-6285 63-6285
$TKS	001144	#20-1795 56-6271 59-6277 59-6277 59-6277 59-6277 63-6285 63-6285 63-6285 63-6285 63-6285 63-6285 63-6285

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
$TMP0	001232	#20-1795	*66-6302	*66-6303	75-7165	75-7167	75-7168	75-7171	75-7173	75-7179
		75-7181	75-7185	75-7187	75-7189	75-7191	75-7193	75-7196	75-7198	75-7200
		75-7203	75-7206	75-7210	75-7213	75-7221	75-7223	75-7227	75-7229	75-7232
		75-7236	75-7239	75-7242	75-7244	75-7253	75-7258	75-7261	75-7276	75-7287
		75-7294	75-7297	75-7303	75-7316	75-7335	75-7345	75-7346		
$TMP1	001234	#20-1795	*66-6304	75-7165	75-7167	75-7168	75-7171	75-7173	75-7179	75-7181
		75-7185	75-7187	75-7189	75-7191	75-7193	75-7196	75-7198	75-7200	75-7203
		75-7206	75-7210	75-7213	75-7221	75-7223	75-7227	75-7229	75-7232	75-7236
		75-7239	75-7242	75-7244	75-7253	75-7258	75-7261	75-7276	75-7287	75-7294
		75-7297	75-7303	75-7316	75-7335	75-7345	75-7346			
$TMP10	001252	#20-1795	*27-1995	*27-2024	*27-2052	*27-2081	*30-2596	*30-2628	*30-2633	*30-2664
		*44-4591	*44-4614	*44-4632	*44-4650	75-7177	75-7179	75-7181	75-7224	75-7234
		75-7289	75-7303							
$TMP11	001254	#20-1795	*27-2122	*27-2128	*27-2146	*27-2152	75-7178	75-7235	75-7303	
$TMP12	001256	#20-1795	75-7235							
$TMP13	001260	#20-1795	75-7235							
$TMP14	001262	#20-1795								
$TMP15	001264	#20-1795	*30-2595	*30-2626	*30-2632	*30-2662	75-7224			
$TMP16	001266	#20-1795								
$TMP17	001270	#20-1795								
$TMP2	001236	#20-1795	*25-1877	*25-1893	*25-1903	*25-1916	*25-1929	*25-1934	*26-1966	*27-1999
		*27-2013	*27-2028	*27-2040	*27-2056	*27-2069	*27-2084	*27-2097	*28-2206	*28-2260
		*29-2281	*29-2312	*30-2336	*30-2378	*30-2597	*30-2635	*31-2724	*31-2772	*31-2821
		*31-2849	*32-2901	*32-2943	*32-2992	*32-3018	*33-3182	*33-3183	*33-3184	*33-3185
		*33-3186	*33-3187	*33-3188	*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	34-3424
		*35-3531	*35-3564	*35-3567	*35-3571	*35-3574	*35-3585	*35-3596	*36-3669	*36-3675
		*36-3684	*37-3768	*37-3773	*37-3782	*38-3864	*38-3871	*38-3883	*39-3962	*39-3974
		*39-3979	*39-3991	*40-4095	*40-4100	*40-4110	*40-4122	*40-4127	*41-4235	*41-4251
		*41-4263	*41-4268	*42-4368	*42-4373	*42-4376	*42-4384	*42-4391	*43-4500	*43-4505
		*43-4508	*43-4521	*43-4526	*44-4592	*44-4615	*44-4633	*44-4651	*44-4679	*44-4688
		*44-4736	*45-4788	*45-4816	*45-4844	*45-4872	*46-4931	*46-4954	*46-4977	*46-5000
		*47-5114	*47-5122	*47-5130	*48-5202	*48-5210	*49-5258	*49-5285	*49-5320	49-5346
		*49-5359	*49-5363	*50-5431	*50-5459	*50-5485	*50-5514	*50-5545	*50-5573	*51-5690
		*51-5713	*51-5739	*51-5762	*51-5791	*51-5812	*52-5901	*52-5930	*52-5952	*52-5974
		*52-6002	*52-6030	*52-6059	*53-6125	*53-6154	*54-6209	*54-6231	*67-6444	*68-6457
		*69-6466	75-7165	75-7167	75-7168	75-7171	75-7173	75-7179	75-7182	75-7185
		75-7187	75-7189	75-7191	75-7193	75-7196	75-7200	75-7203	75-7206	75-7210
		75-7213	75-7221	75-7223	75-7227	75-7229	75-7232	75-7236	75-7239	75-7242
		75-7244	75-7253	75-7258	75-7261	75-7276	75-7287	75-7294	75-7297	75-7303
		75-7316	75-7345	75-7346						
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$TMP21	001274	#20-1795	75-7171	75-7173						
$TMP22	001276	#20-1795								
$TMP23	001300	#20-1795								
$TMP3	001240	#20-1795	*25-1878	*25-1894	*26-1970	*26-1976	*27-2158	*27-2165	*28-2213	*28-2236
		*28-2250	*29-2296	*29-2302	*29-2315	*30-2446	*30-2454	*30-2482	*30-2490	*30-2513
		*30-2528	*30-2543	*30-2559	*30-2574	*30-2582	*30-2590	*30-2598	*30-2634	*31-2725
		*31-2773	*31-2822	*31-2850	*32-2902	*32-2944	*32-2994	*32-3019	*33-3255	*33-3270
		*35-3552	*35-3558	*36-3667	*36-3676	*36-3685	*37-3766	*37-3774	*37-3783	*38-3865
		*38-3872	*38-3884	*39-3963	*39-3973	*39-3980	*39-3989	*40-4120	*40-4128	*41-4240
		*41-4261	*41-4269	*42-4378	*42-4385	*43-4510	*43-4527	*44-4706	*44-4721	*44-4738
		*45-4808	*45-4836	*45-4864	*45-4894	*45-4900	*46-5021	*46-5026	*46-5036	*46-5041

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		*47-5115	*47-5123	*47-5131	*48-5203	*48-5211	*49-5371	*49-5377	*49-5385	*49-5391
		*49-5395	*49-5401	*50-5599	*50-5603	*50-5606	*50-5612	*50-5618	*50-5621	*50-5627
		*50-5633	*50-5639	*50-5642	*50-5648	*50-5651	*50-5654	*50-5657	*51-5832	*51-5837
		*51-5843	*51-5852	*51-5858	*51-5867	*52-6086	*52-6089	*52-6090	*52-6091	*52-6092
		*52-6093	*52-6094	*52-6095	*52-6096	*52-6097	*52-6098	*52-6099	*52-6100	*53-6181
		*53-6184	*53-6185	*53-6186	*53-6187	*54-6250	*54-6255	*54-6257	*67-6447	75-7165
		75-7167	75-7168	75-7172	75-7180	75-7182	75-7185	75-7187	75-7191	75-7193
		75-7196	75-7198	75-7200	75-7203	75-7206	75-7210	75-7213	75-7221	75-7223
		75-7228	75-7230	75-7232	75-7236	75-7239	75-7242	75-7244	75-7245	75-7253
		75-7261	75-7287	75-7294	75-7297	75-7345				
$TMP4	001242	#20-1795	*25-1879	*26-1971	*26-1977	*27-2159	*27-2166	*28-2237	*28-2251	*29-2297
		*29-2303	*30-2447	*30-2453	*30-2478	*30-2489	*30-2514	*30-2583	*30-2591	*31-2823
		*31-2830	*31-2851	*32-2995	*32-3001	*32-3020	*33-3256	*33-3271	*35-3551	*35-3557
		*36-3668	*36-3677	*36-3686	*37-3767	*37-3775	*37-3784	*38-3866	*38-3873	*38-3885
		*39-3964	*39-3969	*39-3981	*39-3990	*40-4121	*40-4129	*41-4249	*41-4262	*41-4270
		*42-4379	*42-4386	*43-4511	*43-4528	*44-4707	*44-4722	*44-4737	*45-4807	*45-4835
		*45-4863	*45-4893	*45-4901	*46-5022	*46-5027	*46-5037	*46-5042	*47-5116	*47-5124
		*47-5132	*48-5204	*48-5212	*49-5370	*49-5376	*49-5384	*49-5390	*49-5396	*49-5402
		*50-5598	*50-5602	*50-5608	*50-5614	*50-5623	*50-5629	*50-5635	*50-5645	*51-5831
		*51-5836	*51-5841	*51-5847	*51-5850	*51-5856	*51-5862	*51-5865	*51-5871	*51-5874
		*52 -085	*52-6089	*52-6090	*52-6091	*52-6092	*52-6093	*52-6094	*52-6095	*52-6096
		*52-6097	*52-6098	*52-6099	*52-6100	*53-6180	*53-6184	*53-6185	*53-6186	*53-6187
		*54-6251	*54-6255	*54-6257	*67-6449	75-7166	75-7169	75-7172	75-7180	75-7182
		75-7188	75-7192	75-7194	75-7197	75-7198	75-7199	75-7200	75-7204	75-7207
		75-7211	75-7212	75-7212	75-7222	75-7228	75-7231	75-7233	75-7237	75-7240
		75-7243	75-7254	75-7261	75-7287	75-7295	75-7298			
$TMP5	001244	#20-1795	*25-1880	*27-1993	*28-2205	*30-2448	*30-2455	*30-2491	*30-2515	*30-2529
		*30-2544	*30-2560	*30-2575	*30-2584	*30-2600	*30-2636	*31-2831	*31-2836	*31-2842
		*32-3002	*32-3009	*33-3182	*33-3183	*33-3184	*33-3185	*33-3186	*33-3187	*33-3188
		*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	*40-4102	*40-4108	*41-4242	*42-4366
		*42-4392	*43-4498	*43-4519	*44-4697	*44-4712	*45-4903	*46-5023	*46-5028	*47-5117
		*47-5125	*48-5205	*49-5372	*49-5378	*49-5386	*49-5392	*49-5397	*49-5403	*50-5609
		*50-5615	*50-5624	*50-5630	*50-5636	*50-5644	*51-5844	*51-5853	*51-5859	*51-5868
		*52-6089	*52-6090	*52-6091	*52-6092	*52-6093	*52-6094	*52-6095	*52-6096	*52-6097
		*52-6098	*52-6099	*52-6100	*53-6184	*53-6185	*53-6186	*53-6187	*54-6255	*54-6257
		*55-6269	55-6269	*55-6269	*55-6269	*55-6269	*56-6271	75-7166	75-7177	75-7178
		75-7185	75-7199	75-7199	75-7201	75-7202	75-7204	75-7211	75-7212	75-7214
		75-7215	75-7224	75-7225	75-7227	75-7229	75-7233	75-7240	75-7258	75-7259
		75-7288	75-7289	75-7295	75-7298					
$TMP6	001246	#20-1795	*27-2123	*27-2129	*27-2147	*27-2153	*30-2449	*30-2460	*30-2465	*30-2496
		*30-2501	*30-2516	*30-2530	*30-2545	*30-2561	*30-2576	*30-2585	*30-2609	*30-2619
		*30-2627	*30-2646	*30-2656	*30-2663	*31-2837	*31-2843	*32-3007	*32-3012	*33-3269
		*40-4104	*40-4107	*40-4113	*40-4115	*40-4117	*41-4244	*41-4248	*41-4254	*41-4256
		*41-4258	*42-4343	*42-4347	*42-4351	*42-4355	*42-4359	*42-4364	*42-4394	*43-4477
		*43-4481	*43-4485	*43-4489	*43-4496	*43-4515	*43-4517	*44-4705	*44-4720	*45-4902
		*46-5029	*47-5118	*47-5126	*48-5206	*49-5369	*49-5375	*49-5381	*49-5383	*49-5389
		*49-5398	*49-5404	*50-5607	*50-5613	*50-5619	*50-5622	*50-5628	*50-5634	*50-5640
		*50-5643	*50-5649	*50-5652	*50-5655	*50-5658	*51-5842	*51-5848	*51-5851	*51-5857
		*51-5863	*51-5866	*51-5872	*51-5875	*52-6089	*52-6090	*52-6091	*52-6092	*52-6093
		*52-6094	*52-6095	*52-6096	*52-6097	*52-6098	*52-6099	*52-6100	*53-6184	*53-6185
		*53-6186	*53-6187	*54-6255	*54-6257	75-7178	75-7199	75-7201	75-7211	75-7214
		75-7224	75-7230	75-7233	75-7259	75-7288	75-7299			

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CREF V01

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
$TMP7	001250	#20-1795	*27-1994	*27-2023	*27-2051	*27-2080	*30-2456	*30-2492	*30-2531	*30-2546
		*30-2562	*30-2577	*30-2599	*30-2637	*31-2838	*31-2844	*32-3008	*32-3013	*40-4103
		*40-4109	*41-4243	*41-4250	*42-4367	*42-4393	*43-4499	*43-4520	*44-4699	*44-4714
		75-7178	75-7202	75-7204	75-7215	75-7225	75-7234	75-7259	75-7289	
$TN	= 000037	19-1777	#19-1777	24-1835	25-1835	#25-1835	25-1946	26-1946	#26-1946	26-1[illegible]
		27-1991	#27-1991	27-2195	28-2195	#28-2195	28-2275	29-2275	#29-2275	29
		30-2333	#30-2333	30-2705	31-2705	#31-2705	31-2884	32-2884	#32-2884	3
		33-3180	#33-3180	33-3358	34-3358	#34-3358	34-3463	35-3463	#35-3463	3 1
		36-3621	#36-3621	36-3720	37-3720	#37-3720	37-3817	38-3817	#38-3817	38 7
		39-3917	#39-3917	39-4020	40-4020	#40-4020	40-4160	41-4160	#41-4160	41-4[illegible]
		42-4301	#42-4301	42-4422	43-4422	#43-4422	43-4570	44-4570	#44-4570	44-47[illegible]
		45-4782	#45-4782	45-4924	46-4924	#46-4924	46-5074	47-5074	#47-5074	47-5
		48-5170	#48-5170	48-5250	49-5250	#49-5250	49-5426	50-5426	#50-5426	50-568[illegible]
		51-5684	#51-5684	51-5896	52-5896	#52-5896	52-6120	53-6120	#53-6120	53-6204
		54-6204	#54-6204	54-6267						
$TPB	001152	#20-1795	59-6277	59-6277	59-6277					
$TPFLG	001157	#20-1795	59-6277	59-6277	59-6277					
$TPS	001150	#20-1795	59-6277	59-6277	59-6277					
$TRAP	041540	24-1811	#64-6287							
$TRAP2	041562	#64-6287	64-6287							
$TRP	= 000014	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287
		64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287
		64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287
		64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287
		64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287
		#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6288	64-6288	64-6288
		64-6288	#64-6288							
$TRPAD	041574	64-6287	#64-6287	64-6289						
$TSTM	003606	#23-1808								
$TSTNM	001102	#20-1795	*55-6269	56-6271	56-6271	*56-6271	56-6271	56-6271	56-6271	56-6271
		57-6273	57-6273	57-6273	66-6302					
$TYPBN	= ******	64-6287								
$TYPDS	040400	#61-6281	64-6287	64-6287						
$TYPE	037600	#59-6277	62-6283	64-6287	64-6287					
$TYPEC	040012	59-6277	59-6277	59-6277	#59-6277	63-6285				
$TYPEX	040142	59-6277	59-6277	59-6277	#59-6277					
$TYPOC	040170	#60-6279	64-6287	64-6287						
$TYPON	040204	60-6279	#60-6279	64-6287						
$TYPOS	040144	#60-6279	64-6287							
$UNIT	001330	#20-1795								
$UNITM	003612	#23-1808								
$USWR	001342	#20-1795								
$VECT1	001366	#20-1795								
$VECT2	001370	#20-1795								
$XOFF	= 000023	59-6277	59-6277							
$XON	= 000021	59-6277	59-6277	59-6277	63-6285					
$XTSTR	036642	#56-6271								
$$GET4	= 000001	#55-6269	#55-6269	55-6269						
$OFILL	040375	*60-6279	*60-6279	60-6279	#60-6279					
$40CAT	= ******	56-6271	57-6273							
.RSET	042622	64-6288	#70-6480							
.$ASTA	= ******	62-6283	62-6283							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
.$X	- 003602	#23-1808 23-1808

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MACRO NAME        REFERENCES
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                   33-3191   33-3192   33-3193
AMAC1             #72-6633  #72-6637  #72-6638
ASMAC1            #19-1210  #52-6089  #52-6090  #52-6091  #52-6092  #52-6093  #52-6094  #52-6095  #52-6096  #52-6097
                  #52-6098  #52-6099  #52-6100  #53-6184  #53-6185  #53-6186  #53-6187  #54-6255  #54-6257
ASMAC2            #19-1218
AS1               #72-6763  #72-6803  #72-6804  #72-6805  #72-6806  #72-6811  #72-6812  #72-6815  #72-6818
AS10              #72-6793  #72-6831  #72-6833  #72-6834  #72-6835  #72-6836  #72-6837
AS11              #72-6799   72-6838   72-6840   72-6841   72-6842   72-6843   72-6844   72-6853
AS2               #72-6766  #72-6820  #72-6821
AS3               #72-6772   72-6822   72-6823
AS4               #72-6778  #72-6824  #72-6825
AS5               #72-6783   72-6826   72-6827   72-6846
AS6               #72-6786   72-6828   72-6829   72-6845
AS7               #72-6789   72-6830   72-6832
COMMEN            #19-1783
ENDCOM            #19-1783
ENDPAS            #19-1137  #55-6269
ERMAC             #19-1192   57-6273
ESCAPE            #19-1783
GETPRI            #19-1783  #55-6269
GETSWR            #19-1783  #24-1812  #24-1812
HMAC1             #19-1223   34-3371   34-3372   34-3373   34-3374   34-3375
HMAC2             #19-1233  #34-3396  #34-3397  #34-3398  #34-3399  #34-3400
HMAC3             #19-1239  #34-3381  #34-3382  #34-3383  #34-3384  #34-3385
ITEMAC            #19-1205   21-1802   21-1802   21-1802   21-1802   21-1802   21-1802   21-1802   21-1802   21-1802
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LDM2              #72-6685  #72-6701  #72-6706  #72-6710  #72-6714
LDM3              #72-6689   72-6702   72-6707   72-6712   72-6716
LDM4              #72-6693   72-6703   72-6708   72-6711   72-6715
LDM5              #72-6697  #72-6704  #72-6709  #72-6713  #72-6717
LDM6              #72-6718  #72-6733  #72-6735
LDM7              #72-6722   72-6739   72-6740
LDM8              #72-6726   72-6746   72-6747
LDM9              #72-6730  #72-6761  #72-6762
LD1M1             #72-6642  #72-6646  #72-6659  #72-6662
LD1M2             #72-6650   72-6660   72-6663   72-6665
LD1M3             #72-6656  #72-6661  #72-6664  #72-6666  #72-6678
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MACRO CROSS REFERENCE

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LPERR	#19-1325	25-1837	26-1947	27-1992	27-2009	27-2022	27-2037	27-2050	27-2066	27-2079
	27-2094	28-2196	29-2276	30-2335	30-2377	31-2706	31-2758	32-2885	32-2928	33-3182
	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190	33-3191	33-3192
	33-3193	34-3359	35-3464	35-3496	36-3622	37-3721	38-3818	44-4580	44-4601	44-4621
	44-4639	44-4668	45-4783	45-481?	45-4839	45-4867	46-4925	46-4948	46-4971	46-4994
	47-5079	48-5174	49-5251	49-5280	49-5314	50-5428	50-5456	50-5484	50-5513	50-5542
	50-5570	51-5686	51-5710	51-5738	51-5761	51-5790	51-5811	52-5898	52-5927	52-5949
	52-5971	52-5999	52-6027	52-6056	53-6122	53-6151	54-6206	54-6228		
MERROR	#19-1229									
MSG	#24-1817	#25-1835	#25-1941	#26-1946	#26-1983	#27-1991	#27-2176	#28-2195	#28-2268	#29-2275
	#29-2321	#30-2333	#30-2700	#31-2705	#31-2878	#32-2884	#32-3047	#33-3180	#33-3352	#34-3358
	#34-3456	#35-3463	#35-3615	#36-3621	#36-3713	#37-3720	#37-3810	#38-3817	#38-3909	#39-3917
	#39-4013	#40-4020	#40-4153	#41-4160	#41-4295	#42-4301	#42-4415	#43-4422	#43-4554	#44-4570
	#44-4775	#45-4782	#45-4918	#46-4924	#46-5067	#47-5074	#47-5162	#48-5170	#48-5243	#49-5250
	#49-5416	#50-5426	#50-5674	#51-5684	#51-5889	#52-5896	#52-6113	#53-6120	#53-6195	#54-6204
MULT	#19-1783									
NAMEP	#19-1182	24-1812								
NEWTST	#19-1783	#24-1835	#25-1946	#26-1991	#27-2195	#28-2275	#29-2333	#30-2705	#31-2884	#32-3180
	#33-3358	#34-3463	#35-3621	#36-3720	#37-3817	#38-3917	#39-4020	#40-4160	#41-4301	#42-4422
	#43-4570	#44-4782	#45-4924	#46-5074	#47-5170	#48-5250	#49-5426	#50-5684	#51-5896	#52-6120
	#53-6204									
NTMPM	#19-1178									
POP	#19-1783	#58-6275	#61-6281	#62-6283	#62-6283	#65-6291	#65-6291			
PUSH	#19-1783	#58-6275	#61-6281	#62-6283	#62-6283	#62-6283	#65-6291	#65-6291		
REPORT	#19-1783									
ROMAC	#19-1283									
RSET	#19-1185	#25-1938	#26-1981	#27-2173	#28-2265	#29-2318	#30-2697	#31-2876	#32-3044	#33-3351
	#34-3453	#35-3613	#36-3711	#37-3808	#38-3907	#39-4011	#40-4151	#41-4293	#42-4413	#43-4552
	#45-4915	#46-5065	#47-5161	#48-5240	#49-5415	#50-5672	#51-5834	#51-5839	#51-5888	#52-6112
	#53-6194	#67-6451	#68-6460	#69-6469						
RTMPM	#19-1173									
SETPRI	#19-1783									
SETTRA	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287
	#64-6287	#64-6288								
SETUP	#19-1783	24-1811								
SKIP	#19-1783									
SLASH	#19-1783									
SPACE	#19-1331	#19-1783								
SSKAD	#19-1322									
STARS	#19-1783	20-1795	20-1795	20-1795	22-1806	23-1808	23-1808	23-1808	25-1835	25-1835
	26-1946	26-1946	27-1991	27-1991	28-2195	28-2195	29-2275	29-2275	30-2333	30-2333
	31-2705	31-2705	32-2884	32-2884	33-3180	33-3180	33-3199	34-3358	34-3358	35-3463
	35-3463	36-3621	36-3621	37-3720	37-3720	38-3817	38-3817	39-3917	39-3917	40-4020
	40-4020	41-4160	41-4160	42-4301	42-4301	43-4422	43-4422	44-4570	44-4570	45-4782
	45-4782	46-4924	46-4924	47-5074	47-5074	48-5170	48-5170	49-5250	49-5250	50-5426
	50-5426	51-5684	51-5684	52-5896	52-5896	53-6120	53-6120	54-6204	54-6204	55-6269
	55-6271	57-6273	58-6275	59-6277	60-6279	61-6281	62-6283	63-6285	63-6285	63-6285
	64-6287	65-6291	65-6291	66-6294	67-6439	68-6454	69-6463	70-6472		
SUMMAC	#19-1310	#25-1835	#33-3180							
SWRSU	#19-1783	#24-1811	#24-1811							
TMAC	#19-1202	54-6267								

MACRO CROSS REFERENCE

MACRO NAME	REFERENCES									
TRMTRP	#64-6287	64-6289								
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TYPDEC	#19-1783									
TYPNAM	#19-1783	24-1812								
TYPNUM	#19-1783									
TYPOCS	#19-1783	#55-6269	#55-6269	#55-6269						
TYPOCT	#19-1783	63-6285								
TYPTXT	#19-1783	#24-1813	#24-1814	#55-6269	#55-6269	#55-6269	#55-6269	#56-6271	#56-6271	
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	#20-1795									
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$$NEWT	#19-1783	24-1835	25-1946	26-1991	27-2195	28-2275	29-2333	30-2705	31-2884	32-3180
	33-3358	34-3463	35-3621	36-3720	37-3817	38-3917	39-4020	40-4160	41-4301	42-4422
	43-4570	44-4782	45-4924	46-5074	47-5170	48-5250	49-5426	50-5684	51-5896	52-6120
	53-6204									
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$$SETU	#24-1811	#24-1811								
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.EQUIV	#19-1328	#19-1776	#19-1783	#19-1783	#19-1783	#19-1783	#19-1783	#19-1783	#19-1783	#19-1783
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.SETUP	#19-1772	#19-1793								
.SWRHI	#19-1772									
.$ACT1	#19-1772	22-1806								
.$APTB	#19-1774	#20-1795	20-1795							
.$APTH	#19-1774	23-1808								
.$APTY	#19-1775	62-6283								
.$CATC	#19-1772	#19-1794								
.$CMTA	#19-1772	#19-1795								
.$EOP	#19-952	#55-6269								
.$ERRO	#19-1596	#57-6273								
.$POWE	#19-1774	#65-6291								
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.$SAVE	#19-1773	#58-6275								
.$SCOP	#19-1335	#56-6271								
.$TRAP	#19-1774	#64-6287								
.$TYPD	#19-1774	#61-6281								
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.$TYPO	#19-819	60-6279								