FP11-F FP11F FLTG PNT PRT A AH-F632C-MC
CKFPACO FICHE 1 OF 2

FP11-F FP11F FLTG PNT PRT A AH-F632C-MC
CKFPACO FICHE 2 OF 2

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1                                       .REM    &
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13                                              IDENTIFICATION
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16                                      PRODUCT CODE:   AC-F630C-MC
17
18                                      PRODUCT NAME:   CKFPACO FP11F FLTG PNT PRT A
19
20                                      DATE CREATED:   APRIL, 1981
21
22                                      MAINTAINER:     DIAGNOSTIC ENGINEERING
23
24                                      AUTHOR:         DAN MILLEVILLE
25
26
27
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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.

CONTENTS

1. ABSTRACT

THE THREE PROGRAMS:

CKFPAC0 CKFPBB0 CKFPCC0

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. CKFPAC0

CKFPAC0 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. CKFPBB0

CKFPBB0 TESTS:

ADDF, ADDD AND SUBD (ALL CONDITIONS NOT TESTED IN CKFPAC0)
CMPD AND CMPF
DIVD AND DIVF
MULD AND MULF
MODD AND MODF

C. CKFPCC0

CKFPCC0 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 CKFPBB0 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 CKFPAC0.
SW<7> 1....	200	SELECT CORRECT INTERRUPT TEST IN PROGRAM CKFPBB0.

6. ERRORS

6.1 SUMMARIES

IN PROGRAM CKFPACO 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 CKFPACO 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 CKFPBB0 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.

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484
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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 E . IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWI (SWR13) OFF, THEN THE USER WILL RECEIVE E, INDIVIDUAL ERROR MESSAGE PLUS AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OU 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.

```
533                     A BIT STUCK HIGH IN THE HARDWARE WILL SHOW UP AS A 0
534                     IN THAT BIT POSITION OF THE 'OR' OF THE FAILING DATA
535                     PATTERNS.
536
537                     A BIT STUCK LOW IN THE HARDWARE WILL SHOW UP AS A  1
538                     IN  THAT  BIT  POSITION  OF THE 'AND' OF THE FAILING
539                     DATA PATTERNS.
540
541                     THUS IF A FAILURE OCCURS:
542                             A.      STUCK HIGHS WILL SHOW AS 0'S IN  THE
543                             'OR' PATTERN.
544                             B.      STUCK LOWS WILL SHOW AS 1'S  IN  THE
545                             'AND' PATTERN.
546
547                     IF THE FAILURE IS  INTERMITTANT  THEN  THIS  PROCEDURE  WILL
548                     STILL  APPLY.!  IF THE FAILURE MOVES FROM ONE BIT TO
549                     ANOTHER, OR FROM ONE GROUP OF BITS TO ANOTHER  GROUP
550                     OF  BITS THEN THE FAULT WILL PROBABLY NOT SHOW UP IN
551                     THE 'AND' OR THE 'OR' PATTERNS;  IN  THIS  CASE  THE
552                     'AND'  PATTERN  WILL BE ALL 0'S AND THE 'OR' PATTERN
553                     WILL BE ALL 1'S.  WHEN THIS OCCURS SOME OTHER METHOD
554                     OF  REPAIR MUST BE FOUND (SUCH AS INSPECTION OF EACH
555                     INDIVIDUAL  ERROR  REPORT  RATHER  THAN  USING   THE
556                     SUMMARY).
557
558                     MAP THE FOLLOWING NOTATION ONTO EACH BIT POSITION IN
559                     THE  'AND'  AND THE 'OR' PATTERNS WHICH ARE TYPED IN
560                     THE ERROR SUMMARY.
561
562                     A15,A14,...A1,A0        B15,B14,...B1,B0
563                             C15,C14,...C1,C0        D15,D14,...C1,C0
564
565                     IN THIS NOTATION A15 THROUGH A0 IS THE FIRST OF  THE
566                     FOUR  16  BIT OCTAL NUMBERS.TYPED, B15 THROUGH B0 IS
567                     THE SECOND, ETC.
568
569                     THIS TABLE SHOWS THE CORRESPONDING AM2901 CHIP  ('E'
570                     NUMBER)  WHICH  IS RESPONSIBLE FOR EACH BIT POSITION
571                     USING THF ABOVE NOTATION.  NOTE THAT  ECO'S  TO  THE
572                     HARDWARE MIGHT MAKE THIS TABLE OBSOLETE IF IT IS NOT
573                     UP DATED.  NOTE ALSC THAT THERE ARE  FOUR  BITS  FOR
574                     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 F78.

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) 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).

                        TEST 34         ADDD WITH NEGATIVE OPRANDS TEST
                        -------         -------------------------------

                                THIS IS A TEST OF THE DDD 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
                                ---                     -------

                                &
                                MNUMBER=214
                                PRGNUM=1
                                .LIST   ME
                                .NLIST  MD,MC,CND
                                .ENABL  ABS
                                        .MCALL  .HEADER,.SWRHI,.EQUAT,.SETUP,.$CATCH,.$ACT11,.$CMTAG
                                        .MCALL  .$TYPE,.$EOP,.$SAVE,.$TYPOCT
                                        .MCALL  .$TYPDEC,.$TRAP,.$POWER,.$APTHDR,.$APTBLS
                                        .MCALL  .$APTYPE,.$READ
                                        .MCALL  .EQUIV                  ;*REMOVE FOR ASSEMBLY ON PDP-10
                                .TITLE  CKFPACO FP11F FLTG PNT PRT A
                                ;*COPYRIGHT (C) 1981
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C5), JAN, 1981.
                                ;*
000000                          $TN=1
160000                          $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT
000244                          FPVECT=244
177400                          $SWR=177400
000200                          $SWRMSK=200
000011                          TAB=11
000015                          CRLF=15
                                .SBTTL  BASIC DEFINITIONS
                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
104000                                  ERROR=EMT
000004                                  SCOPE=IOT
                                ;*MISCELLANEOUS DEFINITIONS
000011                          HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                          LF=     12              ;;CODE FOR LINE FEED
000015                          CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                          CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                          PS=     177776          ;;PROCESSOR STATUS WORD
177776                                  PSW=PS
177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                          DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                          R0      %0              ;;GENERAL REGISTER
000001                          R1=     %1              ;;GENERAL REGISTER
000002                          R2      %2              ;;GENERAL REGISTER
000003                          R3=     %3              ;;GENERAL REGISTER
000004                          R4=     %4              ;;GENERAL REGISTER
000005                          R5=     %5              ;;GENERAL REGISTER
000006                          R6=     %6              ;;GENERAL REGISTER
000007                          R7=     %7              ;;GENERAL REGISTER
000006                          SP      %6              ;;STACK POINTER
000007                          PC=     %7              ;;PROGRAM COUNTER
                                ;*PRIORITY LEVEL DEFINITIONS
```

BASIC DEFINITIONS

```
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7
                        ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03    10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
001000                          SW9-SW09
000400                          SW8-SW08
000200                          SW7=SW07
000100                          SW6=SW06
000040                          SW5=SW05
000020                          SW4=SW04
000010                          SW3=SW03
000004                          SW2=SW02
000002                          SW1=SW01
000001                          SW0=SW00
                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15-  100000
040000                  BIT14=  40000
020000                  BIT13-  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02-  4
000002                  BIT01=  2
000001                  BIT00=  1
001000                          BIT9 BIT09
000400                          BIT8=BIT08
000200                          BIT7=BIT07
000100                          BIT6=BIT06
000040                          BIT5=BIT05
```

```
                000020                  BIT4=BIT04
                000010                  BIT3=BIT03
                000004                  BIT2=BIT02
                000002                  BIT1=BIT01
                000001                  BIT0=BIT00
                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
                000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
                000014          TBITVEC=14              ;;"T" BIT
                000014          TRTVEC= 14              ;;TRACE TRAP
                000014          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
                000020          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                000024          PWRVEC= 24              ;;POWER FAIL
                000030          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
                000034          TRAPVEC=34              ;;"TRAP" TRAP
                000060          TKVEC=  60              ;;TTY KEYBOARD VECTOR
                000064          TPVEC=  64              ;;TTY PRINTER VECTOR
                000240          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                        .SBTTL  FPP REGISTER DEFINITIONS
                000000          AC0     =%0
                000001          AC1     =%1
                000002          AC2     =%2
                000003          AC3     =%3
                000004          AC4     =%4
                000005          AC5     =%5
                000006          AC6     =%6
                000007          AC7     =%7
                                .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 ;;JMP TO STARTING ADDRESS OF PROGRAM
```

```
1427                                    .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 ( $REGAD)+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:
```

ERROR POINTER TABLE

```
                                        .SBTTL  ERROR POINTER TABLE
                                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
                                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                        ;*      DH              ;;POINTS TO THE DATA HEADER
                                        ;*      DT              ;;POINTS TO THE DATA
                                        ;*      DF              ;;POINTS TO THE DATA FORMAT
                                        $ERRTB:
     001442
1434 001442  044704  065163  071646          .WORD   EM1,DH1,DT1,DF1         ;ERROR ITEM # 1
     001452  044741  065253  071670          .WORD   EM2,DH2,DT2,DF2         ;ERROR ITEM # 2
     001462  045005  065346  071712          .WORD   EM3,DH3,DT3,DF3         ;ERROR ITEM # 3
     001472  045052  065437  071712          .WORD   EM4,DH4,DT4,DF4         ;ERROR ITEM # 4
     001502  045112  065533  071734          .WORD   EM5,DH5,DT5,DF5         ;ERROR ITEM # 5
     001512  045146  065533  071766          .WORD   EM6,DH6,DT6,DF6         ;ERROR ITEM # 6
     001522  045200  065533  071766          .WORD   EM7,DH7,DT7,DF7         ;ERROR ITEM # 7
     001532  045112  065533  071766          .WORD   EM10,DH10,DT10,DF10     ;ERROR ITEM # 10
     001542  045233  065533  071766          .WORD   EM11,DH11,DT11,DF11     ;ERROR ITEM # 11
     001552  000000  000000  072010          .WORD   EM12,DH12,DT12,DF12     ;ERROR ITEM # 12
     001562  000000  000000  072076          .WORD   EM13,DH13,DT13,DF13     ;ERROR ITEM # 13
     001572  045314  065533  071766          .WORD   EM14,DH14,DT14,DF14     ;ERROR ITEM # 14
     001602  045437  065533  071766          .WORD   EM15,DH15,DT15,DF15     ;ERROR ITEM # 15
     001612  045562  065573  072130          .WORD   EM16,DH16,DT16,DF16     ;ERROR ITEM # 16
     001622  045633  065653  071712          .WORD   EM17,DH17,DT17,DF17     ;ERROR ITEM # 17
     001632  046066  065743  072150          .WORD   EM20,DH20,DT20,DF20     ;ERROR ITEM # 20
     001642  046244  065533  072172          .WORD   EM21,DH21,DT21,DF21     ;ERROR ITEM # 21
     001652  046375  066031  072204          .WORD   EM22,DH22,DT22,DF22     ;ERROR ITEM # 22
     001662  046375  066066  072232          .WORD   EM23,DH23,DT23,DF23     ;ERROR ITEM # 23
     001672  046375  066224  072254           WORD   EM24,DH24,DT24,DF24     ;ERROR ITEM # 24
     001702  046462  066363  072300          .WORD   EM25,DH25,DT25,DF25     ;ERROR ITEM # 25
     001712  046575  066425  072350          .WORD   EM26,DH26,DT26,DF26     ;ERROR ITEM # 26
     001722  046575  066425  072424          .WORD   EM27,DH27,DT27,DF27     ;ERROR ITEM # 27
     001732  046643  000000  072466          .WORD   EM30,DH30,DT30,DF30     ;ERROR ITEM # 30
     001742  046715  066425  072350          .WORD   EM31,DH31,DT31,DF31     ;ERROR ITEM # 31
     001752  046715  066425  072424          .WORD   EM32,DH32,DT32,DF32     ;ERROR ITEM # 32
     001762  046763  066513  072520          .WORD   EM33,DH33,DT33,DF33     ;ERROR ITEM # 33
     001772  047024  066513  072576          .WORD   EM34,DH34,DT34,DF34     ;ERROR ITEM # 34
     002002  047126  066513  072576          .WORD   EM35,DH35,DT35,DF35     ;ERROR ITEM # 35
     002012  047230  066513  072576          .WORD   EM36,DH36,DT36,DF36     ;ERROR ITEM # 36
     002022  047331  066513  072576          .WORD   EM37,DH37,DT37,DF37     ;ERROR ITEM # 37
     002032  047432  066513  072520          .WORD   EM40,DH40,DT40,DF40     ;ERROR ITEM # 40
     002042  047603  000000  072650          .WORD   EM41,DH41,DT41,DF41     ;ERROR ITEM # 41
     002052  047640  066616  072702          .WORD   EM42,DH42,DT42,DF42     ;ERROR ITEM # 42
     002062  047761  066616  072702          .WORD   EM43,DH43,DT43,DF43     ;ERROR ITEM # 43
     002072  050102  000000  072760          .WORD   EM44,DH44,DT44,DF44     ;ERROR ITEM # 44
     002102  050102  066720  073030          .WORD   EM45,DH45,DT45,DF45     ;ERROR ITEM # 45
     002112  050145  066737  073104          .WORD   EM46,DH46,DT46,DF46     ;ERROR ITEM # 46
     002122  050223  066720  073172          .WORD   EM47,DH47,DT47,DF47     ;ERROR ITEM # 47
     002132  050341  066763  072576          .WORD   EM50,DH50,DT50,DF50     ;ERROR ITEM # 50
     002142  050437  066763  073224          .WORD   EM51,DH51,DT51,DF51     ;ERROR ITEM # 51
     002152  050500  066533  073172          .WORD   EM52,DH52,DT52,DF52     ;ERROR ITEM # 52
     002162  050621  066425  073262          .WORD   EM53,DH53,DT53,DF53     ;ERROR ITEM # 53
     002172  051016  067035  073302          .WORD   EM54,DH54,DT54,DF54     ;ERROR ITEM # 54
     002202  051062  065533  073172          .WORD   EM55,DH55,DT55,DF55     ;ERROR ITEM # 55
     002212  051203  066425  073262          .WORD   EM56,DH56,DT56,DF56     ;ERROR ITEM # 56
```

ERROR POINTER TABLE

```
002222  051400  067035  073302          .WORD   EM57,DH57,DT57,DF57          ;ERROR ITEM # 57
002232  051444  066425  073262          .WORD   EM60,DH60,DT60,DF60          ;ERROR ITEM # 60
002242  051641  067035  073302          .WORD   EM61,DH61,DT61,DF61          ;ERROR ITEM # 61
002252  051705  067035  073302          .WORD   EM62,DH62,DT62,DF62          ;ERROR ITEM # 62
002262  052077  067035  073302          .WORD   EM63,DH63,DT63,DF63          ;ERROR ITEM # 63
002272  052271  067145  073340          .WORD   EM64,DH64,DT64,DF64          ;ERROR ITEM # 64
002302  052271  067076  073340          .WORD   EM65,DH65,DT65,DF65          ;ERROR ITEM # 65
002312  052425  067035  073302          .WORD   EM66,DH66,DT66,DF66          ;ERROR ITEM # 66
002322  052470  065533  072172          .WORD   EM67,DH67,DT67,DF67          ;ERROR ITEM # 67
002332  052721  065533  073360          .WORD   EM70,DH70,DT70,DF70          ;ERROR ITEM # 70
002342  053044  066363  073360          .WORD   EM71,DH71,DT71,DF71          ;ERROR ITEM # 71
002352  053146  066425  073426          .WORD   EM72,DH72,DT72,DF72          ;ERROR ITEM # 72
002362  053222  067035  073302          .WORD   EM73,DH73,DT73,DF73          ;ERROR ITEM # 73
002372  053262  065533  072172          .WORD   EM74,DH74,DT74,DF74          ;ERROR ITEM # 74
002402  053513  065533  073360          .WORD   EM75,DH75,DT75,DF75          ;ERROR ITEM # 75
002412  053636  066363  073360          .WORD   EM76,DH76,DT76,DF76          ;ERROR ITEM # 76
002422  053740  066425  073426          .WORD   EM77,DH77,DT77,DF77          ;ERROR ITEM # 77
002432  054014  067035  073302          .WORD   EM100,DH100,DT100,DF100          ;ERROR ITEM # 100
002442  054054  065533  073360          .WORD   EM101,DH101,DT101,DF101          ;ERROR ITEM # 101
002452  054200  066425  073360          .WORD   EM102,DH102,DT102,DF102          ;ERROR ITEM # 102
002462  054252  066363  073360          .WORD   EM103,DH103,DT103,DF103          ;ERROR ITEM # 103
002472  054355  067035  073302          .WORD   EM104,DH104,DT104,DF104          ;ERROR ITEM # 104
002502  054416  065533  073360          .WORD   EM105,DH105,DT105,DF105          ;ERROR ITEM # 105
002512  054543  066425  073426          .WORD   EM106,DH106,DT106,DF106          ;ERROR ITEM # 106
002522  054616  066363  073360          .WORD   EM107,DH107,DT107,DF107          ;ERROR ITEM # 107
002532  054722  067035  073302          .WORD   EM110,DH110,DT110,DF110          ;ERROR ITEM # 110
002542  054764  066363  073446          .WORD   EM111,DH111,DT111,DF111          ;ERROR ITEM # 111
002552  054764  067233  073446          .WORD   EM112,DH112,DT112,DF112          ;ERROR ITEM # 112
002562  055066  066363  073446          .WORD   EM113,DH113,DT113,DF113          ;ERROR ITEM # 113
002572  055066  067233  073446          .WORD   EM114,DH114,DT114,DF114          ;ERROR ITEM # 114
002602  054764  067452  073446          .WORD   EM115,DH115,DT115,DF115          ;ERROR ITEM # 115
002612  055066  067452  073446          .WORD   EM116,DH116,DT116,DF116          ;ERROR ITEM # 116
002622  055170  065653  071712          .WORD   EM117,DH117,DT117,DF117          ;ERROR ITEM # 117
002632  055324  067736  071712          .WORD   EM120,DH120,DT120,DF120          ;ERROR ITEM # 120
002642  055460  065533  073172          .WORD   EM121,DH121,DT121,DF121          ;ERROR ITEM # 121
002652  055577  066763  072576          .WORD   EM122,DH122,DT122,DF122          ;ERROR ITEM # 122
002662  055676  066763  073224          .WORD   EM123,DH123,DT123,DF123          ;ERROR ITEM # 123
002672  055737  065653  073460          .WORD   EM124,DH124,DT124,DF124          ;ERROR ITEM # 124
002702  056032  065653  073460          .WORD   EM125,DH125,DT125,DF125          ;ERROR ITEM # 125
002712  056122  065533  073446          .WORD   EM126,DH126,DT126,DF126          ;ERROR ITEM # 126
002722  056331  067035  073446          .WORD   EM127,DH127,DT127,DF127          ;ERROR ITEM # 127
002732  056544  067736  071712          .WORD   EM130,DH130,DT130,DF130          ;ERROR ITEM # 130
002742  056644  067035  073544          .WORD   EM131,DH131,DT131,DF131          ;ERROR ITEM # 131
002752  056704  067035  073544          .WORD   EM132,DH132,DT132,DF132          ;ERROR ITEM # 132
002762  056744  070026  073606          .WORD   EM133,DH133,DT133,DF133          ;ERROR ITEM # 133
002772  057003  070026  073606          .WORD   EM134,DH134,DT134,DF134          ;ERROR ITEM # 134
003002  057042  070026  073606          .WORD   EM135,DH135,DT135,DF135          ;ERROR ITEM # 135
003012  057101  070026  073606          .WORD   EM136,DH136,DT136,DF136          ;ERROR ITEM # 136
003022  056744  070136  073660          .WORD   EM137,DH137,DT137,DF137          ;ERROR ITEM # 137
003032  057003  070136  073660          .WORD   EM140,DH140,DT140,DF140          ;ERROR ITEM # 140
003042  057042  070136  073660          .WORD   EM141,DH141,DT141,DF141          ;ERROR ITEM # 141
003052  057101  070136  073660          .WORD   EM142,DH142,DT142,DF142          ;ERROR ITEM # 142
003062  057140  070026  073606          .WORD   EM143,DH143,DT143,DF143          ;ERROR ITEM # 143
003072  057173  070026  073606          .WORD   EM144,DH144,DT144,DF144          ;ERROR ITEM # 144
003102  057140  070136  073660          .WORD   EM145,DH145,DT145,DF145          ;ERROR ITEM # 145
003112  057173  070136  073660          .WORD   EM146,DH146,DT146,DF146          ;ERROR ITEM # 146
003122  057226  067035  073606          .WORD   EM147,DH147,DT147,DF147          ;ERROR ITEM # 1
```

ERROR POINTER TABLE

```
003132  057226  070326  073606          .WORD   EM150,DH150,DT150,DF150    ;ERROR ITEM # 150
003142  057226  070136  073660           WORD   EM151,DH151,DT151,DF151    ;ERROR ITEM # 151
003152  057260  070026  073606          .WORD   EM152,DH152,DT152,DF152    ;ERROR ITEM # 152
003162  057260  070136  073660          .WORD   EM153,DH153,DT153,DF153    ;ERROR ITEM # 153
003172  057312  070417  073700          .WORD   EM154,DH154,DT154,DF154    ;ERROR ITEM # 154
003202  057544  070417  073700          .WORD   EM155,DH155,DT155,DF155    ;ERROR ITEM # 155
003212  057777  067035  073606          .WORD   EM156,DH156,DT156,DF156    ;ERROR ITEM # 156
003222  060214  067035  073606          .WORD   EM157,DH157,DT157,DF157    ;ERROR ITEM # 157
003232  060433  067035  073606          .WORD   EM160,DH160,DT160,DF160    ;ERROR ITEM # 160
003242  060640  067035  073606          .WORD   EM161,DH161,DT161,DF161    ;ERROR ITEM # 161
003252  061045  067035  073606          .WORD   EM162,DH162,DT162,DF162    ;ERROR ITEM # 162
003262  061112  067035  073606          .WORD   EM163,DH163,DT163,DF163    ;ERROR ITEM # 163
003272  061157  065653  071712          .WORD   EM164,DH164,DT164,DF164    ;ERROR ITEM # 164
003302  061224  065653  071712          .WORD   EM165,DH165,DT165,DF165    ;ERROR ITEM # 165
003312  061271  067035  073606          .WORD   EM166,DH166,DT166,DF166    ;ERROR ITEM # 166
003322  061401  067035  073606          .WORD   EM167,DH167,DT167,DF167    ;ERROR ITEM # 167
003332  061640  067035  073606          .WORD   EM170,DH170,DT170,DF170    ;ERROR ITEM # 170
003342  061750  067035  073606          .WORD   EM171,DH171,DT171,DF171    ;ERROR ITEM # 171
003352  062207  067035  073606          .WORD   EM172,DH172,DT172,DF172    ;ERROR ITEM # 172
003362  062446  067035  073606          .WORD   EM173,DH173,DT173,DF173    ;ERROR ITEM # 173
003372  062705  067035  073606          .WORD   EM174,DH174,DT174,DF174    ;ERROR ITEM # 174
003402  063144  067035  073606          .WORD   EM175,DH175,DT175,DF175    ;ERROR ITEM # 175
003412  063403  067035  073606          .WORD   EM176,DH176,DT176,DF176    ;ERROR ITEM # 176
003422  063540  070457  073712          .WORD   EM177,DH177,DT177,DF177    ;ERROR ITEM # 177
003432  063574  067035  073606          .WORD   EM200,DH200,DT200,DF200    ;ERROR ITEM # 200
003442  063731  067035  073606          .WORD   EM201,DH201,DT201,DF201    ;ERROR ITEM # 201
003452  064066  067035  073606          .WORD   EM202,DH202,DT202,DF202    ;ERROR ITEM # 202
003462  064223  067035  073606          .WORD   EM203,DH203,DT203,DF203    ;ERROR ITEM # 203
003472  064360  067035  073606          .WORD   EM204,DH204,DT204,DF204    ;ERROR ITEM # 204
003502  064515  065653  071712          .WORD   EM205,DH205,DT205,DF205    ;ERROR ITEM # 205
003512  064562  067035  073606          .WORD   EM206,DH206,DT206,DF206    ;ERROR ITEM # 206
003522  064627  067035  073606          .WORD   EM207,DH207,DT207,DF207    ;ERROR ITEM # 207
003532  064751  067035  073606          .WORD   EM210,DH210,DT210,DF210    ;ERROR ITEM # 210
003542  045112  070523  073722          .WORD   EM211,DH211,DT211,DF211    ;ERROR ITEM # 211
003552  045146  065533  073740          .WORD   EM212,DH212,DT212,DF212    ;ERROR ITEM # 212
003562  045200  065533  073740          .WORD   EM213,DH213,DT213,DF213    ;ERROR ITEM # 213
003572  065026  067035  073606          .WORD   EM214,DH214,DT214,DF214    ;ERROR ITEM # 214
```

ACT11 HOOKS

```
1438                                    .SBTTL  ACT11 HOOKS
                                        ;;**********************************************************************
                                        ;HOOKS REQUIRED BY ACT11
003602                                          $SVPC=.                 ;SAVE PC
000046                                          .-46
000046  036110                                  $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
```

```
1440

                                .SBTTL  APT PARAMETER BLOCK
                                ;;**************************** **********************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;**************************************************************************
                                ;;
003602 003602                           .$X=.   ;;SAVE CURRENT LOCATION
000024 000024                           .-24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024 000200                           200     ;;FOR APT START UP
000044 000044                           . 44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044 003602                           $APTHDR ;;POINT TO APT HEADER BLOCK
003602 003602                           .-.$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)
```

INITIALIZE THE COMMON TAGS

```
1442
1443 003616                                .SBTTL  INITIALIZE THE COMMON TAGS
                                           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  036170  000020                     MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
003644  012737  000340  000022                     MOV     #340,@#IOTVEC+2 ;;LEVEL 7
003652  012737  036506  000030                     MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
003660  012737  000340  000032                     MOV     #340,@#EMTVEC+2 ;;LEVEL 7
003666  012737  041072  000034                     MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
003674  012737  000340  000036                     MOV     #340,@#TRAPVEC+2;LEVEL 7
003702  012737  041156  000024                     MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
003710  012737  000340  000026                     MOV     #340,@#PWRVEC+2 ;;LEVEL 7
003716  013737  035736  035730                     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  036154  000014                     MOV     #$RTRN,@#TBITVEC ;;SET ''T'' BIT VECTOR TO $RTRN
003750  012737  000340  000016                     MOV     #340,@#TBITVEC+2 ;;LEVEL 7
003756  012737  000002  036154                     MOV     #RTI,$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$,-(SP)      ;;AND PC
004000  000006                                     RTT                     ;;TRY THE RTT
004002  012737  000006  036154  64$:               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  036162                             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 HAPDWARE 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
```

INITIALIZE THE COMMON TAGS

```
      004154                                        70$:
1444                                                .SBTTL  TYPE PROGRAM NAME
                                                    ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
      004154  005227  177777                              INC     #-1             ;;FIRST TIME?
      004160  001047                                      BNE     71$             ;;BRANCH IF NO
      004162  022737  036110  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$:    .ASCIZ  <CRLF>*CKFPAC0 FP11F FLTG PNT PRT A*<CRLF>
      004300                                    71$:
1445  004300                                    LOOP:
```

```
1464                                    .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 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 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.
                                        ;*
                                        ;*****************************************************************
     004300  000004             TST1:   SCOPE
1465 004302  005037  004560             CLR     AERFLG
1466 004306  012737  004350  001110     MOV     #A1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1467 004314  012700  177777             MOV     #-1,R0          ;INITIALIZE THE COUNT PATTERN.
1468 004320  012737  004562  000244     MOV     #AERR1,FPVECT   ;SET UP FOR UNABLE TO DECODE
1469 004326  012737  004574  000010     MOV     #AERR2,10       ;FPP INSTRUCTION TRAP TO 244 OR 10.
1470 004334  005002                     CLR     R2              ;R2 IS THE 'AND' OF BAD DATA.
1471 004336  005102                     COM     R2
1472 004340  005003                     CLR     R3              ;R3 IS THE 'OR' OF BAD DATA.
1473 004342  012737  004626  000004     MOV     #AERR3,ERRVECT  ;IF EITHER INSTRUCTION
1474                                                             ;FAILS TO GO THROUGH THE
1475                                                             ;CORRECT SRC OR DST MODE AN
1476                                                             ;ODD ADDRESS TRAP WILL OCCUR.
1477 004350                         A1:
1478 004350  010004                 A11:    MOV     R0,R4
1479 004352  042704  030020                 BIC     #30020,R4
1480 004356  170104                         LDFPS   R4              ;TEST INSTRUCTION.
1481
1482 004360  012701  177777                 MOV     #-1,R1
1483 004364  170201                 A12:    STFPS   R1              ;TEST INSTRUCTION.
1484 004366  012737  042066  000244         MOV     #FPSPUR,FPVECT  ;SET UP FOR UNEXPECTED TRAPS.
1485 004374  010004                         MOV     R0,R4           ;MASK OFF UNSETTABLE BITS.
1486 004376  042704  030020                 BIC     #30020,R4
1487 004402  012737  042120  000004         MOV     #CPSPUR,ERRVECT
1488 004410  012737  042136  000010         MOV     #CPTWO,10
1489 004416  020401                         CMP     R4,R1           ;COMPARE DATA EXPECTED WITH
1490                                                             ;THE DATA READ.
1491 004420  001002                         BNE     A5              ;IF NOT EQUAL GO REPORT ERROR.
```

```
1492
1493 004422  077026                    A2:     SOB     R0,A1                   ;OTHERWISE DECREMENT COUNT PATTERN
1494 004424  000425                            BR      A5                      ;UNTIL IT IS ZERO.
1495
1496 004426  005237  004560            A3:     INC     AERFLG                  ;RECORD ERROR.
1497 004432  050003                            BIS     R0,R3                   ;COMPUTE 'OR' OF FAILING PATTERNS.
1498 004434  010005                            MOV     R0,R5                   ;COMPUTE 'AND' OF FAILING PATTERNS.
1499 004436  005105                            COM     R5
1500 004440  040502                            BIC     R5,R2
1501
1502 004442  022737  000005  004560            CMP     #5,AERFLG               ;SEE IF MORE THAN 5 ERRORS HAVE
1503 004450  103412                            BLO     A05                     ;OCCURRED. BR IF YES.
1504                                                                           ;OTHERWISE
1505                                                                           ;REPORT ERROR.
1506 004452  012737  004350  001236            MOV     #A1,$TMP2
1507 004460  010037  001240                    MOV     R0,$TMP3
1508 004464  010137  001242                    MOV     R1,$TMP4
1509 004470  010437  001244                    MOV     R4,$TMP5
1510 004474  104001                    A4:     ERROR   +1
1511
1512 004476  000751                    A05:    BR      A2                      ;CONTINUE TESTING.
1513
1514 004500  005737  004560            A5:     TST     AERFLG                  ;SEE IF ANY ERRORS OCCURRED.
1515 004504  001471                            BEQ     ADONE                   ;IF NOT GO TO NEXT TEST.
1516 004506  032777  020000  174424            BIT     #SW13,@SWR              ;OTHERWISE SEE IF A SUMMARY
1517 004514  001404                            BEQ     A6                      ;SHOULD BE TYPED.
1518 004516  032777  000200  174414            BIT     #SW7,@SWR
1519 004524  001461                            BEQ     ADONE
1520
1521 004526                            A6:                                     ;TYPE ERROR SUMMARY.
1522 004526  010237  001236                    MOV     R2,$TMP2
1523 004532  010337  001240                    MOV     R3,$TMP3
1524 004536  012737  004552  001116            MOV     #A7,$ERRPC
1525 004544  112737  000002  001114            MOVB    #2,$ITEMB
1526 004552  004737  041342            A7:     JSR     PC,ERTYPE
1527 004556  000444                            BR      ADONE
1528
1529 004560  000000                    AERFLG:.WORD    0
1530
1531                                   ;UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 244.
1532 004562  011637  001236            AERR1:  MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
1533 004566  022626                            CMP     (SP)+,(SP)+
1534 004570  104010                    1$:     ERROR   +10
1535 004572  000436                            BR      ADONE
1536
1537                                   ;UNABLE TO DECODE INSTRUCTION. TRAPPED TO 10.
1538 004574  021627  004352            AERR2:  CMP     (SP),#A11+2             ;DID TRAP OCCUR OF FPP INSTRUCTION?
1539 004600  001405                            BEQ     1$
1540 004602  021627  004366                    CMP     (SP),#A12+2
1541 004606  001402                            BEQ     1$
1542 004610  000137  042136                    JMP     CPTWO                   ;IF NOT FPP INSTRUCTION THEN
1543                                                                           ;REPORT SPURIOUS TRAP TO 10.
1544
1545 004614  011637  001236            1$:     MOV     (SP),$TMP2              ;OTHERWISE REPORT IR DECIDE ERROR.
1546 004620  022626                            CMP     (SP)+,(SP)+
1547 004622  104011                    2$:     ERROR   +11
1548 004624  000421                            BR      ADONE
```

TEST # 1 - LDFPS, STFPS AND DATA PATHS TEST

```
1549
1550                                        ;TRAP TO 4 HANDLER:
1551 004626  021627  004352    AERR3:  CMP     (SP),#A11+2         ;DID THE TRAP OCCUR ON THE
1552 004632  001405                    BEQ     1$                  ;LDFPS INSTRUCTION?
1553 004634  021627  004366            CMP     (SP),#A12+2         ;OR THE STFPS INSTRUCTION?
1554 004640  001407                    BEQ     2$
1555 004642  000137  042120            JMP     CPSPUR              ;IF NEITHER THEN REPORT
1556                                                               ;UNEXPECTED TRAP TO 4.
1557
1558 004646  011637  001236    1$:     MOV     (SP),$TMP2
1559 004652  022626                    CMP     (SP)+,(SP)+
1560 004654  104014            15$:    ERROR   +14
1561 004656  000404                    BR      ADONE
1562
1563 004660  011637  001236    2$:     MOV     (SP),$TMP2
1564 004664  022626                    CMP     (SP)+,(SP)+
1565 004666  104015            25$:    ERROR   +15
1566
1567 004670                    ADONE:
     004670  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?).
1568
1569
```

TEST # 2 - CFCC TEST

```
1575                                    .SBTTL  TEST # 2 - CFCC TEST
                                        ;;*****************************************************************
                                        ;*TEST 2        CFCC TEST
                                        ;*
                                        ;*THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.
                                        ;*
                                        ;;*****************************************************************
     004672  000004                     TST2:   SCOPE
1576 004674  012737  004706  001110             MOV     #B1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1577 004702  012700  000017                     MOV     #17,R0                  ;R0 CONTAINS TO TEST PATTERN.
1578
1579 004706                             B1:
1580 004706  170100                             LDFPS   R0                      ;LOAD THE TEST PATTERN
1581
1582 004710                             B2:
1583 004710  170000                             CFCC                            ;COPY CONDITION CODES.
1584
1585 004712  013703  177776                     MOV     PSW,R3                  ;SEE IF PATTERN TRANSFERED.
1586 004716  042703  177760                     BIC     #177760,R3
1587 004722  020003                             CMP     R0,R3
1588 004724  001002                             BNE     BERR
1589
1590 004726  077011                     B3:     SOB     R0,B1
1591 004730  000422                             BR      BDONE
1592
1593 004732                             BERR:
1594 004732  170201                             STFPS   R1                      ;WAS FPS MODIFIED BY CFCC?
1595 004734  012737  004710  001236             MOV     #B2,$TMP2
1596 004742  020001                             CMP     R0,R1
1597 004744  001006                             BNE     BERR1
1598
1599 004746  010337  001240                     MOV     R3,$TMP3
1600 004752  010037  001242                     MOV     R0,$TMP4
1601 004756  104003                     1$:     ERROR   +3
1602 004760  000762                             BR      B3
1603
1604 004762                             BERR1:
1605 004762  010037  001240                     MOV     R0,$TMP3
1606 004766  010137  001242                     MOV     R1,$TMP4
1607 004772  104004                     1$:     ERROR   +4
1608 004774  000754                             BR      B3
1609
1610 004776                             BDONE:
     004776  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?).
1611
```

```
1620                                    .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.
                                        ;*
                                        ;*********************************************************
     005000  000004                     TST3:   SCOPE
1621 005002  012737  005016  001110             MOV     #C1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1622 005010  012737  000760  001244             MOV     #760,$TMP5
1623 005016  012737  000202  001250     C1:     MOV     #202,$TMP7
1624 005024  012737  043231  001252             MOV     #SETF1,$TMP10
1625 005032  005000                             CLR     R0
1626
1627 005034  170100                             LDFPS   R0                      ;CLEAR THE FPS.
1628 005036  012737  005044  001236             MOV     #C15,$TMP2
1629
1630 005044  170001                     C15:    SETF                            ;TEST INSTRUCTION.
1631
1632 005046  170201                             STFPS   R1                      ;GET RESULT.
1633 005050  005002                             CLR     R2
1634 005052  020201                             CMP     R2,R1                   ;DID AN ERROR OCCUR?
1635 005054  001402                             BEQ     1$
1636 005056  004737  005476                     JSR     PC,CERR1
1637
1638 005062                             1$:
     005062  012737  005070  001110             MOV     #C2,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1639 005070  012700  147757             C2:     MOV     #147757,R0
1640
1641 005074  170100                             LDFPS   R0                      ;PUT 147757 IS FPS
1642 005076  012737  005104  001236             MOV     #C25,$TMP2
1643 005104  170001                     C25:    SETF                            ;CLEAR FD BIT.
1644
1645 005106  170201                             STFPS   R1                      ;GET RESULT
1646 005110  012702  147557                     MOV     #147557,R2
1647 005114  020102                             CMP     R1,R2                   ;RESULT CORRECT.
1648 005116  001402                             BEQ     1$
1649 005120  004737  005574                     JSR     PC,CERR2
1650
1651 005124                             1$:
     005124  012737  005132  001110             MOV     #C3,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1652 005132  012737  000203  001250     C3:     MOV     #203,$TMP7
1653 005140  012737  043237  001252             MOV     #SETD1,$TMP10
1654 005146  012700  147757                     MOV     #147757,R0
1655
1656 005152  170100                             LDFPS   R0                      ;LOAD 147757 INTO FPS.
1657 005154  012737  005162  001236             MOV     #C35,$TMP2
1658 005162  170011                     C35:    SETD                            ;SETD FD BIT.
1659
1660 005164  170201                             STFPS   R1
1661 005166  012702  147757                     MOV     #147757,R2
1662 005172  020102                             CMP     R1,R2                   ;RESULT CORRECT?
1663 005174  001402                             BEQ     1$
1664 005176  004737  005574                     JSR     PC,CERR2
```

TEST # 3 - SETF, SETD, SETI AND SETL TEST

```
1665
1666 005202                                  1$:
     005202  012737  005210  001110                MOV     #C4,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1667 005210  005000                          C4:     CLR     R0
1668 005212  170100                                  LDFPS   R0                      ;CLEAR FPS.
1669 005214  012737  005222  001236                  MOV     #C45,$TMP2
1670
1671 005222  170011                          C45:    SETD                            ;SET FD BIT.
1672
1673 005224  170201                                  STFPS   R1                      ;GET RESULT.
1674 005226  012702  000200                          MOV     #200,R2
1675 005232  020102                                  CMP     R1,R2                   ;RESULT CORRECT?
1676 005234  001402                                  BEQ     1$
1677 005236  004737  005476                          JSR     PC,CERR1
1678
1679 005242                                  1$:
     005242  012737  005250  001110                MOV     #C5,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1680 005250  012737  000204  001250          C5:     MOV     #204,$TMP7
1681 005256  012737  043245  001252                  MOV     #SETI1,$TMP10
1682 005264  005000                                  CLR     R0
1683
1684 005266  170100                                  LDFPS   R0                      ;CLEAR FPS
1685 005270  012737  005276  001236                  MOV     #C55,$TMP2
1686
1687 005276  170002                          C55:    SETI                            ;CLEAR FL BIT.
1688
1689 005300  170201                                  STFPS   R1                      ;GET RESULT.
1690 005302  005002                                  CLR     R2
1691 005304  020201                                  CMP     R2,R1                   ;RESULT CORRECT?
1692 005306  001402                                  BEQ     1$
1693 005310  004737  005476                          JSR     PC,CERR1
1694
1695 005314                                  1$:
     005314  012737  005322  001110                MOV     #C6,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1696 005322  012700  147757                  C6:     MOV     #147757,R0
1697 005326  170100                                  LDFPS   R0                      ;PUT 147757 INTO FPS
1698 005330  012737  005336  001236                  MOV     #C65,$TMP2
1699
1700 005336  170002                          C65:    SETI                            ;CLEAR FL BIT.
1701
1702 005340  170201                                  STFPS   R1                      ;GET THE RESULT.
1703 005342  012702  147657                          MOV     #147657,R2
1704 005346  020102                                  CMP     R1,R2                   ;RESULT CORRECT?
1705 005350  001402                                  BEQ     1$
1706 005352  004737  005574                          JSR     PC,CERR2
1707
1708 005356                                  1$:
     005356  012737  005364  001110                MOV     #C7,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1709 005364  012737  000205  001250          C7:     MOV     #205,$TMP7
1710 005372  012737  043253  001252                  MOV     #SETL1,$TMP10
1711 005400  012700  147757                          MOV     #147757,R0
1712 005404  170100                                  LDFPS   R0                      ;SET FPS TO 147757.
1713 005406  012737  005414  001236                  MOV     #C75,$TMP2
1714
1715 005414  170012                          C75:    SETL                            ;SET FL BIT.
1716
1717 005416  170201                                  STFPS   R1                      ;GET THE RESULT.
```

```
1718 005420  012702  147757                    MOV     #147757,R2
1719 005424  020102                            CMP     R1,R2                   ;RESULT CORRECT?
1720 005426  001402                            BEQ     1$
1721 005430  004737  005574                    JSR     PC,CERR2
1722
1723 005434                            1$:
     005434  012737  005442  001110            MOV     #C8,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1724 005442  005000                    C8:     CLR     R0
1725 005444  170100                            LDFPS   R0                      ;CLEAR FPS.
1726 005446  012737  005454  001236            MOV     #C85,$TMP2
1727
1728 005454  170012                    C85:    SETL                            ;SET FL BIT.
1729
1730 005456  170201                            STFPS   R1
1731 005460  012702  000100                    MOV     #100,R2
1732 005464  020102                            CMP     R1,R2                   ;RESULT CORRECT.
1733 005466  001402                            BEQ     1$
1734 005470  004737  005476                    JSR     PC,CERR1
1735
1736 005474  000522                    1$:     BR      CDONE
1737
1738                                   ;THESE ARE ERROR ANALYSIS ROUTINES:
1739 005476  010103                    CERR1:  MOV     R1,R3
1740 005500  032703  177477                    BIT     #177477,R3              ;ARE ANY OTHER BITS SET?
1741 005504  001401                            BEQ     2$
1742 005506  000503                    1$:     BR      CERR4
1743
1744 005510  032703  000300            2$:     CMP     #300,R3                 ;ARE BOTH FD AND FL SET?
1745 005514  001774                            BEQ     1$
1746 005516  032703  000300                    BIT     #300,R3                 ;ARE THEY BOTH CLEAR?
1747 005522  001771                            BEQ     1$
1748
1749 005524  032703  000200                    BIT     #200,R3                 ;IS FD SET?
1750 005530  001407                            BEQ     3$
1751 005532  012737  043237  001254            MOV     #SETD1,$TMP11
1752 005540  012737  000203  001246            MOV     #203,$TMP6
1753 005546  000452                            BR      CERR3
1754
1755 005550  032703  000100            3$:     BIT     #100,R3                 ;IS FL SET
1756 005554  001754                            BEQ     1$
1757 005556  012737  043253  001254            MOV     #SETL1,$TMP11
1758 005564  012737  000205  001246            MOV     #205,$TMP6
1759 005572  000440                            BR      CERR3
1760
1761 005574  010103                    CERR2:  MOV     R1,R3
1762 005576  005103                            COM     R3
1763
1764 005600  032703  177477                    BIT     #177477,R3              ;ARE ANY OTHER BITS SET?
1765 005604  001401                            BEQ     2$
1766 005606  000443                    1$:     BR      CERR4
1767
1768 005610  032703  000300            2$:     BIT     #300,R3                 ;ARE BOTH FD AND FL SET?
1769 005614  001774                            BEQ     1$
1770 005616  032701  000300                    BIT     #300,R1                 ;ARE THEY BOTH CLEAR?
1771 005622  001771                            BEQ     1$
1772
1773 005624  032701  000200                    BIT     #200,R1                 ;IS FD CLEAR?
```

```
1774 005630  001007                        BNE     3$
1775 005632  012737  043231  001254        MOV     #SETF1,$TMP11
1776 005640  012737  000202  001246        MOV     #202,$TMP6
1777 005646  000412                        BR      CERR3
1778
1779 005650  032701  000100          3$:   BIT     #100,R1
1780 005654  001354                        BNE     1$                  ;IS FL CLEAR.
1781 005656  012737  043245  001254        MOV     #SETI1,$TMP11
1782 005664  012737  000204  001246        MOV     #204,$TMP6
1783 005672  000400                        BR      CERR3
1784
1785                                ;REPORT THE ERRORS:
1786 005674                         CERR3:
1787 005674  010137  001240                MOV     R1,$TMP3
1788 005700  010237  001242                MOV     R2,$TMP4
1789 005704  012637  005740                MOV     (SP)+,CPC
1790 005710  104012                 1$:    ERROR   +12
1791 005712  000177  000022                JMP     @CPC
1792
1793 005716                         CERR4:
1794 005716  010137  001240                MOV     R1,$TMP3
1795 005722  010237  001242                MOV     R2,$TMP4
1796 005726  012637  005740                MOV     (SP)+,CPC
1797 005732  104013                 1$:    ERROR   +13
1798 005734  000177  000000                JMP     @CPC
1799
1800 005740  000000                 CPC:   .WORD   0
1801
1802 005742                         CDONE:
     005742  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?).
1803
1804
```

```
1824                                    .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.
                                        ;*
                                        ;********************************************************* ********
     005744  000004                     TST4:   SCOPE
1825 005746  012737  005774  001110             MOV     #D1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1826 005754  012705  170003                     MOV     #170003,R5              ;INITIAL OP CODE.
1827 005760  012737  006164  000004             MOV     #DERR2,ERRVECT
1828 005766  012737  006070  000244             MOV     #DERR1,FPVECT
1829
1830 005774  005000                     D1:     CLR     R0.
1831 005776  170100                             LDFPS   R0                      ;CLEAR FPS.
1832 006000  005002                             CLR     R2
1833 006002  010537  006020                     MOV     R5,D2                   ;SET UP THE ILLEGAL INSTRUCTION.
1834 006006  010537  001244                     MOV     R5,$TMP5
1835 006012  012737  006020  001236             MOV     #D2,$TMP2
1836 006020  000000                     D2:     .WORD   0
1837 006022  170000                     D3:     CFCC
1838 006024  005202                             INC     R2
1839 006026  005202                     D4:     INC     R2
1840
1841 006030  170201                             STFPS   R1                      ;REPORT FAILURE. DID NOT TRAP.
1842 006032  010137  001240                     MOV     R1,$TMP3
1843 006036  104016                     1$:     ERROR   +16
1844
1845 006040  022705  170010             D5:     CMP     #170010,R5              ;COMPUTE NEXT OP CODE
1846 006044  001003                             BNE     D6
1847 006046  012705  170013                     MOV     #170013,R5
1848 006052  000750                             BR      D1
1849
1850 006054  022705  170077             D6:     CMP     #170077,R5
1851 006060  001001                             BNE     D7
1852 006062  000452                             BR      DDONE
1853 006064  005205                     D7:     INC     R5
1854 006066  000742                             BR      D1
1855
1856 006070  022716  006022             DERR1:  CMP     #D3,(SP)                ;DID TRAP OCCUR ON TEST INSTRUCTION?
1857 006074  001402                             BEQ     1$
1858 006076  000137  042066                     JMP     FPSPUR
1859
```

```
1860 006102  022626                    1$:     CMP     (SP)+,(SP)+
1861 006104  170201                            STFPS   R1                ;GET THE FPS AND SEE IF IT IS
1862 006106  022701  100000                    CMP     #100000,R1        ;SET CORRECTLY.
1863 006112  001406                            BEQ     3$
1864
1865 006114  012737  100000  001240            MOV     #100000,$TMP3
1866 006122  010137  001242                    MOV     R1,$TMP4
1867 006126  104017                    2$:     ERROR   +17
1868
1869 006130  012704  000001            3$:     MOV     #1,R4
1870 006134  170304                    D8:     STST    R4                ;GET THE FEC CODE. NOTE THAT
1871                                                                      ;IF THE DESTINATION MODE IS
1872                                                                      ;IMPROPERLY DECODED AN ODD
1873                                                                      ;ADDRESS TRAP TO 4 SHOULD OCCUR.
1874 006136  022704  000002                    CMP     #2,R4             ;WAS FEC CORRECT?
1875 006142  001001                            BNE     D9
1876 006144  000735                            BR      D5
1877
1878 006146                            D9:                               ;REPORT STST FAILURE
1879 006146  012737  006134  001240            MOV     #D8,$TMP3
1880 006154  010437  001242                    MOV     R4,$TMP4
1881 006160  104020                    1$:     ERROR   +20
1882 006162  000726                            BR      D5
1883
1884 006164  022716  006136            DERR2:  CMP     #D8+2,(SP)        ;DID THE TRAP OCCUR ON THE
1885 006170  001402                            BEQ     D10               ;STST INSTRUCTION?
1886 006172  000137  042120                    JMP     CPSPUR
1887
1888 006176                            D10:
1889 006176  011637  001236                    MOV     (SP),$TMP2
1890 006202  022626                            CMP     (SP)+,(SP)+
1891 006204  104021                    1$:     ERROR   +21
1892 006206  000714                            BR      D5
1893
1894 006210                            DDONE:
     006210  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?).
1895
1896
```

```
1904                                    .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.
                                        ;*
                                        ;*****************************************************************
     006212  000004                     TS5:    SCOPE
1905 006214  012737  006230  001110             MOV     #E1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1906 006222  012737  006324  000244             MOV     #EERR2,FPVECT           ;SETUP FOR THE INTERRUPT.
1907
1908 006230  012700  040000          E1:        MOV     #40000,R0
1909 006234  170100                             LDFPS   R0                      ;SET FID.
1910 006236  012737  006244  001236             MOV     #E3,$TMP2
1911 006244                          E2:
1912 006244  170020                  E3:        .WORD   170020                  ;ILLEGAL FPP INSTRUCTION.
1913 006246  170000                  E4:        CFCC
1914
1915 006250  170201                             STFPS   R1                      ;SEE IF ERROR WAS DETECTED.
1916 006252  022701  140000                     CMP     #140000,R1
1917 006256  001005                             BNE     EERR0
1918
1919 006260  170304                             STST    R4                      ;SEE IF FEC=2
1920 006262  022704  000002                     CMP     #2,R4
1921 006266  001010                             BNE     EERR1
1922 006270  000431                             BR      EDONE
1923
1924 006272                          EERR0:                                     ;REPORT FPS INCORRECTLY SET.
1925 006272  010137  001240                     MOV     R1,$TMP3
1926 006276  012737  140000  001242             MOV     #140000,$TMP4
1927 006304  104022                  1$:        ERROR   +22
1928 006306  000422                             BR      EDONE
1929
1930 006310                          EERR1:                                     ;REPORT FEC NOT 2.
1931 006310  010537  001240                     MOV     R5,$TMP3
1932 006314  010437  001242                     MOV     R4,$TMP4
1933 006320  104023                  1$:        ERROR   +23
1934 006322  000414                             BR      EDONE
1935
1936 006324  021627  006246          EERR2:     CMP     (SP),#E4                ;DID THE ILLEGAL INSTRUCTION TRAP?
1937 006330  001402                             BEQ     1$
1938 006332  000137  042066                     JMP     FPSPUR
1939
1940 006336                          1$:
1941 006336  011637  001236                     MOV     (SP),$TMP2
1942 006342  022626                             CMP     (SP)+,(SP)+
1943 006344  170201                             STFPS   R1
1944 006346  010137  001240                     MOV     R1,$TMP3
1945 006352  104024                  2$:        ERROR   +24
1946
1947 006354                          EDONE:
     006354  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?).

1948
1949
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1962                                    .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.
                                        ;*
                                        ;*****************************************************************
     006356  000004                     TST6:   SCOPE
1963
1964 006360                             F1:
     006360  012737  006360  001110             MOV     #F1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1965 006366  012737  006436  001236             MOV     #F3,$TMP2
1966 006374  005000                             CLR     R0
1967 006376  170100                             LDFPS   R0
1968 006400  170011                             SETD
1969 006402  012701  010174                     MOV     #FDATI0,R1              ;SET UP THE LOAD DATA.
1970 006406  012702  010240                     MOV     #FXDAT0,R2
1971 006412  012703  000010                     MOV     #10,R3
1972
1973 006416  012221                     F2:     MOV     (R2)+,(R1)+
1974 006420  077302                             SOB     R3,F2
1975
1976 006422  012700  010204                     MOV     #FDATI4,R0              ;SETUP R0 FOR THE LDD (R0),AC0.
1977 006426  012737  007660  000004             MOV     #FERR20,ERRVECT         ;IF THE SRC FLOWS FAIL THEN
1978                                                                            ;AN ODD ADDRESS MAY OCCUR.
1979 006434  005003                             CLR     R3
1980
1981 006436  172410                     F3:     LDD     (R0),AC0
1982 006440  005203                     F4:     INC     R3
1983 006442  005203                             INC     R3
1984
1985 006444  020027  010204                     CMP     R0,#FDATI4              ;WAS R0 AFFECTED?
1986 006450  001402                             BEQ     F5
1987 006452  000137  007024                     JMP     FERR1
1988
1989 006456  020327  000002             F5:     CMP     R3,#2                   ;SEE IF THE PC WAS ADVERSELY
1990 006462  001402                             BEQ     1$                      ;AFFECTED DURING THE INSTRUCTION.
1991 006464  000137  007122                     JMP     FERR2
1992
1993 006470  012701  010174             1$:     MOV     #FDATI0,R1              ;MAKE SURE THE SOURCE DATA WAS
1994 006474  012702  010240                     MOV     #FXDAT0,R2              ;NOT AFFECTED.
1995 006500  012703  000010                     MOV     #10,R3
1996 006504  022122                     2$:     CMP     (R1)+,(R2)+
1997 006506  001402                             BEQ     3$
1998 006510  000137  006766                     JMP     FERR0
1999 006514  077305                     3$:     SOB     R3,2$
2000
2001 006516  170201                             STFPS   R1                      ;MAKE SURE THE FPS IS CORRECT.
2002 006520  022701  000200                     CMP     #200,R1
2003 006524  001402                             BEQ     F6
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2004 006526  000137  007640                    JMP     FERR11
2005
2006 006532                          F6:
     006532  012737  006540  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2007 006540  012737  006602  001236  1$:        MOV     #F10,$TMP2
2008
2009 006546  012703  177777                     MOV     #-1,R3
2010 006552  012704  000010                     MOV     #10,R4
2011 006556  012705  010216                     MOV     #FDAT00,R5              ;SET UP THE OUTPUT DATA BUFFER.
2012 006562  010325                  F7:        MOV     R3,(R5)+
2013 006564  077402                             SOB     R4,F7
2014
2015 006566  012700  010226                     MOV     #FDAT04,R0              ;SET UP R0 FOR DST MODE 1 REG 0.
2016 006572  012737  010026  000004             MOV     #FERR25,ERRVECT         ;IF THE DST FLOWS FAIL AN ODD
2017                                                                         ;ADDRESS COULD OCCUR.
2018 006600  005003                             CLR     R3
2019
2020 006602  174010                  F10:       STD     AC0,(R0)                ;TEST INSTRUCTION.
2021 006604  005203                  F11:       INC     R3
2022 006606  005203                             INC     R3
2023
2024 006610  020027  010226                     CMP     R0,#FDAT04              ;WAS R0 MODIFIED?
2025 006614  001402                             BEQ     F12
2026 006616  000137  007162                     JMP     FERR3
2027
2028 006622  020327  000002          F12:       CMP     R3,#2                   ;WAS THE PC AFFECTED CORRECTLY?
2029 006626  001402                             BEQ     F135
2030 006630  000137  007154                     JMP     FERR4
2031
2032 006634  012701  010216          F135:      MOV     #FDAT00,R1
2033 006640  012702  010240                     MOV     #FXDAT0,R2
2034
2035 006644  022122                             CMP     (R1)+,(R2)+             ;SEE IF THE DATA WAS OUTPUT
2036 006646  001402                             BEQ     F13                     ;TO THE TARGET AREA CORRECTLY.
2037 006650  000137  007260                     JMP     FERR5
2038
2039 006654  022122          F13:       CMP     (R1)+,(R2)+
2040 006656  001402                             BEQ     F14
2041 006660  000137  007260                     JMP     FERR5
2042
2043 006664  022122          F14:       CMP     (R1)+,(R2)+
2044 006666  001402                             BEQ     F15
2045 006670  000137  007260                     JMP     FERR5
2046
2047 006674  022122          F15:       CMP     (R1)+,(R2)+
2048 006676  001402                             BEQ     F16
2049 006700  000137  007260                     JMP     FERR5
2050
2051 006704  022122          F16:       CMP     (R1)+,(R2)+
2052 006706  001402                             BEQ     F17
2053 006710  000137  007604                     JMP     FERR10
2054
2055 006714  022122          F17:       CMP     (R1)+,(R2)+
2056 006716  001402                             BEQ     F20
2057 006720  000137  007314                     JMP     FERR6
2058
2059 006724  022122          F20:       CMP     (R1)+,(R2)+
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2060 006726  001402                        BEQ     F21
2061 006730  000137  007450                JMP     FERR7
2062
2063 006734  022122                F21:    CMP     (R1)+,(R2)+
2064 006736  001402                        BEQ     F22
2065 006740  000137  007604                JMP     FERR10
2066
2067 006744  005001                F22:    CLR     R1
2068 006746  170201                        STFPS   R1              ;MAKE SURE FPS IS CORRECT.
2069 006750  022701  000200                CMP     #200,R1
2070 006754  001402                        BEQ     F23
2071 006756  000137  007640                JMP     FERR11
2072 006762  000137  010260        F23:    JMP     FDONE
2073
2074 006766                        FERR0:                          ;SOURCE DATA AFFECTED BY
2075 006766  012737  010240  001240        MOV     #FXDAT0,$TMP3   ;THE LDD INSTRUCTION.
2076 006774  012737  010252  001242        MOV     #FXDAT0+12,$TMP4
2077 007002  012737  010174  001244        MOV     #FDATI0,$TMP5
2078 007010  012737  010206  001246        MOV     #FDATI0+12,$TMP6
2079 007016  104025                1$:     ERROR   +25
2080 007020  000137  010260                JMP     FDONE
2081
2082 007024  012737  010204  001242  FERR1: MOV     #FDATI4,$TMP4   ;FSRC FLOWS FAILURE.
2083 007032  010037  001240                MOV     R0,$TMP3
2084 007036  012737  000762  001244        MOV     #762,$TMP5
2085 007044  012737  000321  001250        MOV     #321,$TMP7
2086
2087 007052  022700  010174                CMP     #FDATI0,R0      ;FSRC MODE 4?
2088 007056  001004                        BNE     1$
2089 007060  012737  000324  001246        MOV     #324,$TMP6
2090 007066  000412                        BR      4$
2091
2092 007070  022700  010214          1$:   CMP     #FDATI4+10,R0   ;FSRC MODE 2?
2093 007074  001004                        BNE     2$
2094 007076  012737  000322  001246        MOV     #322,$TMP6
2095 007104  000403                        BR      4$
2096
2097 007106                          2$:
2098 007106  104027                3$:     ERROR   +27
2099 007110  000137  010260                JMP     FDONE
2100
2101 007114                          4$:
2102 007114  104026                5$:     ERROR   +26
2103 007116  000137  010260                JMP     FDONE
2104
2105 007122  012701  006440        FERR2:  MOV     #F4,R1          ;THE PC WAS INCORRECTLY AFFECTED
2106                                                               ;DURING THE INSTRUCTION.
2107 007126  010137  001242        FER2:   MOV     R1,$TMP4
2108 007132  162701  000004                SUB     #4,R1
2109 007136  006303                        ASL     R3
2110 007140  060301                        ADD     R3,R1
2111 007142  010137  001240                MOV     R1,$TMP3
2112 007146  104030                1$:     ERROR   +30
2113 007150  000137  010260                JMP     FDONE
2114
2115 007154  012701  006604        FERR4:  MOV     #F11,R1
2116 007160  000762                        BR      FER2
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2117
2118 007162  012737  010226  001242  FERR3:  MOV     #FDAT04,$TMP4          ;FAILURE IN THE FDST FLOWS.
2119 007170  010037  001240                  MOV     R0,$TMP3
2120 007174  012737  000527  001244          MOV     #527,$TMP5
2121 007202  012737  000641  001250          MOV     #641,$TMP7
2122
2123 007210  022700  010216                  CMP     #FDAT00,R0             ;DST MODE 4?
2124 007214  001004                          BNE     1$
2125 007216  012737  000644  001246          MOV     #644,$TMP6
2126 007224  000412                          BR      4$
2127
2128 007226  022700  010236          1$:     CMP     #FDAT04+10,R0          ;DST MODE 2?
2129 007232  001004                          BNE     2$
2130 007234  012737  000642  001246          MOV     #642,$TMP6
2131 007242  000403                          BR      4$
2132
2133 007244                          2$:
2134 007244  104032                  3$:     ERROR   +32
2135 007246  000137  010260                  JMP     FDONE
2136
2137 007252                          4$:
2138 007252  104031                  5$:     ERROR   +31
2139 007254  000137  010260                  JMP     FDONE
2140
2141 007260                          FERR5:                                 ;FAILURE OF STD.
2142 007260  010037  001240                  MOV     R0,$TMP3
2143 007264  012737  010216  001242          MOV     #FDAT00,$TMP4
2144 007272  012737  010234  001244          MOV     #FDAT07,$TMP5
2145 007300  012737  010240  001246          MOV     #FXDAT0,$TMP6
2146 007306  104033          1$:     ERROR   +33
2147 007310  000137  010260                  JMP     FDONE
2148
2149 007314  012701  010230          FERR6:  MOV     #FDAT05,R1             ;DID (BUT GR7) FAIL IN THE FDST
2150 007320  012702  177777                  MOV     #-1,R2                 ;FLOWS?
2151 007324  012703  000003                  MOV     #3,R3
2152 007330  020221          1$:     CMP     R2,(R1)+
2153 007332  001017                          BNE     5$
2154 007334  077303                          SOB     R3,1$
2155
2156                                                                        ;REPORT FAILURE OF (BUT GR7) IN
2157 007336  010037  001240                  MOV     R0,$TMP3               ;THE FDST FLOWS.
2158 007342  012737  000412  001244          MOV     #412,$TMP5
2159 007350  012737  000147  001246          MOV     #147,$TMP6
2160 007356  012737  000145  001250          MOV     #145,$TMP7
2161 007364  104034          2$:     ERROR   +34
2162 007366  000137  010260                  JMP     FDONE
2163
2164 007372  012701  010230          5$:     MOV     #FDAT05,R1             ;DID (BUT GR7) FAIL IN THE SRC FLOWS?
2165 007376  012703  000003                  MOV     #3,R3
2166 007402  005721          6$:     TST     (R1)+
2167 007404  001402                          BEQ     7$
2168 007406  000137  007604                  JMP     +ERR10
2169 007412  077305          7$:     SOB     R3,6$
2170
2171                                                                        ;REPORT FAILURE OF (BUT GR7) IN
2172 007414  010037  001240                  MOV     R0,$TMP3               ;THE FSRC FLOWS.
2173 007420  012737  000207  001244          MOV     #207,$TMP5
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2174 007426  012737  000176  001246          MOV     #176,$TMP6
2175 007434  012737  000174  001250          MOV     #174,$TMP7
2176
2177 007442  104035                  10$:    ERROR   +35
2178 007444  000137  010260                  JMP     FDONE
2179
2180 007450  012701  010232          FERR7:  MOV     #FDAT06,R1          ;DID (BUT FD) FAIL IN THE FDST FLOWS?
2181 007454  012702  177777                  MOV     #-1,R2
2182 007460  012703  000002                  MOV     #2,R3
2183 007464  020221                  3$:     CMP     R2,(R1)+
2184 007466  001017                          BNE     5$
2185 007470  077303                          SOB     R3,1$
2186
2187                                                                      ;REPORT FAILURE OF (BUT FD) IN THE
2188 007472  010037  001240                  MOV     R0,$TMP3            ;FDST FLOWS.
2189 007476  012737  000707  001244          MOV     #707,$TMP5
2190 007504  012737  000244  001246          MOV     #244,$TMP6
2191 007512  012737  000245  001250          MOV     #245,$TMP7
2192 007520  104036                  2$:     ERROR   +36
2193 007522  000137  010260                  JMP     FDONE
2194
2195 007526  012701  010232          5$:     MOV     #FDAT06,R1          ;DID (BUT FD) FAIL IN THE FSRC FLOWS?
2196 007532  012703  000002                  MOV     #2,R3
2197 007536  005721                  6$:     TST     (R1)+
2198 007540  001402                          BEQ     7$
2199 007542  000137  007604                  JMP     FERR10
2200 007546  077305                  7$:     SOB     R3,6$
2201
2202                                                                      ;REPORT FAILURE OF (BUT FD) IN THE
2203 007550  010037  001240                  MOV     R0,$TMP3            ;FSRC FLOWS.
2204 007554  012737  000441  001244          MOV     #441,$TMP5
2205 007562  012737  000076  001246          MOV     #76,$TMP6
2206 007570  012737  000077  001250          MOV     #77,$TMP7
2207 007576  104037                  10$:    ERROR   +37
2208 007600  000137  010260                  JMP     FDONE
2209
2210 007604                          FERR10:                             ;REPORT DATA ERROR.
2211 007604  010037  001240                  MOV     R0,$TMP3
2212 007610  012737  010226  001242          MOV     #FDAT04,$TMP4
2213 007616  012737  010234  001244          MOV     #FDAT07,$TMP5
2214 007624  012737  010250  001246          MOV     #FXDAT4,$TMP6
2215 007632  104040                  1$:     ERROR   +40
2216 007634  000137  010260                  JMP     FDONE
2217
2218 007640                          FERR11:                             ;REPORT BAD FPS.
2219 007640  010137  001240                  MOV     R1,$TMP3
2220 007644  012737  000200  001242          MOV     #200,$TMP4
2221 007652  104041                  1$:     ERROR   +41
2222 007654  000137  010260                  JMP     FDONE
2223
2224 007660  012737  042271  001264  FERR20: MOV     #NULL,$TMP15        ;THE EXECUTION OF THE LDD
2225 007666  005037  001252                  CLR     $TMP10              ;CAUSED A TRAP TO 4, BECAUSE
2226 007672  011637  001236                  MOV     (SP),$TMP2          ;A FSRC FLOW FAILURE RESULTED
2227 007676  012737  010204  001240          MOV     #FDAT14,$TMP3       ;IN AN ODD ADDRESS.
2228 007704  012737  000321  001250          MOV     #321,$TMP7
2229 007712  012737  000762  001244          MOV     #762,$TMP5
2230
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2231 007720  021627  006442            CMP     (SP),#F4+2          ;SEE IF FSRC MODE 6 OR 7 WAS
2232 007724  001424                    BEQ     FERR21              ;EXECUTED.
2233
2234 007726  020027  010202            CMP     R0,#FDAT13          ;FSRC MODE 5?
2235 007732  001006                    BNE     2$
2236
2237                                                               ;REPORT FSRC FLOW FAILURE TO
2238 007734  012737  000325  001246    MOV     #325,$TMP6          ;MODE 5.
2239 007742  022626                    CMP     (SP)+,(SP)+
2240 007744  104042            1$:     ERROR   +42
2241 007746  000544                    BR      FDONE
2242
2243 007750  020027  010204    2$:     CMP     R0,#FDAT15          ;FSRC MODE 3?
2244 007754  001402                    BEQ     3$
2245 007756  000137  042120            JMP     CPSPUR
2246
2247 007762                    3$:                                 ;REPORT FSRC      FLOW FAILURE TO
2248 007762  012737  000323  001246    MOV     #323,$TMP6          ;MODE 3.
2249 007770  022626                    CMP     (SP)+,(SP)+
2250 007772  104042            4$:     ERROR   +42
2251 007774  000531                    BR      FDONE
2252
2253 007776  022626            FERR21: CMP     (SP)+,(SP)+         ;REPORT FSRC FLOW FAILURE TO
2254                                                               ;MODE 6 OR MODE 7.
2255 010000  012737  044035  001264    MOV     #MS16,$TMP15
2256 010006  012737  000326  001246    MOV     #326,$TMP6
2257 010014  012737  000327  001252    MOV     #327,$TMP10
2258 010022  104042            1$:     ERROR   +42
2259 010024  000515                    BR      FDONE
2260
2261 010026  012737  042271  001264  FERR25: MOV     #NULL,$TMP15        ;THE EXECUTION OF THE STD INSTRUCTION
2262 010034  005037  001252            CLR     $TMP10              ;TRAPPED TO 4, BECAUSE A FAILURE
2263 010040  012737  010226  001240    MOV     #FDAT04,$TMP3       ;IN THE FDST FLOWS RESULTED
2264 010046  011637  001236            MOV     (SP),$TMP2          ;IN AN ODD ADDRESS.
2265 010052  012737  000527  001244    MOV     #527,$TMP5
2266 010060  012737  000641  001250    MOV     #641,$TMP7
2267
2268 010066  021627  006604            CMP     (SP),#F10+2         ;FLOW FAILURE TO FDST MODE 6 OR 7?
2269 010072  001424                    BEQ     FERR26
2270
2271 010074  020027  010224            CMP     R0,#FDAT03          ;DID FDST FLOW FAIL TO MODE 5?
2272 010100  001006                    BNE     2$
2273
2274                                                               ;REPORT FLOW FAILURE TO FDST
2275 010102  012737  000645  001246    MOV     #645,$TMP6          ;MODE 5.
2276 010110  022626                    CMP     (SP)+,(SP)+
2277 010112  104043            1$:     ERROR   +43
2278 010114  000461                    BR      FDONE
2279
2280 010116  020027  010230    2$:     CMP     R0,#FDAT05          ;DID FDST FLOW FAIL TO MODE 3?
2281 010122  001402                    BEQ     3$
2282 010124  000137  042120            JMP     CPSPUR
2283
2284 010130                    3$:                                 ;REPORT FDST FLOW FAILED TO MODE 3.
2285 010130  012737  000643  001246    MOV     #643,$TMP6
2286 010136  022626                    CMP     (SP)+,(SP)+
2287 010140  104043            4$:     ERROR   +43
```

```
2288 010142  000446                          BR      FDONE
2289
2290 010144                          FERR26:                 ;REPORT FDST FLOW FAILURE TO MODE
2291 010144  012737  044035  001264          MOV     #MS16,$TMP15    ;6 OR MODE 7.
2292 010152  012737  000646  001246          MOV     #646,$TMP6
2293 010160  012737  000647  001252          MOV     #647,$TMP10
2294 010166  022626                          CMP     (SP)+,(SP)+
2295 010170  104043                  1$:     ERROR   +43
2296 010172  000432                          BR      FDONE
2297
2298 010174  177777                  FDATI0: -1
2299 010176  177777                  FDATI1: -1
2300 010200  177777                  FDATI2: -1
2301 010202  177777                  FDATI3: -1
2302 010204  177777                  FDATI4: -1
2303 010206  177777                  FDATI5: -1
2304 010210  177777                  FDATI6: -1
2305 010212  177777                  FDATI7: -1
2306 010214  177777                          -1
2307 010216  177777                  FDATO0: -1
2308 010220  177777                  FDATO1: -1
2309 010222  177777                  FDATO2: -1
2310 010224  177777                  FDATO3: -1
2311 010226  177777                  FDATO4: -1
2312 010230  177777                  FDATO5: -1
2313 010232  177777                  FDATO6: -1
2314 010234  177777                  FDATO7: -1
2315 010236  177777                          -1
2316 010240  177777                  FXDAT0: -1
2317 010242  177777                  FXDAT1: -1
2318 010244  177777                  FXDAT2: -1
2319 010246  177777                  FXDAT3: -1
2320 010250  052525                  FXDAT4: 052525
2321 010252  031463                  FXDAT5: 031463
2322 010254  007417                  FXDAT6: 007417
2323 010256  000477                  FXDAT7: 000477
2324
2325
2326 010260                          FDONE:
     010260  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?).
2327
2328
```

```
                                .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 INSTRUCTIONS.
                                ;*
                                ;*****************************************************************
 010262  000004                 TST7:   SCOPE
2335 010264  012737  010272  001110        MOV     #I1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2336
2337 010272                     I1:
2338 010272  170011                        SETD                            ;SET FD.
2339 010274  012700  011122                MOV     #IDAT10,R0
2340 010300  012701  011072                MOV     #IPAT10,R1
2341 010304  012702  000004                MOV     #4,R2
2342 010310  012120             I2:        MOV     (R1)+,(R0)+             ;SET UP THE INPUT DATA BUFFER.
2343 010312  077202                        SOB     R2,I2
2344
2345 010314  012700  011122                MOV     #IDAT10,R0              ;LOAD AC1
2346 010320  172510                        LDD     (R0),AC1
2347
2348 010322  012700  011102                MOV     #IPAT20,R0              ;LOAD AC0
2349 010326  172410                        LDD     (R0),AC0
2350
2351 010330  012701  000001                MOV     #1,R1                   ;IN CASE THE FSRC FLOWS FAIL
2352 010334  012737  010672  000004        MOV     #IERR0,ERRVECT          ;AN ODD ADDRESS TRAP TO 4 MAY OCCUR.
2353 010342  012737  010356  001236        MOV     #I3,$TMP2
2354 010350  012737  044515  001240        MOV     #MS35,$TMP3
2355 010356  172401             I3:        LDD     AC1,AC0                 ;TEST INSTRUCTION.
2356 010360  000240             I4:        NOP
2357 010362  000240             I5:        NOP
2358
2359 010364  012700  011112                MOV     #IDAT00,R0
2360 010370  174010                        STD     AC0,(R0)                ;GET AC0, THE RESULTS.
2361
2362 010372  012700  011112                MOV     #IDAT00,R0              ;SEE IF DATA IS CORRECT.
2363 010376  012701  011122                MOV     #IDAT10,R1
2364 010402  012702  000004                MOV     #4,R2
2365 010406  022021             I6:        CMP     (R0)+,(R1)+
2366 010410  001424                        BEQ     I105
2367
2368 010412  012700  011116                MOV     #IDAT02,R0              ;SEE IF (BUT FD) FAILED.
2369 010416  012702  000002                MOV     #2,R2
2370 010422  005720             I7:        TST     (R0)+
2371 010424  001413                        BEQ     I10
2372
2373 010426  012700  011116                MOV     #IDAT02,R0
2374 010432  012702  000002                MOV     #2,R2
2375 010436  022720  177777     1$:        CMP     #-1,(R0)+
2376 010442  001402                        BEQ     2$
2377 010444  000137  010754                JMP     IERR1
2378 010450  077206             2$:        SOB     R2,1$
2379 010452  000401                        BR      I106
2380 010454  077216             I10:       SOB     R2,I7
2381 010456  000137  010774     I106:      JMP     IERR2
2382
2383 010462  077227             I105:      SOB     R2,I6
```

```
2384
2385                                        ;NOW TEST THE LOAD INSTRUCTION WITH FSRC MODE ZERO AND FD CLEAR.
2386
2387 010464                                I11:
     010464 012737 010472 001110           MOV     #I12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
2388 010472 012700 011072                  I12:    MOV     #IPAT10,R0
2389 010476 012701 011122                          MOV     #IDAT10,R1
2390 010502 012702 000004                          MOV     #4,R2
2391 010506 012021                         I13:    MOV     (R0)+,(R1)+
2392 010510 077202                                 SOB     R2,I13
2393
2394 010512 012700 011122                          MOV     #IDAT10,R0              ;SET UP AC1
2395 010516 172510                                 LDD     (R0),AC1
2396
2397 010520 012700 011102                          MOV     #IPAT20,R0              ;SET UP AC0
2398 010524 172410                                 LDD     (R0),AC0
2399
2400 010526 012701 000001                          MOV     #1,R1
2401 010532 012737 010550 001236                   MOV     #I14,$TMP2
2402 010540 012737 044522 001240                   MOV     #MS36,$TMP3
2403 010546 170001                                 SETF                            ;CLEAR FD.
2404
2405 010550 172401                         I14:    LDF     AC1,AC0                 ;TEST INSTRUCTION.
2406 010552 000240                         I15:    NOP
2407 010554 000240                         I16:    NOP
2408
2409 010556 170200                                 STFPS   R0                      ;SEE IF FPS IS STILL CLEAR.
2410 010560 022700 000004                          CMP     #4,R0
2411 010564 001402                                 BEQ     I17
2412 010566 000137 011046                          JMP     IERR3
2413
2414 010572                                I17:                                    ;RESET TO DOUBLE MODE.
2415 010572 170011                                 SETD
2416
2417 010574 012700 011112                          MOV     #IDAT00,RU
2418 010600 174010                                 STD     AC0,(R0)                ;GET AC0
2419
2420 010602 012737 177777 011126                   MOV     #-1,IDAT12
2421 010610 012737 177777 011130                   MOV     #-1,IDAT13
2422 010616 012700 011112                          MOV     #IDAT00,R0
2423 010622 012701 011122                          MOV     #IDAT10,R1
2424 010626 012702 000004                          MOV     #4,R2
2425 010632 022021                         I20:    CMP     (R0)+,(R1)+             ;SEE IF AC0 WAS CORRECT.
2426 010634 001414                                 BEQ     I23
2427
2428 010636 023737 011116 011076                   CMP     IDAT02,IPAT12           ;DID (BUT FD) FAIL?
2429 010644 001402                                 BEQ     I22
2430 010646 000137 010754                  I21:    JMP     IERR1
2431 010652 023737 011120 011100           I22:    CMP     IDAT03,IPAT13
2432 010660 001372                                 BNE     I21
2433 010662 000137 011022                          JMP     IERR4
2434
2435 010666 077217                         I23:    SOB     R2,I20
2436
2437 010670 000520                                 BR      IDONE                   ;NO ERRORS.
2438
2439                                        ;IF AN ODD ADDRESS TRAP OCCURS COME HERE TO ANALYZE THE FSRC FAILURE.
```

```
2440 010672  022716  010360          IERR0:  CMP     #I4,(SP)            ;MAKE SURE THE TRAP OCCURRED
2441 010676  001413                          BEQ     1$                  ;ON THE INSTRUCTION BEING TESTED.
2442 010700  022716  010362                  CMP     #I5,(SP)
2443 010704  001410                          BEQ     1$
2444 010706  022716  010552                  CMP     #I15,(SP)
2445 010712  001405                          BEQ     1$
2446 010714  022716  010554                  CMP     #I16,(SP)
2447 010720  001402                          BEQ     1$
2448 010722  000137  042120                  JMP     CPSPUR
2449
2450 010726  011637  001236          1$:     MOV     (SP),$TMP2          ;REPORT FAILURE.
2451 010732  012737  000627  001240          MOV     #627,$TMP3
2452 010740  012737  000320  001242          MOV     #320,$TMP4
2453 010746  022626                          CMP     (SP)+,(SP)+
2454 010750  104047                  2$:     ERROR   +47
2455 010752  000467                          BR      IDONE
2456
2457                                 ;REPORT DATA ERROR.
2458 010754                          IERR1:
2459 010754  012737  011122  001242          MOV     #IDATI0,$TMP4
2460 010762  012737  011112  001244          MOV     #IDATO0,$TMP5
2461 010770  104051                  1$:     ERROR   +51
2462 010772  000457                          BR      IDONE
2463
2464                                 ;REPORT FAILURE OF (BUT FD)
2465 010774  012737  000153  001244  IERR2:  MOV     #153,$TMP5
2466 011002  012737  000434  001246          MOV     #434,$TMP6
2467 011010  012737  000435  001250          MOV     #435,$TMP7
2468 011016                          IERR25:
2469 011016  104050                  1$:     ERROR   +50
2470 011020  000444                          BR      IDONE
2471 011022  012737  000153  001244  IERR4:  MOV     #153,$TMP5
2472 011030  012737  000435  001246          MOV     #435,$TMP6
2473 011036  012737  000434  001250          MOV     #434,$TMP7
2474 011044  000764                          BR      IERR25
2475
2476                                 ;REPORT INCORRECT FPS AFTER LOAD INSTRUCTION.
2477 011046                          IERR2:
2478 011046  012737  010550  001236          MOV     #I14,$TMP2
2479 011054  010037  001240                  MOV     R0,$TMP3
2480 011060  012737  000004  001242          MOV     #4,$TMP4
2481 011066  104041                  1$:     ERROR   +41
2482 011070  000420                          BR      IDONE
2483
2484
2485 011072  000000                  IPAT10: 0
2486 011074  170360                  IPAT11: 170360
2487 011076  016161                  IPAT12: 016161
2488 011100  052525                  IPAT13: 052525
2489
2490 011102  177777                  IPAT20: -1
2491 011104  177777                  IPAT21: -1
2492 011106  177777                  IPAT22: -1
2493 011110  177777                  IPAT23: -1
2494
2495 011112  000000                  IDAT00: 0
2496 011114  000000                  IDAT01: 0
```

```
2497 011116  000000                IDAT02: 0
2498 011120  000000                IDAT03: 0
2499
2500 011122  000000                IDATI0: 0
2501 011124  000000                IDATI1: 0
2502 011126  000000                IDATI2: 0
2503 011130  000000                IDATI3: 0
2504
2505 011132                        IDONE:
     011132  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?).

2506
2512
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2513                                    .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.
                                        ;*
                                        ;*********************************************************************
     011134  000004                     TST10:  SCOPE
2514 011136                             T1:
     011136  012737  011144  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2515 011144  170011                     1$:     SETD                    ;SET FD
2516 011146  012700  011710                     MOV     #TPAT10,R0
2517 011152  012701  011740                     MOV     #TDAT10,R1
2518 011156  012702  000004                     MOV     #4,R2
2519 011162  012021                     T2:     MOV     (R0)+,(R1)+     ;SET UP THE INPUT DATA BUFFER.
2520 011164  077202                             SOB     R2,T2
2521
2522 011166  012700  011740                     MOV     #TDAT10,R0      ;LOAD AC0
2523 011172  172410                             LDD     (R0),AC0
2524
2525 011174  012700  011720                     MOV     #TPAT20,R0      ;LOAD AC1
2526 011200  172510                             LDD     (R0),AC1
2527
2528 011202  012701  000001                     MOV     #1,R1           ;IF THE (BUT FDST) FORK FAILS
2529 011206  012737  011516  000004             MOV     #TERR0,ERRVECT  ;AN ODD ADDRESS TRAP COULD RESULT.
2530 011214  012737  011230  001240             MOV     #T3,$TMP2
2531 011222  012737  044515  001240             MOV     #MS35,$TMP3
2532 011230  174001                     T3:     STD     AC0,AC1
2533 011232  000240                     T4:     NOP
2534 011234  000240                     T5:     NOP
2535
2536 011236  012700  011730                     MOV     #TDAT00,R0
2537 011242  174110                             STD     AC1,(R0)        ;GET THE DATA.
2538
2539 011244  012703  011730                     MOV     #TDAT00,R3      ;SEE IF THE DATA IS CORRECT.
2540 011250  012704  011740                     MOV     #TDAT10,R4
2541 011254  012705  000004                     MOV     #4,R5
2542 011260  022324                     T6:     CMP     (R3)+,(R4)+
2543 011262  001413                             BEQ     T105
2544
2545 011264  012703  011734                     MOV     #TDAT02,R3      ;DID (BUT FD) FAIL?
2546 011270  012705  000002                     MOV     #2,R5
2547 011274  005723                     T7:     TST     (R3)+
2548 011276  001402                             BEQ     T10
2549 011300  000137  011600                     JMP     TERR1
2550 011304  077505                     T10:    SOB     R5,T7
2551 011306  000137  011620                     JMP     TERR2
2552
2553 011312  077516                     T105:   SOB     R5,T6
2554
2555                                    ;NOW TEST THE STF AC0,AC1 INSTRUCTION.
2556
2557 011314                             T11:
     011314  012737  011322  001110             MOV     #T12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
2558
2559 011322  012700  011710             T12:    MOV     #TPAT10,R0      ;SET UP THE INPUT DATA BUFFER.
2560 011326  012701  011740                     MOV     #TDAT10,R1
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2561 011332  012702  000004            MOV     #4,R2
2562 011336  012021              T13:   MOV     (R0)+,(R1)+
2563 011340  077202                     SOB     R2,T13
2564
2565 011342  012700  011740            MOV     #TDATI0,R0          ;SET UP AC0
2566 011346  172410                     LDD     (R0),AC0
2567
2568 011350  012700  011720            MOV     #TPAT20,R0          ;SET UP AC1
2569 011354  172510                     LDD     (R0),AC1
2570
2571 011356  012701  000001            MOV     #1,R1
2572 011362  012737  011400  001236    MOV     #T14,$TMP2
2573 011370  012737  044522  001240    MOV     #MS36,$TMP3
2574 011376  170001                     SETF                        ;CLEAR FD
2575 011400  174001              T14:   STF     AC0,AC1
2576 011402  000240              T15:   NOP
2577 011404  000240              T16:   NOP
2578
2579 011406  005000                     CLR     R0
2580 011410  170200                     STFPS   R0                  ;SEE IF FPS IS CLEAR.
2581 011412  022700  000010            CMP     #10,R0
2582 011416  001401                     BEQ     T17
2583 011420  000521                     BR      TERR3
2584
2585 011422                      T17:
2586 011422  170011                     SETD                        ;SET FD.
2587
2588 011424  012700  011730            MOV     #TDAT00,R0
2589 011430  174110                     STD     AC1,(R0)            ;PICK UP AC1.
2590
2591 011432  012737  177777  011744    MOV     #-1,TDATI2
2592 011440  012737  177777  011746    MOV     #-1,TDATI3
2593 011446  012703  011730            MOV     #TDAT00,R3
2594 011452  012704  011740            MOV     #TDATI0,R4
2595 011456  012705  000004            MOV     #4,R5
2596 011462  022324              T20:   CMP     (R3)+,(R4)+         ;WAS THE DATA TRANSFERRED CORRECTLY?
2597 011464  001412                     BEQ     T23
2598
2599 011466  023737  011734  011714    CMP     TDAT02,TPAT12       ;DID (BUT FD) FAIL.
2600 011474  001401                     BEQ     T22
2601 011476  000440              T21:   BR      TERR1
2602 011500  023737  011736  011716    T22:   CMP     TDAT03,TPAT13
2603 011506  001373                     BNE     T21
2604 011510  000456                     BR      TERR4
2605
2606 011512  077515              T23:   SOB     R5,T20
2607 011514  000516                     BR      TDONE
2608
2609
2610                                    ;TRAP HERE THROUGH VECTOR 4 IF AN ODD ADDRESS OCCURS.
2611 011516  022716  011232    TERR0:   CMP     #T4,(SP)            ;MAKE SURE THE TRAP WAS ON
2612 011522  001413                     BEQ     1$                  ;AN INSTRUCTION BEING TESTED.
2613 011524  022716  011234            CMP     #T5,(SP)
2614 011530  001410                     BEQ     1$
2615 011532  022716  011402            CMP     #T15,(SP)
2616 011536  001405                     BEQ     1$
2617 011540  022716  011404            CMP     #T16,(SP)
```

```
2618 011544  001402                        BEQ     1$
2619 011546  000137  042120                JMP     CPSPUR
2620
2621 011552  011637  001236          1$:   MOV     (SP),$TMP2
2622 011556  022626                        CMP     (SP)+,(SP)+
2623 011560  012737  000527  001240        MOV     #527,$TMP3
2624 011566  012737  000640  001242        MOV     #640,$TMP4
2625 011574  104121                2$:   ERROR   +121
2626 011576  000464                        BR      TDONE
2627
2628                                ;REPORT DATA FAILURE.
2629 011600                         TERR1:
2630 011600  012737  011740  001242        MOV     #TDATI0,$TMP4
2631 011606  012737  011730  001244        MOV     #TDAT00,$TMP5
2632 011614  104123                1$:   ERROR   +123
2633 011616  000454                        BR      TDONE
2634
2635                                ;REPORT FAILURE OF (BUT FD).
2636 011620  012737  000160  001246  TERR2: MOV     #160,$TMP6
2637 011626  012737  000161  001250        MOV     #161,$TMP7
2638 011634  012737  000640  001244  TERR25: MOV    #640,$TMP5
2639 011642  104122                1$:   ERROR   +122
2640 011644  000441                        BR      TDONE
2641 011646  012737  000161  001246  TERR4: MOV     #161,$TMP6
2642 011654  012737  000160  001250        MOV     #160,$TMP7
2643 011662  000764                        BR      TERR25
2644
2645                                ;REPORT INCORRECT FPS AFTER STORE INSTRUCTION.
2646 011664                         TERR3:
2647 011664  012737  011402  001236        MOV     #T15,$TMP2
2648 011672  010037  001240                MOV     R0,$TMP3
2649 011676  012737  000010  001242        MOV     #10,$TMP4
2650 011704  104041                1$:   ERROR   +41
2651 011706  000420                        BR      TDONE
2652
2653 011710  000000                TPAT10: 0
2654 011712  170360                TPAT11: 170360
2655 011714  016161                TPAT12: 016161
2656 011716  052525                TPAT13: 052525
2657
2658 011720  177777                TPAT20: -1
2659 011722  177777                TPAT21: -1
2660 011724  177777                TPAT22: -1
2661 011726  177777                TPAT23: -1
2662
2663 011730  000000                TDAT00: 0
2664 011732  000000                TDAT01: 0
2665 011734  000000                TDAT02: 0
2666 011736  000000                TDAT03: 0
2667
2668 011740  000000                TDATI0: 0
2669 011742  000000                TDATI1: 0
2670 011744  000000                TDATI2: 0
2671 011746  000000                TDATI3: 0
2672
2673 011750                         TDONE:
     011750  104413                        RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
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                                        ;SEE IF THE USER HAS EXPRESSED
                                        ;THE DESIRE TO CHANGE THE SOFTWARE
                                        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                        ;THE USER TYPED CONTROL G?).
2804
2805
2808
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2809                            .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,...C1,C0
;*
;*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 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
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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.
                        ;*
                        ;;*************************************************************
011752  000004         TST11:  SCOPE
2810 011754  170011             SETD                            ;SET FD.
2811 
                        ;TEST ACCUMULATOR 0 WITH FLOATING ONE
011756  012737  044067  001244          MOV     #MNUM0,$TMP5
011764  012737  012020  001236          MOV     #G1,$TMP2
011772  012700  014760                  MOV     #GPA 00,R0
011776  012701  015020                  MOV     #GDAT00,R1
012002  012737  012020  001110          MOV     #G1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012010  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
012014  012703  000102                  MOV     #102,R3
012020  172410                 G1:      LDD     (R0),AC0
012022  174000                          STD     AC0,AC0
012024  172400                          LDD     AC0,AC0         ;STORE THE TEST PATTERN.
012026  174011                          STD     AC0,(R1)
012030  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
012034  005737  014754                  TST     GFLAG1
012040  001004                          BNE     G2
012042  005137  014754                  COM     GFLAG1
012046  000261                          SEC
012050  000401                          BR      G3
012052  000241                 G2:      CLC
012054  006160  000006         G3:      ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
012060  006160  000004                  ROL     4(R0)
012064  006160  000002                  ROL     2(R0)
012070  006110                          ROL     (R0)
012072  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
```

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*TEST # 11 - ACCUMULATORS DATA PATTERNS TEST

012076  077330                          SOB     R3,G1
012100  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2812                            ;TEST ACCUMULATOR 0 WITH FLOATING ZERO
012104  012737  044067  001244          MOV     #MNUM0,$TMP5
012112  012737  012146  001236          MOV     #G4,$TMP2
012120  012700  014770                  MOV     #GPAT10,R0
012124  012701  015020                  MOV     #GDAT00,R1
012130  012737  012146  001110          MOV     #G4,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012136  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
012142  012703  000102                  MOV     #102,R3
012146  172410                  G4:     LDD     (R0),AC0
012150  174000                          STD     AC0,AC0
012152  172400                          LDD     AC0,AC0         ;STORE THE TEST PATTERN.
012154  174011                          STD     AC0,(R1)
012156  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
012162  005737  014754                  TST     GFLAG1
012166  001004                          BNE     G5
012170  005137  014754                  COM     GFLAG1
012174  000241                          CLC
012176  000401                          BR      G6
012200  000261                  G5:     SEC
012202  006160  000006          G6:     ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
012206  006160  000004                  ROL     4(R0)
012212  006160  000002                  ROL     2(R0)
012216  006110                          ROL     (R0)
012220  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
012224  077330                          SOB     R3,G4
012226  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2813                            ;TEST ACCUMULATOR 1 WITH FLOATING ONE
012232  012737  044075  001244          MOV     #MNUM1,$TMP5
012240  012737  012274  001236          MOV     #G7,$TMP2
012246  012700  014760                  MOV     #GPAT00,R0
012252  012701  015020                  MOV     #GDAT00,R1
012256  012737  012274  001110          MOV     #G7,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012264  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
012270  012703  000102                  MOV     #102,R3
012274  172410                  G7:     LDD     (R0),AC0
012276  174001                          STD     AC0,AC1
012300  172401                          LDD     AC1,AC0         ;STORE THE TEST PATTERN.
012302  174011                          STD     AC0,(R1)
012304  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
012310  005737  014754                  TST     GFLAG1
012314  001004                          BNE     G10
012316  005137  014754                  COM     GFLAG1
012322  000261                          SEC
012324  000401                          BR      G11
012326  000241                  G10:    CLC
012330  006160  000006          G11:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
012334  006160  000004                  ROL     4(R0)
012340  006160  000002                  ROL     2(R0)
012344  006110                          ROL     (R0)
012346  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
012352  077330                          SOB     R3,G7
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                012354  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2814                                    ;TEST ACCUMULATOR 1 WITH FLOATING ZERO
                012360  012737  044075  001244          MOV     #MNUM1,$TMP5
                012366  012737  012422  001236          MOV     #G12,$TMP2
                012374  012700  014770                  MOV     #GPAT10,R0
                012400  012701  015020                  MOV     #GDAT00,R1
                012404  012737  012422  001110          MOV     #G12,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
                012412  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
                012416  012703  000102                  MOV     #102,R3
                012422  172410                  G12:    LDD     (R0),AC0
                012424  174001                          STD     AC0,AC1
                012426  172401                          LDD     AC1,AC0         ;STORE THE TEST PATTERN.
                012430  174011                          STD     AC0,(R1)
                012432  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
                012436  005737  014754                  TST     GFLAG1
                012442  001004                          BNE     G13
                012444  005137  014754                  COM     GFLAG1
                012450  000241                          CLC
                012452  000401                          BR      G14
                012454  000261                  G13:    SEC
                012456  006160  000006          G14:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
                012462  006160  000004                  ROL     4(R0)
                012466  006160  000002                  ROL     2(R0)
                012472  006110                          ROL     (R0)
                012474  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
                012500  077330                          SOB     R3,G12
                012502  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2815                                    ;TEST ACCUMULATOR 2 WITH FLOATING ONE
                012506  012737  044102  001244          MOV     #MNUM2,$TMP5
                012514  012737  012550  001236          MOV     #G15,$TMP2
                012522  012700  014760                  MOV     #GPAT00,R0
                012526  012701  015020                  MOV     #GDAT00,R1
                012532  012737  012550  001110          MOV     #G15,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
                012540  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
                012544  012703  000102                  MOV     #102,R3
                012550  172410                  G15:    LDD     (R0),AC0
                012552  174002                          STD     AC0,AC2
                012554  172402                          LDD     AC2,AC0         ;STORE THE TEST PATTERN.
                012556  174011                          STD     AC0,(R1)
                012560  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                                ;THAT WHICH WAS WRITTEN.
                012564  005737  014754                  TST     GFLAG1
                012570  001004                          BNE     G16
                012572  005137  014754                  COM     GFLAG1
                012576  000261                          SEC
                012600  000401                          BR      G17
                012602  000241                  G16:    CLC
                012604  006160  000006          G17:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
                012610  006160  000004                  ROL     4(R0)
                012614  006160  000002                  ROL     2(R0)
                012620  006110                          ROL     (R0)
                012622  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                                ;BUFFER.
                012626  077330                          SOB     R3,G15
                012630  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
```

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2816                                    ;TEST ACCUMULATOR 2 WITH FLOATING ZERO
     012634  012737  044102  001244             MOV     #MNUM2,$TMP5
     012642  012737  012676  001236             MOV     #G20,$TMP2
     012650  012700  014770                     MOV     #GPAT10,R0
     012654  012701  015020                     MOV     #GDAT00,R1
     012660  012737  012676  001110             MOV     #G20,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
     012666  004737  014112                     JSR     PC,GSETUP               ;LOAD TEST PATTERN.
     012672  012703  000102                     MOV     #102,R3
     012676  172410                   G20:      LDD     (R0),AC0
     012700  174002                             STD     AC0,AC2
     012702  172402                             LDD     AC2,AC0         ;STORE THE TEST PATTERN.
     012704  174011                             STD     AC0,(R1)
     012706  004737  014210                     JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                             ;THAT WHICH WAS WRITTEN.
     012712  005737  014754                     TST     GFLAG1
     012716  001004                             BNE     G21
     012720  005137  014754                     COM     GFLAG1
     012724  000241                             CLC
     012726  000401                             BR      G22
     012730  000261                   G21:      SEC
     012732  006160  000006           G22:      ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
     012736  006160  000004                     ROL     4(R0)
     012742  006160  000002                     ROL     2(R0)
     012746  006110                             ROL     (R0)
     012750  004737  014170                     JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                             ;BUFFER.
     012754  077330                             SOB     R3,G20
     012756  004737  014322                     JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2817                                    ;TEST ACCUMULATOR 3 WITH FLOATING ONE
     012762  012737  044107  001244             MOV     #MNUM3,$TMP5
     012770  012737  013024  001236             MOV     #G23,$TMP2
     012776  012700  014760                     MOV     #GPAT00,R0
     013002  012701  015020                     MOV     #GDAT00,R1
     013006  012737  013024  001110             MOV     #G23,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
     013014  004737  014112                     JSR     PC,GSETUP               ;LOAD TEST PATTERN.
     013020  012703  000102                     MOV     #102,R3
     013024  172410                   G23:      LDD     (R0),AC0
     013026  174003                             STD     AC0,AC3
     013030  172403                             LDD     AC3,AC0         ;STORE THE TEST PATTERN.
     013032  174011                             STD     AC0,(R1)
     013034  004737  014210                     JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                             ;THAT WHICH WAS WRITTEN.
     013040  005737  014754                     TST     GFLAG1
     013044  001004                             BNE     G24
     013046  005137  014754                     COM     GFLAG1
     013052  000261                             SEC
     013054  000401                             BR      G25
     013056  000241                   G24:      CLC
     013060  006160  000006           G25:      ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
     013064  006160  000004                     ROL     4(R0)
     013070  006160  000002                     ROL     2(R0)
     013074  006110                             ROL     (R0)
     013076  004737  014170                     JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                             ;BUFFER.
     013102  077330                             SOB     R3,G23
     013104  004737  014322                     JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2818                                    ;TEST ACCUMULATOR 3 WITH FLOATING ZERO
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```
013110  012737  044107  001244          MOV     #MNUM3,$TMP5
013116  012737  013152  001236          MOV     #G26,$TMP2
013124  012700  014770                  MOV     #GPAT10,R0
013130  012701  015020                  MOV     #GDAT00,R1
013134  012737  013152  001110          MOV     #G26,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013142  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013146  012703  000102                  MOV     #102,R3
013152  172410                  G26:    LDD     (R0),AC0
013154  174003                          STD     AC0,AC3
013156  172403                          LDD     AC3,AC0         ;STORE THE TEST PATTERN.
013160  174011                          STD     AC0,(R1)
013162  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
013166  005737  014754                  TST     GFLAG1
013172  001004                          BNE     G27
013174  005137  014754                  COM     GFLAG1
013200  000241                          CLC
013202  000401                          BR      G30
013204  000261                  G27:    SEC
013206  006160  000006          G30:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013212  006160  000004                  ROL     4(R0)
013216  006160  000002                  ROL     2(R0)
013222  006110                          ROL     (R0)
013224  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
013230  077330                          SOB     R3,G26
013232  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2819                    ;TEST ACCUMULATOR 4 WITH FLOATING ONE
013236  012737  044116  001244          MOV     #MNUM4,$TMP5
013244  012737  013300  001236          MOV     #G31,$TMP2
013252  012700  014760                  MOV     #GPAT00,R0
013256  012701  015020                  MOV     #GDAT00,R1
013262  012737  013300  001110          MOV     #G31,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013270  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013274  012703  000102                  MOV     #102,R3
013300  172410                  G31:    LDD     (R0),AC0
013302  174004                          STD     AC0,AC4
013304  172404                          LDD     AC4,AC0         ;STORE THE TEST PATTERN.
013306  174011                          STD     AC0,(R1)
013310  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
013314  005737  014754                  TST     GFLAG1
013320  001004                          BNE     G32
013322  005137  014754                  COM     GFLAG1
013326  000261                          SEC
013330  000401                          BR      G33
013332  000241                  G32:    CLC
013334  006160  000006          G33:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013340  006160  000004                  ROL     4(R0)
013344  006160  000002                  ROL     2(R0)
013350  006110                          ROL     (R0)
013352  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
013356  077330                          SOB     R3,G31
013360  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2820                    ;TEST ACCUMULATOR 4 WITH FLOATING ZERO
013364  012737  044116  001244          MOV     #MNUM4,$TMP5
```

TEST # 11 - ACCUMULATORS DATA PATTERNS TEST

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013372  012737  013426  001236          MOV     #G34,$TMP2
013400  012700  014770                  MOV     #GPAT10,R0
013404  012701  015020                  MOV     #GDAT00,R1
013410  012737  013426  001110          MOV     #G34,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013416  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013422  012703  000102                  MOV     #102,R3
013426  172410                  G34:    LDD     (R0),AC0
013430  174004                          STD     AC0,AC4
013432  172404                          LDD     AC4,AC0         ;STORE THE TEST PATTERN.
013434  174011                          STD     AC0,(R1)
013436  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
013442  005737  014754                  TST     GFLAG1
013446  001004                          BNE     G35
013450  005137  014754                  COM     GFLAG1
013454  000241                          CLC
013456  000401                          BR      G36
013460  000261                  G35:    SEC
013462  006160  000006          G36:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013466  006160  000004                  ROL     4(R0)
013472  006160  000002                  ROL     2(R0)
013476  006110                          ROL     (R0)
013500  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
013504  077330                          SOB     R3,G34
013506  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2821                    ;TEST ACCUMULATOR 5 WITH FLOATING ONE
013512  012737  044124  001244          MOV     #MNUM5,$TMP5
013520  012737  013554  001236          MOV     #G37,$TMP2
013526  012700  014760                  MOV     #GPAT00,R0
013532  012701  015020                  MOV     #GDAT00,R1
013536  012737  013554  001110          MOV     #G37,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013544  004737  014112                  JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013550  012703  000102                  MOV     #102,R3
013554  172410                  G37:    LDD     (R0),AC0
013556  174005                          STD     AC0,AC5
013560  172405                          LDD     AC5,AC0         ;STORE THE TEST PATTERN.
013562  174011                          STD     AC0,(R1)
013564  004737  014210                  JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                                        ;THAT WHICH WAS WRITTEN.
013570  005737  014754                  TST     GFLAG1
013574  001004                          BNE     G40
013576  005137  014754                  COM     GFLAG1
013602  000261                          SEC
013604  000401                          BR      G41
013606  000241                  G40:    CLC
013610  006160  000006          G41:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013614  006160  000004                  ROL     4(R0)
013620  006160  000002                  ROL     2(R0)
013624  006110                          ROL     (R0)
013626  004737  014170                  JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                                        ;BUFFER.
013632  077330                          SOB     R3,G37
013634  004737  014322                  JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2822                    ;TEST ACCUMULATOR 5 WITH FLOATING ZERO
013640  012737  044124  001244          MOV     #MNUM5,$TMP5
013646  012737  013702  001236          MOV     #G42,$TMP2
```

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013654  012700  014770          MOV     #GPAT10,R0
013660  012701  015020          MOV     #GDAT00,R1
013664  012737  013702  001110  MOV     #G42,$LPERR     ;SET UP THE LOOP ON ERROR ADDRESS.
013672  004737  014112          JSR     PC,GSETUP               ;LOAD TEST PATTERN.
013676  012703  000102          MOV     #102,R3
013702  172410          G42:    LDD     (R0),AC0
013704  174005                  STD     AC0,AC5
013706  172405                  LDD     AC5,AC0         ;STORE TH  TEST PATTERN.
013710  174011                  STD     AC0,(R1)
013712  004737  014210          JSR     PC,GCMP                 ;COMPARE THE DATA READ WITH
                                                        ;THAT WHICH WAS WRITTEN.
013716  005737  014754          TST     GFLAG1
013722  001004                  BNE     G43
013724  005137  014754          COM     GFLAG1
013730  000241                  CLC
013732  000401                  BR      G44
013734  000261          G43:    SEC
013736  006160  000006  G44:    ROL     6(R0)                   ;GENERATE THE NEXT TEST PATTERN.
013742  006160  000004          ROL     4(R0)
013746  006160  000002          ROL     2(R0)
013752  006110                  ROL     (R0)
013754  004737  014170          JSR     PC,GRESET               ;RESET DEFAULT PATTERN IN OUTPUT
                                                        ;BUFFER.
013760  077330                  SOB     R3,G42
013762  004737  014322          JSR     PC,GSUM                 ;TYPE ERROR SUMMARY.
2823
2824 013766  000137  015032      JMP     GDONE
2825                    ;**********IMPORTANT**********
2826                    ;*      IN CASE OF AN ECO OR CHIP NUMBER CHANGE, CHANGE THE 'CHPNUM' ASCII
2827                    ;*      STRING AT THE APPROPRIATE LOCATIONS.
2828                    ;;*****************************************************************
2829                    ;                A15 A11 A07 A03 B15 B11 B07 B03 C15 C11 C07 C03 D15 D11 D07 D03
2830                    ;                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
2831                    ;                A12 A08 A04 A00 B12 B08 B04 B00 C12 C08 C04 C00 D12 D08 D04 D00
2832 013772     105     063     067  CHPNUM: .ASCII  ?E37 E45 E34 E42 E33 E41 E36 E44 E35 E43 E38 E46 E39 E47 E40 E48?
2833                                        .EVEN
2834 014072  170000  007400  000360  BITSTS: .WORD   170000,7400,360,17,7777,170377,177417,177760
2835                    ;USE THIS ROUTINE TO INITIALIZE ALL THE DATA BUFFERS.
2836 014112  012705  014754          GSETUP: MOV     #GFLAG1,R5
2837 014116  012704  000026                  MOV     #26,R4
2838 014122  005025                  1$:     CLR     (R5)+
2839 014124  077402                          SOB     R4,1$
2840
2841 014126  012705  014770                  MOV     #GPAT10,R5
2842 014132  012704  000010                  MOV     #10,R4
2843 014136  005125                  2$:     COM     (R5)+
2844 014140  077402                          SOB     R4,2$
2845
2846 014142  020037  014760          GS1:    CMP     R0,GPAT00
2847 014146  001401                          BEQ     3$
2848 014150  000207                          RTS     PC
2849
2850 014152  012705  015020          3$:     MOV     #GDAT00,R5
2851 014156  012704  000004                  MOV     #4,R4
2852 014162  005125                  4$:     COM     (R5)+
2853 014164  077402                          SOB     R4,4$
2854 014166  000207                          RTS     PC
```

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2855
2856 014170  012705  015020          GRESET: MOV     #GDAT00,R5
2857 014174  012704  000004                  MOV     #4,R4
2858 014200  005025                  1$:     CLR     (R5)+
2859 014202  077402                          SOB     R4,1$
2860 014204  000137  014142                  JMP     GS1
2861
2862                                 ;SEE IF THE DATA WRITTEN MATCHES THE DATA READ.
2863 014210  012705  015020          GCMP:   MOV     #GDAT00,R5
2864 014214  012704  000004                  MOV     #4,R4
2865 014220  010002                          MOV     R0,R2
2866 014222  022225                  1$:     CMP     (R2)+,(R5)+
2867 014224  001402                          BEQ     2$
2868 014226  000137  014236                  JMP     GERR1
2869 014232  077405                  2$:     SOB     R4,1$
2870 014234  000207                          RTS     PC
2871
2872                                 ;COME HERE TO REPORT AND RECORD ERRORS.
2873 014236  012637  015030          GERR1:  MOV     (SP)+,GADR      ;SAVE THE RETURN ADDRESS.
2874 014242  010037  001240                  MOV     R0,.240         ;COMPUTE 'OR' OF BAD DATA.
2875 014246  012705  015000                  MOV     #GAND0,R5
2876 014252  012704  000004                  MOV     #4,R4
2877 014256  051065  000010          1$:     BIS     (R0),10(R5)
2878 014262  012002                          MOV     (R0)+,R2
2879 014264  005102                          COM     R2
2880 014266  040225                          BIC     R2,(R5)+
2881 014270  077406                          SOB     R4,1$
2882 014272  013700  001240                  MOV     1240,R0
2883 014276  005237  014756                  INC     GFLAG2          ;INCREMENT ERROR COUNT.
2884 014302  010037  001240                  MOV     R0,$TMP3
2885 014306  012737  015020  001242          MOV     #GDAT00,$TMP4
2886 014314  104044                  3$:     ERROR   +44
2887 014316  000177  000506                  JMP     @GADR
2888
2889                                 ;SEE IF ANY ERRORS HAVE OCCURRED AND WHETHER OR NOT AN ERROR SUMMARY
2890                                 ;SHOULD BE TYPED.
2891 014322  005737  014756          GSUM:   TST     GFLAG2          ;ANY ERRORS?
2892 014326  001410                          BEQ     100$            ;BRANCH IF NOT
2893 014330  032777  020000  164602          BIT     #SW13,@SWR      ;INHIBIT ERROR PRINT OUT?
2894 014336  001405                          BEQ     1$              ;BRANCH IF NOT INHIBITED
2895 014340  032777  000200  164572          BIT     #SW7,@SWR       ;PRINT SUMMARY?
2896 014346  001001                          BNE     1$              ;BRANCH IF NOT
2897 014350  000207                  100$:   RTS     PC              ;EXIT - NO ERRORS TO REPORT
2898 014352  013737  014756  001246  1$:     MOV     GFLAG2,$TMP6    ;YES PRINT SUMMARY.
2899 014360  012737  015000  001240          MOV     #GAND0,$TMP3
2900 014366  012737  015010  001242          MOV     #GOR0,$TMP4
2901 014374  012637  015030                  MOV     (SP)+,GADR      ;SAVE RETURN ADDRESS FOR POSSIBLE LOOPING
2902 014400  012737  014414  001116          MOV     #2$,$ERRPC
2903 014406  112737  000045  001114          MOVB    #45,$ITEMB
2904 014414  004737  041342          2$:     JSR     PC,ERTYPE
2905 014420  010046                          MOV     R0,-(SP)        ;SAVE R0
2906 014422  010146                          MOV     R1,-(SP)        ;SAVE R1
2907 014424  010246                          MOV     R2,-(SP)        ;SAVE R2
2908 014426  012700  013772                  MOV     #CHPNUM,R0      ;MOVE ADDRESS OF CHIP NUMBER ASCII'S TO R0
2909 014432  012702  015000                  MOV     #GAND0,R2       ;MOVE ADDRESS OF 'AND' DATA TO R2
2910 014436  112737  000077  014746          MOVB    #'?,11$         ;MOVE ASCII '?' TO NEXT 3 LOCATIONS
2911 014444  112737  000077  014747          MOVB    #'?,11$+1
```

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2912 014452 112737 000077 014750          MOVB    #'?,11$+2
2913 014460 104401 014746                 TYPE    ,11$            ;TYPE ERROR MESSAGE BELOW
2914 014464 012701 014072          3$:    MOV     #BITSTS,R1      ;MOVE ADDRESS OF BIT TESTING TO R1
2915 014470 032112                 4$:    BIT     (R1)+,(R2)      ;SEE IF ANY BITS IN THE GROUP WERE SET
2916 014472 001413                        BEQ     5$              ;BRANCH AROUND CHIP # PRINT IF NOT
2917 014474 116037 000000 014746          MOVB    0(R0),11$+0     ;MOVE 1ST ASCII DIGIT TO LOCATION
2918 014502 116037 000001 014747          MOVB    1(R0),11$+1     ;MOVE 2ND ASCII DIGIT TO LOCATION
2919 014510 116037 000002 014750          MOVB    2(R0),11$+2     ;MOVE 3RD ASCII DIGIT TO LOCATION
2920 014516 104401 014746                 TYPE    ,11$            ;TYPE THE CHIP NUMBER
2921 014522 062700 000004          5$:    ADD     #4,R0           ;MOVE ASCII POINTER TO NEXT CHIP NUMBER
2922 014526 022701 014102                 CMP     #BITSTS+10,R1   ;SEE IF WE ARE DONE CHECKING THE 'AND' SETS
2923 014532 001356                        BNE     4$              ;BRANCH BACK IF NOT
2924 014534 062702 000002                 ADD     #2,R2           ;MAP TO NEXT 'AND' LOCATION
2925 014540 022702 015010                 CMP     #GAND0+10,R2    ;SEE IF ALL 'AND' LOCATIONS HAVE BEEN CHECKED
2926 014544 001347                        BNE     3$              ;BRANCH BACK IF NOT
2927 014546 012700 013772                 MOV     #CHPNUM,R0      ;RESET CHIP NUMBER ASCII POINTER IN R0
2928 014552 012702 015010                 MOV     #GOR0,R2        ;MOVE 'OR' STARTING ADDRESS TO R2
2929 014556 011246                 6$:    MOV     (R2),-(SP)      ;PUT 'OR' DATA ON STACK
2930 014560 046116 000010                 BIC     10(R1),(SP)     ;CLEAR BITS NOT UNDER TEST
2931 014564 022126                        CMP     (R1)+,(SP)+     ;SEE IF ANY BITS WERE FOUND CLEAR
2932 014566 001413                        BEQ     7$              ;BRANCH AROUND CHIP # PRINTING IF OK
2933 014570 116037 000000 014746          MOVB    0(R0),11$       ;MOVE 1ST ASCII DIGIT TO LOCATION
2934 014576 116037 000001 014747          MOVB    1(R0),11$+1     ;MOVE 2ND ASCII DIGIT TO LOCATION
2935 014604 116037 000002 014750          MOVB    2(R0),11$+2     ;MOVE 3RD ASCII DIGIT TO LOCATION
2936 014612 104401 014746                 TYPE    ,11$            ;TYPE THE CHIP NUMBER
2937 014616 062700 000004          7$:    ADD     #4,R0           ;POINT R0 TO NEXT ASCII CHIP REPRESENTATION
2938 014622 022701 014102                 CMP     #BITSTS+10,R1   ;SEE IF WE ARE DONE CHECKING THE 'AND' SETS
2939 014626 001353                        BNE     6$              ;BRANCH BACK IF NOT
2940 014630 012701 014072                 MOV     #BITSTS,R1      ;RESET BIT TEST CHECK WORDS ADDRESS TO R1
2941 014634 062702 000002                 ADD     #2,R2           ;MAP TO NEXT 'AND' LOCATION
2942 014640 022702 015010                 CMP     #GAND0+10,R2    ;SEE IF ALL 'AND' LOCATIONS HAVE BEEN CHECKED
2943 014644 001344                        BNE     6$              ;BRANCH BACK IF NOT
2944 014646 122737 000077 014746          CMPB    #'?,11$         ;SEE IF ANY CHIP NUMBER HAS BEEN LOADED
2945 014654 001002                        BNE     8$              ;BRANCH TO RETURN JUMP IF SO
2946 014656 104401 014746                 TYPE    ,11$            ;TYPE THE QUESTION MARKS - COULDN'T ISOLATE TO A CHIP
2947 014662 104401 001313          8$:    TYPE    ,$CRLF          ;TYPE A <CRLF>
2948 014666 012602                        MOV     (SP)+,R2        ;RESTORE R2
2949 014670 012601                        MOV     (SP)+,R1        ;RESTORE R1
2950 014672 012600                        MOV     (SP)+,R0        ;RESTORE R0
2951 014674 000177 000130                 JMP     @GADR
2952 014700 000207                 9$:    RTS     PC
2953
2954 014702      200      103      110  10$:    .ASCIZ  <CRLF>'CHIP NUMBERS TO INITIALLY LOOK AT'<CRLF>
2955 014746      077      077      077  11$:    .ASCIZ  '???  '
2956
2957 014754 000000                 GFLAG1: .WORD   0
2958 014756 000000                 GFLAG2: .WORD   0
2959 014760 000000                 GPAT00: .WORD   0
2960 014762 000000                 GPAT01: .WORD   0
2961 014764 000000                 GPAT02: .WORD   0
2962 014766 000000                 GPAT03: .WORD   0
2963 014770 177777                 GPAT10: .WORD   -1
2964 014772 177777                 GPAT11: .WORD   -1
2965 014774 177777                 GPAT12: .WORD   -1
2966 014776 177777                 GPAT13: .WORD   -1
2967 015000 177777                 GAND0:  .WORD   -1
2968 015002 177777                 GAND1:  .WORD   -1
```

```
2969 015004  177777          GAND2:  .WORD   -1
2970 015006  177777          GAND3:  .WORD   -1
2971 015010  000000          GOR0:   .WORD   0
2972 015012  000000          GOR1:   .WORD   0
2973 015014  000000          GOR2:   .WORD   0
2974 015016  000000          GOR3:   .WORD   0
2975 015020  000000          GDAT00: .WORD   0
2976 015022  000000          GDAT01: .WORD   0
2977 015024  000000          GDAT02: .WORD   0
2978 015026  000000          GDAT03: .WORD   0
2979 015030  000000          GADR:   .WORD   0
2980 015032                  GDONE:
     015032  104413                  RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                             ;SEE IF THE USER HAS EXPRESSED
                                                             ;THE DESIRE TO CHANGE THE SOF'WARE
                                                             ;VIR'UAL CONSOLE SWITCH REGISTER (HAS
                                                             ;THE USER TYPED CONTROL G?).
```

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2987                                    .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.
                                        ;*
                                        ;*********************************************************
     015034  000004                     TST12:  SCOPE
2988 015036  012737  015044  001110             MOV     #H1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2989
2990 015044  005037  015570             H1:     CLR     HFLAG
2991 015050  012700  015572                     MOV     #HA1W,R0                ;INITIALIZE THE  OAD BUFFER DATA.
2992 015054  012701  015712                     MOV     #HDAT1,R1
2993 015060  012703  000024                     MOV     #24,R3
2994 015064  012120                     H2:     MOV     (R1)+,(R0)+
2995 015066  077302                             SOB     R3,H2
2996
2997 015070  004737  015516                     JSR     PC,HCLR                 ;CLEAR THE OUTPUT DATA BUFFER.
2998
2999 015074  170011                     H3:     SETD
3000                                    ;LOAD ACCUMULATOR 1
     015076  012700  015572                     MOV     #HA1W,R0
     015102  172410                             LDD     (R0),AC0
     015104  174001                             STD     AC0,AC1
3001                                    ;LOAD ACCUMULATOR 2
     015106  012700  015602                     MOV     #HA2W,R0
     015112  172410                             LDD     (R0),AC0
     015114  174002                             STD     AC0,AC2
3002                                    ;LOAD ACCUMULATOR 3
     015116  012700  015612                     MOV     #HA3W,R0
     015122  172410                             LDD     (R0),AC0
     015124  174003                             STD     AC0,AC3
3003                                    ;LOAD ACCUMULATOR 4
     015126  012700  015622                     MOV     #HA4W,R0
     015132  172410                             LDD     (R0),AC0
     015134  174004                             STD     AC0,AC4
3004                                    ;LOAD ACCUMULATOR 5
     015136  012700  015632                     MOV     #HA5W,R0
     015142  172410                             LDD     (R0),AC0
     015144  174005                             STD     AC0,AC5
3005
3006 015146  004737  015402             H4:     JSR     PC,HSTD                 ;GO READ ALL ACCUMULATORS BACK.
3007
3008 015152  004737  015460                     JSR     PC,HCMP                 ;SEE IF DATA IS CORRECT.
3009
3010                                    ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 1,
                                        ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                        ;THE DATA.
     015156  012700  015572                     MOV     #HA1W,R0
     015162  012702  000004                     MOV     #4,R2
     015166  010001                             MOV     R0,R1
     015170  005121                     H5:     COM     (R1)+
     015172  172410                             LDD     (R0),AC0
     015174  174001                             STD     AC0,AC1
     015176  004737  015402                     JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
     015202  004737  015460                     JSR     PC,HCMP         ;CHECK THE DATA.
```

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                                        SOB     R2,H5
                                ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 2,
                                ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                ;THE DATA.
015206  012700  015602          H6:     MOV     #HA2W,R0
015210  012702  000004                  MOV     #4,R2
015214  010001                          MOV     R0,R1
015216  005121                  H6:     COM     (R1)+
015220  172410                          LDD     (R0),AC0
015222  174002                          STD     AC0,AC2
015224  004737  015402                  JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
015230  004737  015460                  JSR     PC,HCMP         ;CHECK THE DATA.
015234  077210                          SOB     R2,H6
                                ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 3,
                                ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                ;THE DATA.
015240  012700  015612                  MOV     #HA3W,RC
015244  012702  000004                  MOV     #4,R2
015250  010001                          MOV     R0,R1
015252  005121                  H7:     COM     (R1)+
015254  172410                          LDD     (R0),AC0
015256  174003                          STD     AC0,AC3
015260  004737  015402                  JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
015264  004737  015460                  JSR     PC,HCMP         ;CHECK THE DATA.
015270  077210                          SOB     R2,H7
                                ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 4,
                                ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                ;THE DATA.
015272  012700  015622          H10:    MOV     #HA4W,R0
015276  012702  000004                  MOV     #4,R2
015302  010001                          MOV     R0,R1
015304  005121                  H10:    COM     (R1)+
015306  172410                          LDD     (R0),AC0
015310  174004                          STD     AC0,AC4
015312  004737  015402                  JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
015316  004737  015460                  JSR     PC,HCMP         ;CHECK THE DATA.
015322  077210                          SOB     R2,H10
                                ;COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 5,
                                ;RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
                                ;THE DATA.
015324  012700  015632          H11:    MOV     #HA5W,R0
015330  012702  000004                  MOV     #4,R2
015334  010001                          MOV     R0,R1
015336  005121                  H11:    COM     (R1)+
015340  172410                          LDD     (R0),AC0
015342  174005                          STD     AC0,AC5
015344  004737  015402                  JSR     PC,HSTD         ;READ ALL THE ACCUMULATORS BACK.
015350  004737  015460                  JSR     PC,HCMP         ;CHECK THE DATA.
015354  077210                          SOB     R2,H11

015360  005737  015570                  TST     HFLAG
015364  001402                          BEQ     H12
015366  000137  015762                  JMP     HDONE

015372  005137  015570          H12:    COM     HFLAG
015376  000137  015074                  JMP     H3
```

```
3023
3024 015402  004737  015516          ;STORE ALL ACCUMULATORS IN THE OUTPUT BUFFERS.
3025                                  HSTD:   JSR     PC,HCLR                 ;CLEAR ALL OUTPUT BUFFERS.
                                      ;STORE ACCUMULATOR 1
     015406  012704  015642                  MOV     #HA1R,R4
     015412  172401                          LDD     AC1,AC0
     015414  174014                          STD     AC0,(R4)
3026                                  ;STORE ACCUMULATOR 2
     015416  012704  015652                  MOV     #HA2R,R4
     015422  172402                          LDD     AC2,AC0
     015424  174014                          STD     AC0,(R4)
3027                                  ;STORE ACCUMULATOR 3
     015426  012704  015662                  MOV     #HA3R,R4
     015432  172403                          LDD     AC3,AC0
     015434  174014                          STD     AC0,(R4)
3028                                  ;STORE ACCUMULATOR 4
     015436  012704  015672                  MOV     #HA4R,R4
     015442  172404                          LDD     AC4,AC0
     015444  174014                          STD     AC0,(R4)
3029                                  ;STORE ACCUMULATOR 5
     015446  012704  015702                  MOV     #HA5R,R4
     015452  172405                          LDD     AC5,AC0
     015454  174014                          STD     AC0,(R4)
3030 015456  000207                          RTS     PC
3031
3032                                  ;COMPARE DATA LOADED WITH DATA READ.
3033 015460  012637  015566          HCMP:   MOV     (SP)+,HADR              ;SAVE RETURN ADDRESS.
3034 015464  012703  015572                  MOV     #HA1W,R3
3035 015470  012704  015642                  MOV     #HA1R,R4
3036 015474  012705  000024                  MOV     #24,R5
3037 015500  022324                  HCMP1:  CMP     (R3)+,(R4)+
3038 015502  001402                          BEQ     HCMP2
3039 015504  000137  015534                  JMP     HERROR
3040 015510  077505                  HCMP2:  SOB     R5,HCMP1
3041 015512  000177  000050                  JMP     @HADR
3042
3043                                  ;CLEAR THE DATA OUTPUT BUFFER.
3044 015516  012704  015642          HCLR:   MOV     #HA1R,R4
3045 015522  012705  000024                  MOV     #24,R5
3046 015526  005024                  HCLR1:  CLR     (R4)+
3047 015530  077502                          SOB     R5,HCLR1
3048 015532  000207                          RTS     PC
3049
3050                                  ;REPORT ERROR.
3051 015534                          HERROR:
3052 015534  012703  015572                  MOV     #HA1W,R3
3053 015540  012704  001236                  MOV     #$TMP2,R4
3054 015544  012705  000012                  MOV     #12,R5
3055 015550  010324                  1$:     MOV     R3,(R4)+
3056 015552  062703  000010                  ADD     #10,R3
3057 015556  077504                          SOB     R5,1$
3058 015560  104046                  2$:     ERROR   +46
3059 015562  000137  015762                  JMP     HDONE
3060
3061
3062 015566  000000                  HADR:   .WORD   0
3063 015570  000000                  HFLAG:  .WORD   0
3064
```

TEST # 12 - FPP ACCUMULATORS DUAL ADDRESS TEST

```
3065 015572 000000 000000 000000 HA1W:   .WORD   0.0.0.0
3066 015602 000000 000000 000000 HA2W:   .WORD   0.0.0.0
3067 015612 000000 000000 000000 HA3W:   .WORD   0.0.0.0
3068 015622 000000 000000 000000 HA4W:   .WORD   0.0.0.0
3069 015632 000000 000000 000000 HA5W:   .WORD   0.0.0.0
3070
3071 015642 000000 000000 000000 HA1R:   .WORD   0.0.0.0
3072 015652 000000 000000 000000 HA2R:   .WORD   0.0.0.0
3073 015662 000000 000000 000000 HA3R:   .WORD   0.0.0.0
3074 015672 000000 000000 000000 HA4R:   .WORD   0.0.0.0
3075 015702 000000 000000 000000 HA5R:   .WORD   0.0.0.0
3076
3077 015712 073567 073567 073567 HDAT1:  .WORD   73567,73567,73567,73567
3078 015722 063146 063146 063146 HDAT2:  .WORD   63146,63146,63146,63146
3079 015732 010421 010421 010421 HDAT3:  .WORD   10421,10421,10421,10421
3080 015742 031463 031463 031463 HDAT4:  .WORD   31463,31463,31463,31463
3081 015752 042104 042104 042104 HDAT5:  .WORD   42104,42104,42104,42104
3082 015762                      HDONE:
     015762 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?).
3083
3084
```

TEST # 13 - FSRC MODE 0 WITH ILLEGAL ACCUMULATOR TEST

```
3092                                    .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 RESULT IN A TRAP TO 244
                                        ;*WITH FEC=2 (ILLEGAL FPP INSTRUCTION).
                                        ;*
                                        ;*****************************************************************
     015764  000004                     TST13:  SCOPE
3093 015766                             S1:
     015766  012737  015774  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3094 015774  170011                     1$:     SETD                    ;SET FD
3095 015776  012700  016506                     MOV     #SPAT10,R0      ;LOAD AC0
3096 016002  172410                             LDD     (R0),AC0
3097
3098 016004  012737  016206  000244             MOV     #SERR0,FPVECT   ;USE OF THE NON-EXISTENT AC-
3099                                                                     ;CUMULATOR SHOULD RESULT IN
3100                                                                     ;A TRAP TO 244.
3101 016012  012700  000001                     MOV     #1,R0           ;A FAILURE IN THE FSRC FLOWS
3102                                                                     ;WILL RESULT IN AN ODD ADDRESS
3103 016016  012737  016416  000004             MOV     #SERR1,ERRVECT  ;TRAP TO 4.
3104 016024  005003                             CLR     R3
3105
3106 016026  172407                     S2:     LDD     AC7,AC0
3107 016030  170000                     S3:     CFCC
3108 016032  005203                             INC     R3
3109 016034  005203                     S4:     INC     R3
3110
3111 016036  012701  016516                     MOV     #SDAT00,R1      ;NO TRAP OCCURRED!.
3112 016042  174011                             STD     AC0,(R1)        ;SEE IF AC0 WAS MODIFIED.
3113
3114 016044  012701  016516                     MOV     #SDAT00,R1
3115 016050  012702  016506                     MOV     #SPAT10,R2
3116 016054  012703  000004                     MOV     #4,R3
3117 016060  022122                     S5:     CMP     (R1)+,(R2)+
3118 016062  001402                             BEQ     S6
3119 016064  000137  016346                     JMP     SERR2
3120 016070  077305                     S6:     SOB     R3,S5
3121
3122 016072  000137  016372                     JMP     SERR3
3123
3124                                    ;NOW TEST AC6.
3125 016076                             S7:
     016076  012737  016104  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3126 016104  170011                     1$:     SETD
3127
3128 016106  012700  016506                     MOV     #SPAT10,R0      ;LOAD AC0
3129 016112  172410                             LDD     (R0),AC0
3130
3131 016114  012737  016264  000244             MOV     #SERR4,FPVECT
3132 016122  012700  000001                     MOV     #1,R0
3133 016126  012737  016450  000004             MOV     #SERR5,ERRVECT
3134 016134  005003                             CLR     R3
3135
3136 016136  172406                     S8:     LDD     AC6,AC0
3137 016140  170000                     S9:     CFCC
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3138 016142  005203                        INC     R3
3139 016144  005203                S10:     INC     R3
3140
3141 016146  012701  016516                MOV     #SDAT00,R1
3142 016152  174011                        STD     AC0,(R1)            ;NO TRAP. GET AC0.
3143
3144 016154  012701  016516                MOV     #SDAT00,R1          ;WAS AC0 MODIFIED.
3145 016160  012702  016506                MOV     #SPAT10,R2
3146 016164  012703  000004                MOV     #4,R3
3147 016170  022122                S11:    CMP     (R1)+,(R2)+
3148 016172  001402                        BEQ     S12
3149 016174  000137  016360                JMP     SERR6
3150 016200  077305                S12:    SOB     R3,S11
3151 016202  000137  016404                JMP     SERR7
3152
3153                               ;TRAPPED TO 244.
3154 016206  021627  016030        SERR0:  CMP     (SP),#S3            ;PC OF TRAP CORRECT?
3155 016212  001402                        BEQ     1$
3156 016214  000137  042066                JMP     FPSPUR
3157
3158 016220  012737  016076  016502  1$:   MOV     #S7,SADR
3159
3160 016226  011637  001236        SERR10: MOV     (SP),$TMP2
3161 016232  022626                        CMP     (SP)+,(SP)+
3162 016234  005004                        CLR     R4
3163 016236  170204                        STFPS   R4                  ;IS FPS CORRECT?
3164 016240  022704  100200                CMP     #100200,R4
3165 016244  001020                        BNE     SERR15
3166
3167 016246  005004                        CLR     R4
3168 016250  170304                        STST    R4                  ;IS FEC CORRECT?
3169 016252  022704  000002                CMP     #2,R4
3170 016256  001023                        BNE     SERR20
3171 016260  000177  000216                JMP     @SADR
3172
3173 016264  021627  016140        SERR4:  CMP     (SP),#S9
3174 016270  001402                        BEQ     1$
3175 016272  000137  042066                JMP     FPSPUR
3176 016276  012737  016526  016502  1$:   MOV     #SDONE,SADR
3177 016304  000750                        BR      SERR10
3178
3179                               ;REPORT FPS FAILURE:
3180 016306  012737  100200  001242  SERR15: MOV     #100200,$TMP4
3181 016314  010437  001240                MOV     R4,$TMP3
3182 016320  104117                1$:     ERROR   +117
3183 016322  000177  000154                JMP     @SADR
3184
3185                               ;REPORT FEC BAD:
3186 016326  012737  000002  001242  SERR20: MOV     #2,$TMP4
3187 016334  010437  001240                MOV     R4,$TMP3
3188 016340  104120                1$:     ERROR   +120
3189 016342  000177  000134                JMP     @SADR
3190
3191
3192                               ;AC0 WAS MODIFIED. (BUT FSRC) FORK FAILED.
3193 016346  012737  016026  001236  SERR2:  MOV     #S2,$TMP2
3194 016354  104112                1$:     ERROR   +112
```

```
3195 016356  000463                          BR      SDONE
3196 016360  012737  016136  001236  SERR6:  MOV     #S8,$TMP2
3197 016366  104114                  1$:     ERROR   +114
3198 016370  000456                          BR      SDONE
3199
3200 016372  012737  016026  001236  SERR3:  MOV     #S2,$TMP2
3201 016400  104111                  1$:     ERROR   +111
3202 016402  000451                          BR      SDONE
3203 016404  012737  016136  001236  SERR7:  MOV     #S8,$TMP2
3204 016412  104113                  1$:     ERROR   +113
3205 016414  000444                          BR      SDONE
3206
3207                                 ;FAILURE OF (BUT FSRC) CAUSED AN ODD ADDRESS TRAP TO 4.
3208 016416  021627  016030          SERR1:  CMP     (SP),#S3        ;DID TRAP OCCUR ON TESTED INSTRUCTION?
3209 016422  001405                          BEQ     1$
3210 016424  021627  016034                  CMP     (SP),#S4
3211 016430  001402                          BEQ     1$
3212 016432  000137  042120                  JMP     CPSPUR
3213
3214 016436  011637  001236          1$:     MOV     (SP),$TMP2
3215 016442  022626                          CMP     (SP)+,(SP)+
3216 016444  104115                  2$:     ERROR   +115
3217 016446  000427                          BR      SDONE
3218
3219 016450  021627  016136          SERR5:  CMP     (SP),#S8        ;DID TRAP OCCUR ON TEST INSTRUCTION?
3220 016454  001405                          BEQ     1$
3221 016456  021627  016140                  CMP     (SP),#S9
3222 016462  001402                          BEQ     1$
3223 016464  000137  042120                  JMP     CPSPUR
3224
3225 016470  011637  001236          1$:     MOV     (SP),$TMP2
3226 016474  022626                          CMP     (SP)+,(SP)+
3227 016476  104116                  2$:     ERROR   +116
3228 016500  000412                          BR      SDONE
3229
3230 016502  000000                  SADR:   0
3231 016504  177777                          -1
3232 016506  010421                  SPAT10: .WORD   10421
3233 016510  021042                  SPAT11: .WORD   21042
3234 016512  031463                  SPAT12: .WORD   31463
3235 016514  042104                  SPAT13: .WORD   42104
3236
3237 016516  000000                  SDAT00: .WORD   0
3238 016520  000000                  SDAT01: .WORD   0
3239 016522  000000                  SDAT02: .WORD   0
3240 016524  000000                  SDAT03: .WORD   0
3241
3242 016526                          SDONE:
     016526  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?).
```

3243

```
                                        .SBTTL  TEST # 14 - FSRC MODE 2 TEST
                                        ;*********************************************************************
                                        ;*TEST #4        FSRC MODE 2 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 2, AUTO
                                        ;* INCREMENT MODE.
                                        ;*
                                        ;*********************************************************************
     016530  000004                     TST14:  SCOPE
3251 016532  012737  016540  001110             MOV     #J',$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3252
3253 016540                             J1:
3254 016540  170011                             SETD                    ;SET DOUBLE MODE
3255
3256 016542  012700  017016                     MOV     #JDAT0,R0
3257 016546  172410                             LDD     (R0),AC0        ;LOAD AC0
3258
3259 016550  012700  016776                     MOV     #JDATI0,R0
3260 016554  005003                             CLR     R3
3261 016556  012737  016646  000004             MOV     #JERR0,ERRVECT
3262
3263 016564  172420                     J2:     LDD     (R0)+,AC0       ;TEST INSTRUCTION
3264 016566  005203                     J3:     INC     R3
3265 016570  005203                     J4:     INC     R3
3266
3267 016572  012701  017006                     MOV     #JDAT00,R1
3268 016576  174011                             STD     AC0,(R1)        ;PICK UP RESULTS
3269
3270 016600  020027  016766                     CMP     R0,#JBUF0       ;WAS AN AUTO
3271 016604  001001                             BNE     1$              ;DECREMENT EXECUTED?
3272 016606  000442                             BR      JERR1
3273
3274 016610  012702  016776             1$:     MOV     #JDATI0,R2      ;IS DATA CORRECT?
3275 016614  012703  017006                     MOV     #JDAT00,R3
3276 016620  012704  000004                     MOV     #4,R4
3277 016624  022223                     J5:     CMP     (R2)+,(R3)+
3278 016626  001401                             BEQ     J6
3279 016630  000443                             BR      JERR2
3280 016632  077404                     J6:     SOB     R4,J5
3281
3282 016634  022700  017006                     CMP     #JDATI0+10,R0   ;WAS R0 INCREM.
3283 016640  001401                             BEQ     J7              ;BY 10 (OCTAL)
3284 016642  000424                             BR      JERR1
3285
3286 016644  000470                     J7:     BR      JDONE
3287
3288                                     ;IF A TRAP THROUGH 4 OCCURS COME HERE
3289
3290 016646  021627  016566             JERR0:  CMP     (SP),#J3        ;SEE IF THE TRAP
3291 016652  001405                             BEQ     J10             ;OCCURRED ON THE
3292 016654  021627  016570                     CMP     (SP),#J4        ;TESTED INSTRUCTION
3293 016660  001402                             BEQ     J10
3294 016662  000137  042120                     JMP     CPSPUR
3295
3296 016666  012737  000762  001240  J10:     MOV     #762,$TMP3      ;REPORT FSRC FLOW
3297 016674  012737  000322  001242             MOV     #322,$TMP4      ;FAILURE
3298 016702  011637  001236                     MOV     (SP),$TMP2
```

```
3299 016706  022626                        CMP     (SP)+,(SP)+
3300 016710  104052                1$:     ERROR   +52
3301 016712  000445                        BR      JDONE
3302
3303 016714                        JERR1:                          ;REPORT, R0 NOT
3304 016714  012737  016564  001236        MOV     #J2,$TMP2       ;CORRECTLY AFFECTED
3305 016722  010037  001240                MOV     R0,$TMP3
3306 016726  012737  017006  001242        MOV     #JDAT10+10,$TMP4
3307 016734  104053                1$:     ERROR   +53
3308 016736  000433                        BR      JDONE
3309
3310                               ;REPORT DATA FAILURE
3311
3312 016740                        JERR2:
3313 016740  012737  016564  001236        MOV     #J2,$TMP2
3314 016746  012737  016776  001240        MOV     #JDAT10,$TMP3
3315 016754  012737  017006  001242        MOV     #JDAT00,$TMP4
3316 016762  104054                1$:     ERROR   +54
3317 016764  000420                        BR      JDONE
3318
3319 016766  010421                JBUF0:  .WORD   010421
3320 016770  021042                JBUF1:  .WORD   021042
3321 016772  042104                JBUF2:  .WORD   042104
3322 016774  031463                JBUF3:  .WORD   031463
3323
3324 016776  052525                JDAT10: .WORD   052525
3325 017000  114631                JDAT11: .WORD   114631
3326 017002  063146                JDAT12: .WORD   063146
3327 017004  073567                JDAT13: .WORD   073567
3328
3329 017006  000000                JDAT00: .WORD   0
3330 017010  000000                JDAT01: .WORD   0
3331 017012  000000                JDAT02: .WORD   0
3332 017014  000000                JDAT03: .WORD   0
3333
3334 017016  177777                JDAT0:  .WORD   -1
3335 017020  177777                JDAT1:  .WORD   -1
3336 017022  177777                JDAT2:  .WORD   -1
3337 017024  177777                JDAT3:  .WORD   -1
3338
3339
3340 017026                        JDONE:
     017026  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?).
3341
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```
3349                                    .SBTTL  TEST # 15 - FSRC MODE 4 TEST
                                        ;*********************************************************************
                                        ;*TEST 15       FSRC MODE 4 TEST
                                        ;*
                                        ;* THIS IS A TEST OF FSRC MODE 4, AUTO
                                        ;* DECREMENT MODE.
                                        ;*
                                        ;*********************************************************************
     017030  000004                     TST15:  SCOPE
3350 017032  012737  017040  001110             MOV     #K1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3351
3352 017040                             K1:
3353 017040  170011                             SETD                    ;SET DOUBLE MODE
3354
3355 017042  012700  017314                     MOV     #KPAT0,R0
3356 017046  172410                             LDD     (R0),AC0        ;LOAD A DEFAULT
3357                                                                     ;PATTERN INTO AC0
3358 017050  012700  017274                     MOV     #KBUF0,R0
3359 017054  005003                             CLR     R3
3360 017056  012737  017146  000004             MOV     #KERR0,ERRVECT
3361
3362 017064  172440                     K2:     LDD     -(R0),AC0       ;TEST INSTRUCTION
3363 017066  005203                     K3:     INC     R3
3364 017070  005203                     K4:     INC     R3
3365
3366 017072  012701  017304                     MOV     #KDAT00,R1
3367 017076  174011                             STD     AC0,(R1)        ;PICK UP THE RESULT
3368
3369 017100  020027  017304                     CMP     R0,#KBUF0+10    ;WAS AN AUTO
3370 017104  001001                             BNE     1$              ;INCREMENT EXECUTED
3371 017106  000441                             BR      KERR1
3372
3373 017110  012702  017264             1$:     MOV     #KDAT10,R2      ;IS DATA CORRECT?
3374 017114  012703  017304                     MOV     #KDAT00,R3
3375 017120  012704  000004                     MOV     #4,R4
3376 017124  022223                     K5:     CMP     (R2)+,(R3)+
3377 017126  001401                             BEQ     K6
3378 017130  000442                             BR      KERR2
3379 017132  077404                     K6:     SOB     R4,K5
3380
3381 017134  022700  017264                     CMP     #KBUF0-10,R0    ;WAS R0 DECREMENTED
3382 017140  001401                             BEQ     K7              ;PROPERLY?
3383 017142  000423                             BR      KERR1
3384
3385 017144  000467                     K7:     BR      KDONE
3386
3387                                    ;TRAP TO HERE ON AN ODD ADDRESS ERROR
3388
3389 017146  021627  017066             KERR0:  CMP     (SP),#K3        ;SEE IF THE ERROR
3390 017152  001405                             BEQ     K10             ;OCCURRED AT THE
3391 017154  021627  017070                     CMP     (SP),#K4        ;INSTRUCTION TESTED.
3392 017160  001402                             BEQ     K10
3393 017162  000137  042120                     JMP     CPSPUR
3394
3395 017166  012737  000762  001240  K10:     MOV     #762,$TMP3      ;REPORT FAILURE IN
3396 017174  012737  000324  001242             MOV     #324,$TMP4      ;FSRC FLOWS
3397 017202  011637  001236                     MOV     (SP),$TMP2
```

```
3398 017206  104055                  1$:     ERROR   +55
3399 017210  000445                          BR      KDONE
3400
3401 017212                          KERR1:                          ;REPORT, R0
3402 017212  012737  017064  001236          MOV     #K2,$TMP2       ;INCORRECTLY AFFECTED.
3403 017220  010037  001240                  MOV     R0,$TMP3
3404 017224  012737  017264  001242          MOV     #KDATI0,$TMP4
3405 017232  104056                  1$:     ERROR   +56
3406 017234  000433                          BR      KDONE
3407
3408                                 ;REPORT DATA FAILURE
3409
3410 017236                          KERR2:
3411 017236  012737  017064  001236          MOV     #K2,$TMP2
3412 017244  012737  017264  001240          MOV     #KDATI0,$TMP3
3413 017252  012737  017304  001242          MOV     #KDATO0,$TMP4
3414 017260  104057                  1$:     ERROR   +57
3415 017262  000420                          BR      KDONE
3416
3417 017264  052525                  KDATI0: .WORD   052525
3418 017266  114631                  KDATI1: .WORD   114631
3419 017270  063140                  KDATI2: .WORD   063140
3420 017272  073567                  KDATI3: .WORD   073567
3421
3422 017274  010421                  KBUF0:  .WORD   010421
3423 017276  031463                  KBUF1:  .WORD   031463
3424 017300  042104                  KBUF2:  .WORD   042104
3425 017302  021042                  KBUF3:  .WORD   021042
3426
3427 017304  000000                  KDATO0: .WORD   0
3428 017306  000000                  KDATO1: .WORD   0
3429 017310  000000                  KDATO2: .WORD   0
3430 017312  000000                  KDATO3: .WORD   0
3431
3432 017314  177777                  KPAT0:  .WORD   -1
3433 017316  177777                  KPAT1:  .WORD   -1
3434 017320  177777                  KPAT2:  .WORD   -1
3435 017322  177777                  DPAT3:  .WORD   -1
3436
3437 017324                          KDONE:
     017324  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?).
3438
3445
```

```
3446                                    .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)
                                        ;*
                                        ;;*****************************************************************
     017326  000004
3447 017330  012737  017336  001110     TST16:  SCOPE
                                                MOV     #L1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3448
3449 017336                             L1:
3450 017336  170011                             SETD                    ;SET DOUBLE MODE
3451
3452 017340  012700  017606                     MOV     #LPAT10,R0
3453 017344  172410                             LDD     (R0),AC0        ;LOAD AC0
3454
3455 017346  012700  017630                     MOV     #LDATI0,R0      ;SET UP THE INPUT
3456 017352  012701  017616                     MOV     #LPAT20,R1      ;DATA
3457 017356  012702  000004                     MOV     #4,R2
3458
3459 017362  012120                     1$:     MOV     (R1)+,(R0)+
3460 017364  077202                             SOB     R2,1$
3461
3462 017366  012700  017630                     MOV     #LDATI0,R0
3463 017372  005003                             CLR     R3
3464 017374  170001                             SETF                    ;CLEAR FD.
3465
3466 017376  172420                     L2:     LDF     (R0)+,AC0
3467 017400  005203                     L3:     INC     R3
3468
3469 017402                             L4:
3470 017402  170011                             SETD                    ;SET FD
3471
3472 017404  012701  017642                     MOV     #LDATO0,R1
3473 017410  174011                             STD     AC0,(R1)        ;PICK UP RESULTS
3474
3475 017412  020027  017634                     CMP     R0,#LDATI2      ;WAS R0 INCREMENTED
3476 017416  001401                             BEQ     1$              ;CORRECTLY BY 4
3477 017420  000421                             BR      LERR1
3478
3479 017422  012737  177777  017634     1$:     MOV     #-1,LDATI2
3480 017430  012737  177777  017636             MOV     #-1,LDATI3
3481 017436  012702  017630                     MOV     #LDATI0,R2      ;IS DATA CORRECT
3482 017442  012703  017642                     MOV     #LDATO0,R3
3483 017446  012704  000004                     MOV     #4,R4
3484
3485 017452  022223                     L5:     CMP     (R2)+,(R3)+
3486 017454  001401                             BEQ     L6
3487 017456  000427                             BR      LERR2
3488 017460  077404                     L6:     SOB     R4,L5
3489
3490 017462  000473                             BR      LDONE
3491
3492 017464                             LERR1:                          ;REPORT FAILURE
3493 017464  012737  017376  001236             MOV     #L2,$TMP2       ;R0 NOT INCREMENTED
3494 017472  010037  001240                     MOV     R0,$TMP3        ;BY 4
```

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

```
3495 017476  012737  017634  001242          1$:     MOV     #LDATI2,$TMP4
3496 017504  104060                                  ERROR   +60
3497 017506  000461                                  BR      LDONE
3498
3499 017510                                  LERR3:                          ;REPORT DATA FAILURE.
3500 017510  012737  017376  001236                  MOV     #L2,$TMP2
3501 017516  012737  017630  001240                  MOV     #LDATI0,$TMP3
3502 017524  012737  017642  001242                  MOV     #LDAT00,$TMP4
3503 017532  104061                          1$:     ERROR   +61
3504 017534  000446                                  BR      LDONE
3505
3506 017536  012702  017616                  LERR2:  MOV     #LPAT20,R2      ;DID (BUT FD)
3507 017542  012703  017642                          MOV     #LDAT00,R3      ;FAIL.
3508 017546  012704  000004                          MOV     #4,R4
3509 017552  022223                          1$:     CMP     (R2)+,(R3)+
3510 017554  001355                                  BNE     LERR3
3511 017556  077403                                  SOB     R4,1$
3512 017560  012737  017376  001236                  MOV     #L2,$TMP2
3513 017566  012737  017630  001240                  MOV     #LDATI0,$TMP3
3514 017574  012737  017644  001242                  MOV     #LDAT01,$TMP4
3515 017602  104062                          2$:     ERROR   +62
3516 017604  000422                                  BR      LDONE
3517
3518 017606  177777                          LPAT10: .WORD   -1
3519 017610  177777                          LPAT11: .WORD   -1
3520 017612  177777                          LPAT12: .WORD   -1
3521 017614  177777                          LPAT13: .WORD   -1
3522
3523 017616  052525                          LPAT20: .WORD   052525
3524 017620  114631                          LPAT21: .WORD   114631
3525 017622  063142                          LPAT22: .WORD   063142
3526 017624  073567  000001                  LPAT23: .WORD   073567,1
3527 017630  000000                          LDATI0: .WORD   0
3528 017632  000000                          LDATI1: .WORD   0
3529 017634  000000                          LDATI2: .WORD   0
3530 017636  000000  000001                  LDATI3: .WORD   0,1
3531 017642  000000                          LDAT00: .WORD   0
3532 017644  000000                          LDAT01: .WORD   0
3533 017646  000000                          LDAT02: .WORD   0
3534 017650  000000                          LDAT03: .WORD   0
3535
3536 017652                                  LDONE:
     017652  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?).

3537
3545
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3546                                    .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.
                                        ;*
                                        ;*****************************************************************
     017654  000004                     TST17:  SCOPE
3547
3548 017656                             ;1:
3549 017656  170011                             SETD
3550
3551 017660  012700  020152                     MOV     #MPAT10,R0
3552 017664  172410                             LDD     (R0),AC0        ;LOAD BACKGROUND
3553                                                                     ;PATTERN INTO AC0.
3554 017666  005004                             CLR     R4
3555 017670  012737  020112  000004             MOV     #MERR3,ERRVECT
3556
3557 017676  172427  000000     M15:    LDD     #0,AC0          ;TEST INSTRUCTION
3558         017700                             .=.-2
3559 017700  005204                             .WORD   5204
3560 017702  005204             M2:     INC     R4              ;NOTE THAT
3561 017704  005204             M3:     INC     R4              ;005204-INC R4
3562 017706  005204             M4:     INC     R4
3563
3564 017710  020427  000003                     CMP     R4,#3           ;SEE IF THE PC
3565 017714  001401                             BEQ     1$              ;WAS INCREMENTED
3566 017716  000443                             BR      MERR0           ;BY 2 DURING THE
3567                                                                     ;INSTRUCTION.  IF
3568                                                                     ;NOT THEN A BAD
3569                                                                     ;CONSTANT WAS GENERATED
3570 017720  012700  020172     1$:     MOV     #MDAT00,R0
3571 017724  174010                             STD     AC0,(R0)        ;GET THE DATA
3572
3573 017726  012700  020172                     MOV     #MDAT00,R0
3574 017732  022720  005204                     CMP     #5204,(R0)+     ;IS THE DATA CORRECT?
3575 017736  001401                             BEQ     M5
3576 017740  000451                             BR      MERR1
3577 017742  012701  000003     M5:     MOV     #3,R1
3578 017746  005720             M6:     TST     (R0)+
3579 017750  001002                             BNE     M7
3580 017752  077103                             SOB     R1,M6
3581 017754  000512                             BR      MDONE
3582
3583 017756  012700  020172     M7:     MOV     #MDAT00,R0      ;DID (BUT GRM) FAIL?
3584 017762  012701  000004             MOV     #4,R1
3585 017766  022720  005204     M8:     CMP     #5204,(R0)+
3586 017772  001401                             BEQ     M9
3587 017774  000433                             BR      MERR1
3588 017776  077105             M9:     SOB     R1,M8
3589
3590 020000                     MERR2:                          ;REPORT FAILURE
3591 020000  012737  017676  001236             MOV     #M15,$TMP2      ;OF (BUT GR7)
3592 020006  012737  020162  001240             MOV     #MPAT20,$TMP3
3593 020014  012737  020172  001242             MOV     #MDAT00,$TMP4
```

```
3594 020022  104063                1$:     ERROR   +63
3595 020024  000466                        BR      MDONE
3596
3597 020026  012705  017702        MERR0:  MOV     #M2,R5          ;REPORT FAILURE
3598 020032  010537  001242                MOV     R5,$TMP4        ;PC INCREMENTED
3599 020036  162704  000003                SUB     #3,R4
3600 020042  006304                        ASL     R4
3601 020044  160405                        SUB     R4,R5
3602 020046  010537  001240                MOV     R5,$TMP3
3603 020052  012737  017676  001236        MOV     #M15,$TMP2
3604 020060  104064                1$:     ERROR   +64
3605 020062  000447                        BR      MDONE
3606
3607 020064                        MERR1:                          ;REPORT DATA
3608 020064  012737  017676  001236        MOV     #M15,$TMP2      ;FAILURE
3609 020072  012737  020172  001240        MOV     #MDAT00,$TMP3
3610 020100  012737  020162  001242        MOV     #MPAT20,$TMP4
3611 020106  104066                1$:     ERROR   +66
3612 020110  000434                        BR      MDONE
3613                               ;TRAP TO HERE THROUGH 4.
3614 020112  032716  000001        MERR3:  BIT     #1,(SP)         ;SEE IF THE
3615 020116  001002                        BNE     1$              ;TRAP TO 4 OCCURRED
3616 020120  000137  042120                JMP     CPSPUR          ;BECAUSE OF AN
3617                                                               ;ODD ADDRESS
3618 020124  011637  001240        1$:     MOV     (SP),$TMP3      ;IF YES REPORT
3619 020130  012737  017702  001242        MOV     #M2,$TMP4       ;BAD CONSTANT
3620 020136  012737  017676  001236        MOV     #M15,$TMP2      ;GENERATED
3621 020144  022626                        CMP     (SP)+,(SP)+
3622 020146  104065                2$:     ERROR   +65
3623 020150  000414                        BR      MDONE
3624
3625 020152  177777        MPAT10: .WORD   -1
3626 020154  177777        MPAT11: .WORD   -1
3627 020156  177777        MPAT12: .WORD   -1
3628 020160  177777        MPAT13: .WORD   -1
3629
3630 020162  005204        MPAT20: .WORD   5204
3631 020164  005204        MPAT21: .WORD   5204
3632 020166  005204        MPAT22: .WORD   5204
3633 020170  005204        MPAT23: .WORD   5204
3634
3635 020172  000000        MDAT00: .WORD   0
3636 020174  000000        MDAT01: .WORD   0
3637 020176  000000        MDAT02: .WORD   0
3638 020200  000000        MDAT03: .WORD   0
3639
3640 020202                MDONE:
     020202  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?).
3641
3648
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```
                                .SBTTL  TEST # 20 - FSRC MODE 3 TEST
                                ;*****************************************************************
                                ;*TEST 20        FSRC MODE 3 TEST
                                ;*
                                ;* THIS IS A TEST OF FSRC MODE 3, AUTO INCREMENT
                                ;* DEFERRED
                                ;*
                                ;*****************************************************************
020204  000004                  TST20:  SCOPE
020206                          N1:
020206  170011                          SETD                    ;SET FD MODE
020210  012700  020670                  MOV     #NPAT10,R0
020214  172410                          LDD     (R0),AC0        ;LOAD AC0 WITH A DEFAULT
                                                                ;PATTERN
020216  012700  020656                  JMP     #NPAT20,R0
020222  005003                          CLR     R3
020224  012737  020400  000004          MOV     #NERR0,ERRVECT  ;IF A FAILURE OCCURS
                                                                ;IN THE FSRC FLOWS AN
                                                                ;ODD TRAP TO 4 COULD OCCUR
020232  172430                  N2:     LDD     @(R0)+,AC0      ;TEST INSTRUCTION.
020234  005203                  N3:     INC     R3
020236  005203                  N4:     INC     R3
020240  012701  020636                  MOV     #NDAT00,R1
020244  174011                          STD     AC0,(R1)        ;GET THE DATA
020246  020027  020660                  CMP     R0,#NPAT20+2    ;WAS R0 INCREMENTED
020252  001437                          BEQ     N12             ;BY 2?
020254  020027  020666          N5:     CMP     R0,#NPAT20+10   ;FSRC MODE 2?
020260  001001                          BNE     N6
020262  000506                          BR      NERR1
020264  020027  020646          N6:     CMP     R0,#NPAT20-10   ;FSRC MODE 4?
020270  001001                          BNE     N7
020272  000520                          BR      NERR2
020274  020027  020656          N7:     CMP     R0,#NPAT20
020300  001023                          BNE     N11
020302  012702  020636                  MOV     #NDAT00,R2      ;FSRC MODE 0?
020306  012703  000004                  MOV     #4,R3
020312  022227  177777          N8:     CMP     (R2)+,#-1
020316  001002                          BNE     N9
020320  077304                          SOB     R3,N8
020322  000510                          BR      NERR3
020324  012702  020636          N9:     MOV     #NDAT00,R2      ;FSRC MODE 1
020330  012703  020656                  MOV     #NPAT20,R3
020334  012704  000004                  MOV     #4,R4
020340  022223                  N10:    CMP     (R2)+,(R3)+
020342  001002                          BNE     N1
020344  077403                          SOB     R4,N10
020346  000502                          BR      NERR4
```

```
3698 020350  000505                  N11:    BR      NERR5
3699
3700 020352  012702  020636          N12:    MOV     #NDAT00,R2      ;DATA CORRECT?
3701 020356  012703  020700                  MOV     #NDAT10,R3
3702 020362  012704  000004                  MOV     #4,R4
3703 020366  022223                  N13:    CMP     (R2)+,(R3)+
3704 020370  001002                          BNE     N14
3705 020372  077403                          SOB     R4,N13
3706 020374  000545                          BR      NDONE
3707
3708 020376  000504                  N14:    BR      NERR6
3709
3710                                 ;IF AN ODD ADDRESS TRAP OCCURS COME HERE
3711                                 ;TO SEE IF THE FAILURE WAS IN THE FSRC
3712                                 ;FLOWS
3713
3714 020400  022716  020236          NERR0:  CMP     #N4,(SP)        ;FSRC MODE 6 OR 7?
3715 020404  001412                          BEQ     NERR10
3716 020406  022716  020234                  CMP     #N3,(SP)
3717 020412  001402                          BEQ     1$
3718 020414  000137  042120                  JMP     CPSPUR
3719 020420  020027  020654          1$:     CMP     R0,#NPAT20-2    ;FSRC MODE 5?
3720 020424  001407                          BEQ     NERR11
3721 020426  000137  042120                  JMP     CPSPUR
3722
3723 020432                          NERR10:                         ;WENT TO FSRC
3724 020432  011637  001236                  MOV     (SP),$TMP2      ;MODE 6 OR 7.
3725 020436  022626                          CMP     (SP)+,(SP)+
3726 020440  104067                  1$:     ERROR   +67
3727 020442  000522                          BR      NDONE
3728
3729 020444  011637  001236          NERR11: MOV     (SP),$TMP2      ;WENT TO FSRC
3730 020450  022626                          CMP     (SP)+,(SP)+     ;MODE 5.
3731 020452  012737  000627  001244          MOV     #627,$TMP5
3732 020460  012737  000323  001250          MOV     #323,$TMP7
3733 020466  012737  000325  001246          MOV     #325,$TMP6
3734 020474  104070                  1$:     ERROR   +70
3735 020476  000504                          BR      NDONE
3736 020500  012737  000322  001246  NERR1:  MOV     #322,$TMP6      ;FSRC MODE 2.
3737 020506  012737  000627  001244  NERR20: MOV     #627,$TMP5
3738 020514  012737  000323  001250          MOV     #323,$TMP7
3739 020522  012737  020232  001236          MOV     #N2,$TMP2
3740 020530  104071                  1$:     ERROR   +71
3741 020532  000466                          BR      NDONE
3742 020534  012737  000324  001246  NERR2:  MOV     #324,$TMP6      ;FSRC MODE 4
3743 020542  000761                          BR      NERR20
3744 020544  012737  000320  001246  NERR3:  MOV     #320,$TMP6      ;FSRC MODE 0
3745 020552  000755                          BR      NERR20
3746 020554  012737  000321  001246  NERR4:  MOV     #321,$TMP6      ;FSRC MODE 1
3747 020562  000751                          BR      NERR20
3748
3749 020564  010037  001240          NERR5:  MOV     R0,$TMP3        ;R0 NOT
3750 020570  012737  020660  001242          MOV     #NPAT20+2,$TMP4 ;INCREMENTED
3751 020576  012737  020232  001236          MOV     #N2,$TMP2       ;PROPERLY.
3752 020604  104072                  1$:     ERROR   +72
3753 020606  000440                          BR      NDONE
3754
```

```
3755 020610                                NERR6:                          ;DATA FAILURE.
3756 020610  012737  020232  001236              MOV     #N2,$TMP2
3757 020616  012737  020636  001240              MOV     #NDAT00,$TMP3
3758 020624  012737  020700  001242              MOV     #NDAT10,$TMP4
3759 020632  104073                        1$:   ERROR   +73
3760 020634  000425                              BR      NDONE
3761
3762 020636  000000                        NDAT00: .WORD   0
3763 020640  000000                        NDAT01: .WORD   0
3764 020642  000000                        NDAT02: .WORD   0
3765 020644  000000  052525  052525       NDAT03: .WORD   0,52525,52525,52525,52525
3766 020656  020700                        NPAT20: .WORD   NDAT10
3767 020660  070707                        NPAT21: .WORD   070707
3768 020662  070707                        NPAT22: .WORD   070707
3769 020664  070707  000001                NPAT23: .WORD   070707,1
3770 020670  177777                        NPAT10: .WORD   -1
3771 020672  177777                        NPAT11: .WORD   -1
3772 020674  177777                        NPAT12: .WORD   -1
3773 020676  177777                        NPAT13: .WORD   -1
3774
3775 020700  010421                        NDAT10: .WORD   010421
3776 020702  021042                        NDAT11: .WORD   021042
3777 020704  031463                        NDAT12: .WORD   031463
3778 020706  042104                        NDAT13: .WORD   042104
3779
3780 020710                                NDONE:
     020710  104413                              PSETUP                  ;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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3788
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                                .SBTTL  TEST # 21 - FSRC MODE 5 TEST
                                ;*********************************************************************
                                ;*TEST 21       FSRC MODE 5 TEST
                                ;*
                                ;* THIS IS A TEST OF FSRC MODE 5, AUTO DECREMENT
                                ;* DEFERRED.
                                ;*
                                ;*********************************************************************
020712  000004                TST21:  SCOPE
                        01:
020714  170011                        SETD                    ;SET FD MODE

020716  012700  021374                MOV     #OPAT10,R0
020722  172410                        LDD     (R0),AC0        ;LOAD AC0 WITH A
                                                                ;DEFAULT PATTERN.
020724  012700  021362                MOV     #OPAT21,R0
020730  005003                        CLR     R3
020732  012737  021104  000004        MOV     #OERR0,ERRVEC   ;IF A FAILURE
                                                                ;OCCURS IN THE FSRC
                                                                ;FLOWS AN ODD ADDR.
                                                                ;TRAP TO 4 MAY OCCUR.
020740  172450                02:     LDD     @-(R0),AC0      ;TEST INSTRUCTION
020742  005203                03:     INC     R3
020744  005203                04:     INC     R3

020746  012701  021342                MOV     #ODAT00,R1
020752  174011                        STD     AC0,(R1)        ;GET THE DATA

020754  020027  021360                CMP     R0,#OPAT20      ;WAS R0 DECREMENTED
020760  001436                        BEQ     012             ;BY 2?

020762  020027  021372        05:     CMP     R0,#OPAT21+10   ;FSRC MODE 2
020766  001001                        BNE     06
020770  000505                        BR      OERR1

020772  020027  021352        06:     CMP     R0,#OPAT21-10   ;FSRC MODE 4?
020776  001001                        BNE     07
021000  000517                        BR      OERR2

021002  020027  021362        07:     CMP     R0,#OPAT21

021006  012702  021344                MOV     #ODAT01,R2      ;FSRC MODE 0?
021012  012703  000004                MOV     #4,R3
021016  022227  177777        08:     CMP     (R2)+,#-1
021022  001002                        BNE     09
021024  077304                        SOB     R3,08
021026  000510                        BR      OERR3

021030  012702  021342        09:     MOV     #ODAT00,R2      ;FSRC MODE 1?
021034  012703  021362                MOV     #OPAT21,R3
021040  012704  000004                MOV     #4,R4
021044  022223                010:    CMP     (R2)+,(R3)+
021046  001002                        BNE     011
021050  077403                        SOB     R4,010
021052  000502                        BR      OERR4
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3838 021054  000505                    011:    BR      OERR5
3839
3840 021056  012702  021342            012:    MOV     #ODAT00,R2      ;DATA CORRECT?
3841 021062  012703  021404                    MOV     #ODAT10,R3
3842 021066  012704  000004                    MOV     #4,R4
3843 021072  022223                    013:    CMP     (R2)+,(R3)+
3844 021074  001002                            BNE     014
3845 021076  077403                            SOB     R4,013
3846 021100  000545                            BR      ODONE
3847
3848 021102  000504                    014:    BR      OERR6
3849
3850                                    ;IF AN ODD ADDRESS TRAP OCCURS COME
3851                                    ;HERE TO SEE IF THE FAILURE WAS IN THE
3852                                    ;FSRC FLOWS:
3853
3854 021104  022716  020744            OERR0:  CMP     #04,(SP)        ;FSRC MODE 6 OR 7?
3855 021110  001412                            BEQ     OERR10
3856 021112  022716  020742                    CMP     #03,(SP)
3857 021116  001402                            BEQ     1$
3858 021120  000137  042120                    JMP     CPSPUR
3859 021124  020027  021364            1$:     CMP     R0,#OPAT21+2    ;FSRC MODE 3?
3860 021130  001425                            BEQ     OERR1
3861 021132  000137  042120                    JMP     CPSPUR
3862
3863 021136                            OERR10:                         ;WENT TO FSRC
3864 021136  011637  001236                    MOV     (SP),$TMP2      ;MODE 6 OR 7
3865 021142  022626                            CMP     (SP)+,(SP)+
3866 021144  104074                    1$:     ERROR   +74
3867 021146  000522                            BR      ODONE
3868
3869 021150  011637  001240            OERR11: MOV     (SP),$TMP3      ;WENT TO FSRC MODE
3870 021154  022626                            CMP     (SP)+,(SP)+     ;3
3871 021156  012737  000627  001244            MOV     #627,$TMP5
3872 021164  012737  000325  001250            MOV     #325,$TMP7
3873 021172  012737  000323  001246            MOV     #323,$TMP6
3874 021200  104075                    1$:     ERROR   +75
3875 021202  000504                            BR      ODONE
3876
3877 021204  012737  000322  001246    OERR1:  MOV     #322,$TMP6      ;FSRC MODE2
3878 021212  012737  000627  001242    OERR20: MOV     #627,$TMP4
3879 021220  012737  000325  001250            MOV     #325,$TMP7
3880 021226  012737  020740  001236            MOV     #02,$TMP2
3881 021234  104076                    1$:     ERROR   +76
3882 021236  000466                            BR      ODONE
3883 021240  012737  000324  001246    OERR2:  MOV     #324,$TMP6      ;FSRC MODE 4
3884 021246  000761                            BR      OERR20
3885 021250  012737  000320  001246    OERR3:  MOV     #320,$TMP6      ;FSRC MODE 0
3886 021256  000755                            BR      OERR20
3887 021260  012737  000321  001246    OERR4:  MOV     #321,$TMP6      ;FSRC MODE 1
3888 021266  000751                            BR      OERR20
3889
3890 021270  010037  001240            OERR5:  MOV     R0,$TMP3        ;R0 NOT DECREMENTED
3891 021274  012737  021360  001242            MOV     #OPAT20,$TMP4   ;PROPERLY
3892 021302  012737  020744  001236            MOV     #04,$TMP2
3893 021310  104077                    1$:     ERROR   +77
3894 021312  000440                            BR      ODONE
```

```
3895
3896 021314                                   OERR6:                          ;DATA FAILURE
3897 021314  012737  020740  001236                MOV     #02,$TMP2
3898 021322  012737  021342  001240                MOV     #ODAT00,$TMP3
3899 021330  012737  021404  001242                MOV     #ODATI0,$TMP4
3900 021336  104100                          1$:   ERROR   +100
3901 021340  000425                                BR      ODONE
3902
3903 021342  000000                          ODAT00: .WORD   0
3904 021344  000000                          ODAT01: .WORD   0
3905 021346  000000                          ODAT02: .WORD   0
3906 021350  000000  052525  052525          ODAT03: .WORD   0,52525,52525,52525
3907 021360  021404                          OPAT20: .WORD   ODATI0
3908 021362  070707                          OPAT21: .WORD   070707
3909 021364  070707                          OPAT22: .WORD   070707
3910 021366  070707                          OPAT23: .WORD   070707
3911 021370  070707  000001                  OPAT24: .WORD   070707,1
3912 021374  177777                          OPAT10: .WORD   -1
3913 021376  177777                          OPAT11: .WORD   -1
3914 021400  177777                          OPAT12: .WORD   -1
3915 021402  177777                          OPAT13: .WORD   -1
3916
3917 021404  073567                          ODATI0: .WORD   73567
3918 021406  004210                          ODATI1: .WORD   004210
3919 021410  114631                          ODATI2: .WORD   114631
3920 021412  125252                          ODATI3: .WORD   125252
3921
3922 021414                                   ODONE:
     021414  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?).
3923
3929
```

```
                                                .SBTTL  TEST # 22 - FSRC MODE 6 TEST
                                                ;;*****************************************************************
                                                ;*TEST 22       FSRC MODE 6 TEST
                                                ;*
                                                ;* THIS IS A TEST OF FSRC MODE 6, INDEX MODE
                                                ;*
                                                ;;*****************************************************************
     021416  000004                             TST22:  SCOPE
3931
3932 021420
3933 021420  170011                                     SETD                    ;SET FD MODE
3934
3935 021422  012700  022040                             MOV     #PPAT10,R0
3936 021426  172410                                     LDD     (R0),AC0        ;LOAD A DEFAULT PATTERN
3937                                                                            ;INTO AC0
3938 021430  012737  021536  000004                     MOV     #PERR0,ERRVECT  ;IF THE (BUT FSRC) FORQ
3939                                                                            ;FAILS AN ODD ADDRESS TRAP
3940 021436  012700  021607                             MOV     #PDAT10-241,R0  ;COULD OCCUR.
3941
3942 021442  172460  000241                     P2:     LDD     241(R0),AC0
3943         021444                             P3=P2+2
3944
3945 021446  012701  022060                     P4:     MOV     #PDAT00,R1
3946 021452  174011                                     STD     AC0,(R1)        ;GET THE DATA
3947 021454  012703  000004                             MOV     #4,R3
3948 021460  012702  022050                             MOV     #PDAT10,R2
3949 021464  012701  022060                             MOV     #PDAT00,R1
3950 021470  022221                             P5:     CMP     (R2)+,(R1)+     ;CHECK THE DATA
3951 021472  001007                                     BNE     P6
3952 021474  077303                                     SOB     R3,P5
3953 021476  022700  021607                             CMP     #PDAT10-241,R0  ;R0 CORRECT?
3954 021502  001401                                     BEQ     1$
3955 021504  000512                                     BR      PERR21
3956 021506  000137  022070                     1$:     JMP     PDONE
3957
3958 021512  012701  022060                     P6:     MOV     #PDAT00,R1
3959 021516  012703  000004                             MOV     #4,R3
3960 021522  022721  177777                     P7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
3961 021526  001401                                     BEQ     P8
3962 021530  000512                                     BR      PERR1
3963 021532  077305                             P8:     SOB     R3,P7
3964 021534  000523                                     BR      PERR2
3965                                            ;TRAP TO HERE ON AN ODD ADDRESS
3966 021536  021627  021444                     PERR0:  CMP     (SP),#P3
3967 021542  001411                                     BEQ     PERR11
3968 021544  021627  021446                             CMP     (SP),#P4        ;WAS IT FSRC MODE 7?
3969 021550  001402                                     BEQ     PERR10
3970 021552  000137  042120                             JMP     CPSPUR
3971
3972 021556  012737  000327  001246     PERR10: MOV     #327,$TMP6
3973 021564  000443                                     BR      PERR17
3974 021566  022700  021607                     PERR11: CMP     #PDAT10-241,R0  ;WAS IT FSRC MODE 1
3975 021572  001004                                     BNE     PERR12
3976 021574  012737  000321  001246                     MOV     #321,$TMP6
3977 021602  000434                                     BR      PERR17
3978 021604  022700  021617                     PERR12. CMP     #PDAT10-241+10,R0       ;WAS IT FSRC MODE 2
3979 021610  001004                                     BNE     PERR13
```

```
3980 021612  012737  000322  001246          MOV     #322,$TMP6
3981 021620  000425                          BR      PERR17
3982 021622  022700  021611          PERR13: CMP     #PDATI0-241+2,R0        ;WAS IT FSRC MODE 3
3983 021626  001004                          BNE     PERR14
3984 021630  012737  000323  001246          MOV     #323,$TMP6
3985 021636  000416                          BR      PERR17
3986 021640  022700  021577          PERR14: CMP     #PDATI0-241-10,R0       ;WAS IT FSRC MODE 4
3987 021644  001004                          BNE     PERR15
3988 021646  012737  000324  001246          MOV     #324,$TMP6
3989 021654  000407                          BR      PERR17
3990 021656  022700  021605          PERR15: CMP     #PDATI0-241-2,R0        ;WAS IT FSRC MODE 5
3991 021662  001401                          BEQ     PERR16
3992 021664  000416                          BR      PERR20
3993 021666  012737  000325  001246  PERR16: MOV     #325,$TMP6
3994
3995 021674  012737  000627  001244  PERR17: MOV     #627,$TMP5      ;REPORT FSRC
3996 021702  012737  000326  001250          MOV     #326,$TMP7      ;FLOWS FAILURE.
3997 021710  011637  001236                  MOV     (SP),$TMP2
3998 021714  022626                          CMP     (SP)+,(SP)+
3999 021716  104101                  1$:     ERROR   +101
4000 021720  000463                          BR      PDONE
4001
4002 021722  011637  001236          PERR20: MOV     (SP),$TMP2      ;REPORT R0 AFFECTED
4003 021726  022626                          CMP     (SP)+,(SP)+
4004 021730  000403                          BR      PERR22
4005 021732  012737  021442  001236  PERR21: MOV     #P2,$TMP2
4006 021740                          PERR22:
4007 021740  010037  001240                  MOV     R0,$TMP3
4008 021744  012737  021607  001242          MOV     #PDATI0-241,$TMP4
4009 021752  104102                  1$:     ERROR   +102
4010 021754  000445                          BR      PDONE
4011
4012 021756                          PERR1:                          ;DATA FAILURE.
4013 021756  012737  021442  001236          MOV     #P2,$TMP2
4014 021764  012737  022050  001240          MOV     #PDATI0,$TMP3
4015 021772  012737  022060  001242          MOV     #PDAT00,$TMP4
4016 022000  104104                  1$:     ERROR   +104
4017 022002  000432                          BR      PDONE
4018
4019 022004                          PERR2:                          ;FSRC FAILURE TO
4020 022004  012737  021442  001236          MOV     #P2,$TMP2       ;MODE 0
4021 022012  012737  000627  001244          MOV     #627,$TMP5
4022 022020  012737  000326  001250          MOV     #326,$TMP7
4023 022026  012737  000320  001246          MOV     #320,$TMP6
4024 022034  104103                  1$:     ERROR   +103
4025 022036  000414                          BR      PDONE
4026
4027 022040  177777                  PPAT10: .WORD   -1
4028 022042  177777                  PPAT11: .WORD   -1
4029 022044  177777                  PPAT12: .WORD   -1
4030 022046  177777                  PPAT13: .WORD   -1
4031
4032 022050  010421                  PDATI0: .WORD   010421
4033 022052  031463                  PDATI1: .WORD   031463
4034 022054  052525                  PDATI2: .WORD   052525
4035 022056  073567                  PDATI3: .WORD   073567
4036
```

```
4037 022060  000000                PDAT00: .WORD   0
4038 022062  000000                PDAT01: .WORD   0
4039 022064  000000                PDAT02: .WORD   0
4040 022066  000000                PDAT03: .WORD   0
4041
4042 022070                        PDONE:
     022070  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?).
4043
4050
```

```
                                .SBTTL  TEST # 23 - FSRC MODE 7 TEST
                                ;*****************************************************************
                                ;*TEST_23 .      FSRC MODE 7 TEST
                                ;*
                                ;* THIS IS A TEST OF FSRC MODE 7, INDEX
                                ;* DEFERRED MODE.
                                ;*
                                ;*****************************************************************
 022072  000004                 TST23:  SCOPE
4052
4053 022074                     Q1:
4054 022074  170011                     SETD
4055
4056 022076  012700  022530             MOV     #QPAT10,R0
4057 022102  172410                     LDD     (R0),AC0        ;LOAD A DEFAULT
                                                                ;PATTERN INTO AC0
4058
4059 022104  012737  022236  000004     MOV     #QERR0,ERRVECT  ;IF THE (BUT FSRC)
                                                                ;FORK FAILS AN
4060                                                            ;ODD ADR TRAP COULD
4061                                                            ;OCCUR
4062
4063 022112  012700  022277             MOV     #QPAT20-241,R0
4064
4065 022116  172470  000241     Q2:     LDD     @241(R0),AC0
4066         022120             Q3=Q2+2
4067
4068 022122  012701  022550     Q4:     MOV     #QDAT00,R1
4069 022126  174011                     STD     AC0,(R1)        ;GET THE DATA
4070
4071 022130  012703  000004             MOV     #4,R3
4072 022134  012704  022550             MOV     #QDAT00,R4
4073 022140  012705  022560             MOV     #QDAT10,R5
4074 022144  022425             Q5:     CMP     (R4)+,(R5)+     ;CHECK THE DATA
4075 022146  001007                     BNE     Q6
4076 022150  077303                     SOB     R3,Q5
4077
4078 022152  022700  022277             CMP     #QPAT20-241,R0  ;CHECK R0.
4079 022156  001401                     BEQ     1$
4080 022160  000514                     BR      QERR21
4081 022162  000137  022570     1$:     JMP     QDONE
4082
4083 022166  012701  022550     Q6:     MOV     #QDAT00,R1
4084 022172  012703  000004             MOV     #4,R3
4085 022176  022721  177777     Q7:     CMP     #-1,(R1)+       ;WAS IT FSRC MODE 0?
4086 022202  001002                     BNE     Q8
4087 022204  077304                     SOB     R3,Q7
4088 022206  000513                     BR      QERR2
4089
4090 022210  012701  022540     Q8:     MOV     #QPAT20,R1
4091 022214  012702  022550             MOV     #QDAT00,R2
4092 022220  012703  000004             MOV     #4,R3
4093 022224  022122             Q9:     CMP     (R1)+,(R2)+     ;WAS IT FSRC 6
4094 022226  001401                     BEQ     Q10             ;OR DATA FAILURE
4095 022230  000524                     BR      QERR1
4096 022232  077304             Q10:    SOB     R3,Q9
4097 022234  000504                     BR      QERR3
4098
4099                            ;TRAP TO HERE ON AN ODD ADR FAILURE
```

```
4100
4101 022236  021627  021444          QERR0:  CMP     (SP),#P3
4102 022242  000137  042120                  JMP     CPSPUR
4103
4104 022246  022700  022277          QERR11: CMP     #QPAT20-241,R0  ;WAS IT FSRC
4105 022252  001004                          BNE     QERR12          ;MODE 1?
4106 022254  012737  000321  001246          MOV     #321,$TMP6
4107 022262  000434                          BR      QERR17
4108 022264  022700  022307          QERR12: CMP     #QPAT20-241+10,R0       ;WAS IT FSRC
4109 022270  001004                          BNE     QERR13          ;MODE 2?
4110 022272  012737  000322  001246          MOV     #322,$TMP6
4111 022300  000425                          BR      QERR17
4112 022302  022700  022301          QERR13: CMP     #QPAT20-241+2,R0        ;WAS IT FSRC
4113 022306  001004                          BNE     QERR14          ;MODE 3?
4114 022310  012737  000323  001246          MOV     #323,$TMP6
4115 022316  000416                          BR      QERR17
4116 022320  022700  022267          QERR14: CMP     #QPAT20-241-10,R0       ;WAS IT FSRC
4117 022324  001004                          BNE     QERR15          ;MODE 4
4118 022326  012737  000324  001246          MOV     #324,$TMP6
4119 022334  000407                          BR      QERR17
4120
4121 022336  022700  022275          QERR15: CMP     #QPAT20-241-2,R0        ;WAS IT FSRC
4122 022342  001401                          BEQ     QERR16          ;MODE 5
4123 022344  000416                          BR      QERR20
4124
4125 022346  012737  000325  001246  QERR16: MOV     #325,$TMP6
4126
4127 022354  012737  000627  001244  QERR17: MOV     #627,$TMP5      ;REPORT FSRC FAILURE
4128 022362  012737  000327  001250          MOV     #327,$TMP7
4129 022370  011637  001236                  MOV     (SP),$TMP2
4130 022374  022626                          CMP     (SP)+,(SP)+
4131 022376  104105                  1$:     ERROR   +105
4132 022400  000473                          BR      QDONE
4133
4134 022402  011637  001236          QERR20: MOV     (SP),$TMP2      ;REPORT R0 AFFECTED.
4135 022406  022626                          CMP     (SP)+,(SP)+
4136 022410  000403                          BR      QERR22
4137 022412  012737  022116  001236  QERR21: MOV     #Q2,$TMP2
4138 022420                          QERR22:
4139 022420  010037  001240                  MOV     R0,$TMP3
4140 022424  012737  022277  001242          MOV     #QPAT20-241,$TMP4
4141 022432  104106                  1$:     ERROR   +106
4142 022434  000455                          BR      QDONE
4143
4144 022436  012737  000320  001246  QERR2:  MOV     #320,$TMP6      ;WENT TO FSRC
4145 022444  000403                          BR      QERR4           ;MODE 0
4146 022446  012737  000326  001246  QERR3:  MOV     #326,$TMP6      ;WENT TO FSRC
4147                                                                  ;MODE 6
4148 022454  012737  000627  001244  QERR4.  MOV     #627,$TMP5
4149 022462  012737  000327  001250          MOV     #327,$TMP7
4150 022470  012737  022116  001236          MOV     #Q2,$TMP2
4151 022476  104107                  1$:     ERROR   +107
4152 022500  000433                          BR      QDONE
4153
4154 022502                          QERR1:                          ;DATA FAILURE
4155 022502  012737  022116  001236          MOV     #Q2,$TMP2
4156 022510  012737  022560  001240          MOV     #QDATI0,$TMP3
```

```
4157 022516  012737  022550  001242          MOV     #QDAT00,$TMP4
4158 022524  104110                  1$:     ERROR   +110
4159 022526  000420                          BR      QDONE
4160
4161 022530  177777                  QPAT10: .WORD   -1
4162 022532  177777                  QPAT11: .WORD   -1
4163 022534  177777                  QPAT12: .WORD   -1
4164 022536  177777                  QPAT13: .WORD   -1
4165
4166 022540  022560                  QPAT20: .WORD   QDAT10
4167 022542  052525                  QPAT21: .WORD   52525
4168 022544  052525                  QPAT22: .WORD   52525
4169 022546  052525                  QPAT23: .WORD   52525
4170
4171 022550  000000                  QDAT00: .WORD   0
4172 022552  000000                  QDAT01: .WORD   0
4173 022554  000000                  QDAT02: .WORD   0
4174 022556  000000                  QDAT03: .WORD   0
4175
4176 022560  073567                  QDAT10: .WORD   073567
4177 022562  052525                  QDAT11: .WORD   052525
4178 022564  031463                  QDAT12: .WORD   031463
4179 022566  010421                  QDAT13: .WORD   010421
4180
4181 022570                          QDONE:
     022570  104413                          RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                     ;SEE IF THE USER HAS EXPRFSSED
                                                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                     ;THE USER TYPED CONTROL G?).
418<
```

```
4199                                    .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.
                                        ;*
                                        ;*****************************************************************
     022572  000004
4200 022574  005037  023716            TST24:  SCOPE
                                               CLR     UFLAG
4201 022600  012700  023646                    MOV     #UPAT00,R0      ;SET UP AC#0 DATA.
4202 022604  012701  000004                    MOV     #4,R1
4203 022610  012720  177777            U0:     MOV     #-1,(R0)+
4204 022614  077103                            SOB     R1,U0
4205
4206 022616  012737  000033  023720            MOV     #033,UTMP1
4207 022624  012737  000023  023722            MOV     #023,UTMP2
4208 022632  012737  023376  000244            MOV     #UERR0,FPVECT   ;IN CASE (BUT FIUV FAILS)
4209 022640                            U1:
     022640  012737  022646  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4210 022646  012700  000200            1$:     MOV     #200,R0
4211 022652  170100                            LDFPS   R0
4212 022654  012700  023646                    MOV     #UPAT00,R0      ;LOAD AC0
4213 022660  172410                            LDD     (R0),AC0
4214 022662  013737  023720  023724            MOV     UTMP1,UROM1
4215 022670  012737  000001  023726            MOV     #001,UROM2
4216 022676  012737  000254  023730            MOV     #254,UROM3
4217
4218 022704  012700  023656                    MOV     #UPAT10,R0      ;LOAD 0 INTO AC0
4219 022710  172410                    U2:     LDD     (R0),AC0
4220 022712  010037  001252                    MOV     R0,$TMP10
4221 022716  012737  022710  001236            MOV     #U2,$TMP2
4222
4223 022724  012704  000204                    MOV     #204,R4         ;SEE IF FPS IS CORRECT
4224 022730  170205                            STFPS   R5
4225
4226 022732  020405                            CMP     R4,R5
4227 022734  001402                            BEQ     U3
4228 022736  000137  023422                    JMP     UERR1
4229
4230 022742                            U3:
     022742  012737  022750  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4231 022750  012700  000200            1$:     MOV     #200,R0
4232 022754  170100                            LDFPS   R0
4233
4234 022756  012700  023646                    MOV     #UPAT00,R0      ;LOAD AC0
4235 022762  172410                            LDD     (R0),AC0
```

TEST # 24 - (BUT EZBT V8),(BUT ENBT) AND (BUT FIUV) TEST

```
 4236 022764  013737  023722  023724          MOV     UTMP2,UROM1
 4237 022772  012737  000003  023726          MOV     #003,UROM2
 4238 023000  012737  000054  023730          MOV     #054,UROM3
 4239
 4240 023006  012700  023366                  MOV     #UPAT20,R0      ;LOAD A POSITIVE NUMBER
 4241                                                                 ;INTO AC0
 4242 023012  172410                  U4:     LDD     (R0),AC0
 4243 023014  010037  001252                  MOV     R0,$TMP10
 4244 023020  012737  023012  001236          MOV     #U4,$TMP2
 4245 023026  012704  000200                  MOV     #200,R4         ;FPS CORRECT?
 4246 023032  170205                          STFPS   R5
 4247 023034  020405                          CMP     R4,R5
 4248 023036  001402                          BEQ     U5
 4249 023040  000137  023506                  JMP     UERR2
 4250 023044                          U5:
      023044  012737  023052  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 4251 023052  012700  000200          1$.     MOV     #200,R0
 4252 023056  170100                          LDFPS   R0
 4253 023060  012700  023646                  MOV     #UPAT00,R0      ;LOAD ACC
 4254 023064  172410                          LDD     (R0),AC0
 4255 023066  013737  023722  023724          MOV     UTMP2,UROM1
 4256 023074  012737  000403  023726          MOV     #403,UROM2
 4257 023102  012737  000056  023730          MOV     #056,UROM3
 4258 023110  012700  023676                  MOV     #UPAT30,R0      ;LOAD A NEGATIUE
 4259                                                                 ;NUMBER INTO AL0
 4260 023114  172410                  U6:     LDD     (R0),AC0
 4261 023116  010037  001252                  MOV     R0,$TMP10
 4262 023122  012737  023114  001236          MOV     #U6,$TMP2
 4263 023130  012704  000210                  MOV     #210,R4         ;FPS CORRECT
 4264 023134  170205                          STFPS   R5
 4265 023136  020405                          CMP     R4,R5
 4266 023140  001402                          BEQ     U7
 4267 023142  000137  023506                  JMP     UERR2
 4268 023146                          U7:
      023146  012737  023154  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 4269 023154  012700  000200          1$:     MOV     #200,R0
 4270 023160  170100                          LDFPS   R0
 4271 023162  012700  023646                  MOV     #UPAT00,R0      ;LOAD AC0
 4272 023166  172410                          LDD     (R0),AC0
 4273 023170  013737  023720  023724          MOV     UTMP1,UROM1
 4274 023176  012737  000401  023726          MOV     #401,UROM2
 4275 023204  012737  000256  023730          MOV     #256,UROM3
 4276 023212  012700  023706                  MOV     #UPAT40,R0      ;LOAD -0 INTO AC0
 4277 023216  172410                  U10:    LDD     (R0),AC0
 4278 023220  000240                  U11:    NOP                     ;TRAP FROM HERE IF
 4279 023222  010037  001252                  MOV     R0,$TMP10
 4280 023226  012737  023216  001236          MOV     #U10,$TMP2      ;(BUT FIUV) FAULS.
 4281 023234  012704  000214                  MOV     #214,R4         ;SEE IF FPS IS CORRECT.
 4282 023240  170205                          STFPS   R5
 4283 023242  020405                          CMP     R4,R5
 4284 023244  001402                          BEQ     U12
 4285 023246  000137  023422                  JMP     UERR1
 4286 023252  005737  023716          U12:    TST     UFLAG           ;SEE IF ALL THE PATTERNS
 4287 023256  001021                          BNE     U14             ;HAVE BEEN TEST WITH
                                                                      ;BOTH AC NOT EQUAL TO 0 AND AC=0
 4288
 4289 023260  012700  023646                  MOV     #UPAT00,R0      ;IF NOT GO BACK AND
 4290 023264  012701  000004                  MOV     #4,R1           ;CHECK THEM WITH AC=0
```

*EST # 24 - (BUT EZBT Y8),(BUT ENBT) AND (BUT FIUV) TEST

```
4291 023270  005020                    U13:    CLR     (R0)+
4292 023272  077102                            SOB     R1,U13
4293 023274  012737  177777  023716            MOV     #-1,UFLAG
4294 023302  012737  000233  023720            MOV     #233,UTMP1
4295 023310  012737  000223  023722            MOV     #223,UTMP2
4296 023316  000137  022640                    JMP     U1
4297 023322                            U14:
     023322  012737  023330  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4298                           ;NOW SEE IF A TRAP CAN BE FORCED BY SETTING FIUV AND LOADING -0
4299 023330  012737  023572  000244  1$:       MOV     #UERR3,FPVECT
4300 023336  012700  004200                    MOV     #4200,R0        ;SET FD AND FIUV
4301 023342  170100                            LDFPS   R0
4302 023344  012700  023646                    MOV     #UPAT00,R0      ;SET UP AC0
4303 023350  172410                            LDD     (R0),AC0
4304 023352  012700  023706                    MOV     #UPAT40,R0      ;LOAD -0
4305 023356  172410                    U15:    LDD     (R0),AC0        ;SHOULD TRAP TO 244
4306 023360  170000                    U16:    CFCC
4307 023362  000240                            NOP
4308 023364  012737  023356  001236            MOV     #U15,$TMP2      ;REPORT ERROR.
4309                                                                    ;DIDN'T TRAP
4310 023372  104127                    1$:     ERROR   +127            ;(BUT FIUV) FAILED.
4311 023374  000556                            BR      UDONE
4312
4313                                   ;TRAPPED TO 244.  DID (BUT FIUV) FAIL?
4314 023376  021627  023220            UERR0:  CMP     (SP),#U11
4315 023402  001402                            BEQ     1$
4316 023404  000137  042066                    JMP     FPSPUR
4317 023410  011637  001236            1$:     MOV     (SP),$TMP2
4318 023414  022626                            CMP     (SP)+,(SP)+
4319 023416  104126                    2$:     ERROR   +126
4320 023420  000544                            BR      UDONE
4321
4322                                   ;COME HERE TO ANALYZE FPS ERRORS
4323
4324 023422  032705  000004            UERR1:  BIT     #4,R5
4325 023426  001432                            BEQ     UERR20
4326 023430  012737  000443  001244    UERR10: MOV     #443,$TMP5
4327 023436  013703  023730                    MOV     UROM3,R3
4328 023442  010337  001250                    MOV     R3,$TMP7
4329 023446  032703  000200                    BIT     #200,R3
4330 023452  001403                            BEQ     1$
4331 023454  042703  000200                    BIC     #200,R3
4332 023460  000402                            BR      2$
4333 023462  052703  000200            1$:     BIS     #200,R3
4334 023466  010337  001246            2$:     MOV     R3,$TMP6
4335 023472  010537  001240            UERR11: MOV     R5,$TMP3
4336 023476  010437  001242                    MOV     R4,$TMP4
4337 023502  104124                    1$:     ERROR   +124
4338 023504  000512                            BR      UDONE
4339 023506  032705  000004            UERR2:  BIT     #4,R5
4340 023512  001746                            BEQ     UERR10
4341 023514  013737  023724  001244    UERR20: MOV     UROM1,$TMP5
4342 023522  013703  023726                    MOV     UROM2,R3
4343 023526  010337  001250                    MOV     R3,$TMP7
4344 023532  032703  000400                    BIT     #400,R3
4345 023536  001403                            BEQ     1$
4346 023540  042703  000400                    BIC     #400,R3
```

```
 4347 023544  000402                          BR      2$
 4348 023546  052703  000400          1$:     BIS     #400,R3
 4349 023552  010337  001246          2$:     MOV     R3,$TMP6
 4350 023556  010537  001240          UERR21: MOV     R5,$TMP3
 4351 023562  010437  001242                  MOV     R4,$TMP4
 4352 023566  104125                  1$:     ERROR   +125
 4353 023570  000460                          BR      UDONE
 4354
 4355                                 ;INTERRUPT HERE WHEN FIUV SET AND ATTEMPTED TO LOAD-0
 4356 023572  021627  023360          UERR3:  CMP     (SP),#U16
 4357 023576  001402                          BEQ     1$
 4358 023600  000137  042066                  JMP     FPSPUR
 4359 023604  022626                  1$:     CMP     (SP)+,(SP)+
 4360 023606  005000                          CLR     R0
 4361 023610  170300                          STST    R0                      ;GET FEC.
 4362 023612  022700  000014                  CMP     #14,R0                  ;CORRECT
 4363 023616  001001                          BNE     UERR4
 4364 023620  000444                          BR      UDONE
 4365 023622  012737  023356  001236  UERR4:  MOV     #U15,$TMP2
 4366 023630  012737  000012  001242          MOV     #12,$TMP4
 4367 023636  010037  001240                  MOV     R0,$TMP3
 4368 023642  104130                  1$:     ERROR   +130
 4369 023644  000432                          BR      UDONE
 4370 023646  000000                  UPAT00: .WORD   0
 4371 023650  000000                  UPAT01: .WORD   0
 4372 023652  000000                  UPAT02: .WORD   0
 4373 023654  000000                  UPAT03: .WORD   0
 4374
 4375 023656  000000                  UPAT10: .WORD   0                       ;0
 4376 023660  000000                  UPAT11: .WORD   0
 4377 023662  000000                  UPAT12: .WORD   0
 4378 023664  000000                  UPAT13: .WORD   0
 4379
 4380 023666  010421                  UPAT20: .WORD   010421                  ;+ US NUM
 4381 023670  114631                  UPAT21: .WORD   114631
 4382 023672  125252                  UPAT22: .WORD   125252
 4383 023674  177777                  UPAT23: .WORD   177777
 4384
 4385 023676  114631                  UPAT30: .WORD   114631                  ;NEG NUM
 4386 023700  135673                  UPAT31: .WORD   135673
 4387 023702  146314                  UPAT32: .WORD   146314
 4388 023704  167356                  UPAT33: .WORD   167356
 4389
 4390 023706  100000                  UPAT40: .WORD   100000                  ;NEG ZERO
 4391 023710  000000                  UPAT41: .WORD   0
 4392 023712  000000                  UPAT42: .WORD   0
 4393 023714  000000                  UPAT43: .WORD   0
 4394
 4395 023716  000000                  UFLAG:  .WORD   0
 4396 023720  000000                  UTMP1:  .WORD   0
 4397 023722  000000                  UTMP2:  .WORD   0
 4398 023724  000000                  UROM1:  .WORD   0
 4399 023726  000000                  UROM2:  .WORD   0
 4400 023730  000000                  UROM3:  .WORD   0
 4401 023732                          UDONE:
 4402
 4403
```

```
                                .SBTTL  TEST # 25 - ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
                                ;*****************************************************************
                                ;*TEST 25        ADDF,ADDD,SUBF AND SUBD WITH FSRC=AC=0 TEST
                                ;*
                                ;* THIS IS A TEST OF ADD AND SUB WITH FSRC=AC-0
                                ;*
                                ;*****************************************************************
                                TST25:  SCOPE
                                W1:
023732  000004                  
023734
023734  012737  023742  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
                                1$:     MOV     #200,R0
                                        LDFPS   R0              ;SET DOUBLE MODE
                                        MOV     #WPAT00,R0      ;LOAD AC0=:
                                        LDD     (R0),AC0
                                        MOV     #W2,$TMP2
                                        MOV     #WPAT00,R0
                                W2:     ADDD    (R0),AC0        ;TEST INSTRUCTION.
                                        STFPS   R5              ;GET FPS
                                        SETD                    ;SET DOUBLE MODE
                                        MOV     #WPAT00,R0
                                        STD     AC0,(R0)        ;GET THE RESULT
                                        MOV     #WPAT00,R1
                                        MOV     #4,R2
                                W3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT
                                        BEQ     W4
                                                                ;NO
                                        JSR     PC,WSETUP
                                1$:     ERROR   +133
                                        JMP     WDONE
                                W4:     SOB     R2,W3
                                        CMP     #204,R5         ;IS FPS CORRECT
                                        BEQ     W5
                                                                ;NO
                                        MOV     #204,$TMP4
                                        MOV     R5,$TMP3
                                1$:     ERROR   +137
                                        JMP     WDONE
                                W5:
024062
024062  012737  024070  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
                                1$:     MOV     #200,R0
                                        LDFPS   R0              ;SET DOUBLE MODE
                                        MOV     #WPAT00,R0      ;LOAD AC0=0
                                        LDD     (R0),AC0
                                        MOV     #W6,$TMP2
                                        CLR     R0
                                        LDFPS   R0              ;GO TO FLOATING MODE
                                        MOV     #WPAT00,R0
                                W6:     ADDF    (R0),AC0        ;TEST INSTRUCTION
                                        STFPS   R5              ;GET FPS
                                        SETD                    ;RESET TO DOUBLE MODE
                                        MOV     #WPAT00,R0
                                        STD     AC0,(R0)        ;GET THE RESULT
                                        MOV     #WPAT00,R1
                                        MOV     #4,R2
                                W7:     CMP     (R0)+,(R1)+     ;WAS THE RESULT
```

```
4457 024150  001402                          BEQ     W10             ;NO. REPORT FAILURE.
4458 024152  104134                  1$:     ERROR   +134
4459 024154  000764                          BR      WDONE
4460 024156  077205                  W10:    SOB     R2,W7
4461 024160  022705  000004                  CMP     #4,R5           ;WAS FPS CORRECT
4462 024164  001407                          BEQ     W11
4463                                                                 ;INCORRECT FPS.
4464 024166  012737  000004  001242          MOV     #4,$TMP4
4465 024174  010537  001240                  MOV     R5,$TMP3
4466 024200  104140                  1$:     ERROR   +140
4467 024202  000551                          BR      WDONE
4468 024204                          W11:
     024204  012737  024212  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4469 024212  012700  000200          1$:     MOV     #200,R0
4470 024216  170100                          LDFPS   R0              ;SET DOUBLE MODE
4471 024220  012700  024506                  MOV     #WPAT00,R0      ;LOAD AC0=0
4472 024224  172410                          LDD     (R0),AC0
4473 024226  012737  024240  001236          MOV     #W12,$TMP2
4474 024234  012700  024506                  MOV     #WPAT00,R0
4475 024240  173010                  W12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
4476 024242  170205                          STFPS   R5              ;GET FPS
4477 024244  170011                          SETD                    ;SET DOUBLE MODE
4478 024246  012700  024506                  MOV     #WPAT00,R0
4479 024252  174010                          STD     AC0,(R0)        ;GET THE RESULT
4480 024254  012701  024506                  MOV     #WPAT00,R1
4481 024260  012702  000004                  MOV     #4,R2
4482 024264  022021                  W13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4483 024266  001404                          BEQ     W14
4484                                                                 ;NO.
4485 024270  004737  024454                  JSR     PC,WSETUP
4486 024274  104135                  1$:     ERROR   +135
4487 024276  000513                          BR      WDONE
4488 024300  077207                  W14:    SOB     R2,W13
4489 024302  022705  000204                  CMP     #204,R5         ;IS FPS CORRECT?
4490 024306  001407                          BEQ     W15
4491                                                                 ;NO.
4492 024310  012737  000204  001242          MOV     #204,$TMP4
4493 024316  010537  001240                  MOV     R5,$TMP3
4494 024322  104141                  1$:     ERROR   +141
4495 024324  000500                          BR      WDONE
4496 024326                          W15:
     024326  012737  024334  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4497 024334  012700  000200          1$:     MOV     #200,R0
4498 024340  170100                          LDFPS   R0              ;SET DOUBLE MODE
4499 024342  012700  024506                  MOV     #WPAT00,R0      ;LOAD AC0-0
4500 024346  172410                          LDD     (R0),AC0
4501 024350  012737  024366  001236          MOV     #W16,$TMP2
4502 024356  005000                          CLR     R0
4503 024360  170100                          LDFPS   R0              ;ENTER FLOATING MODE.
4504 024362  012700  024506                  MOV     #WPAT00,R0
4505 024366  173010                  W16:    SUBF    (R0),AC0        ;TEST INSTRUCTION.
4506 024370  170205                          STFPS   R5              ;GET FPS
4507 024372  170011                          SETD                    ;RESET TO DOUBLE MODE
4508 024374  012700  024506                  MOV     #WPAT00,R0      ;GET THE RESULT.
4509 024400  174010                          STD     AC0,(R0)
4510 024402  012701  024506                  MOV     #WPAT00,R1
4511 024406  012702  000004                  MOV     #4,R2
```

```
4512 024412  022021                    W17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4513 024414  001404                            BEQ     W20
4514                                                                    ;NO.
4515 024416  004737  024454                    JSR     PC,WSETUP
4516 024422  104136                    1$:     ERROR   +136
4517 024424  000440                            BR      WDONE
4518 024426  077207                    W20:    SOB     R2,W17
4519 024430  022705  000004                    CMP     #4,R5           ;IS FPS CORRECT?
4520 024434  001434                            BEQ     WDONE
4521                                                                    ;NO
4522 024436  012737  000004  001242            MOV     #4,$TMP4
4523 024444  010537  001240                    MOV     R5,$TMP3
4524 024450  104142                    1$:     ERROR   +142
4525 024452  000425                            BR      WDONE
4526
4527                                    ;SET UP FOR ERROR CALL
4528
4529 024454  012737  024506  001240    WSETUP: MOV     #WPAT00,$TMP3
4530 024462  012737  024506  001242            MOV     #WPAT00,$TMP4
4531 024470  012737  024506  001246            MOV     #WPAT00,$TMP6
4532 024476  012737  024506  001244            MOV     #WPAT00,$TMP5
4533 024504  000207                            RTS     PC
4534 024506  000000                    WPAT00: .WORD   0
4535 024510  000000                    WPAT01: .WORD   0
4536 024512  000000                    WPAT02: .WORD   0
4537 024514  000000                    WPAT03: .WORD   0
4538
4539 024516  000000                    WDAP00: .WORD   0
4540 024520  000000                    WDAT01: .WORD   0
4541 024522  000000                    WDAT02: .WORD   0
4542 024524  000000                    WDAT03: .WORD   0
4543
4544 024526                             WDONE:
     024526  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?).
4545
4546
```

TEST # 26 - ADDD AND SUB WITH FSRC=0

```
4553                                    .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.
                                        ;*
                                        ;*****************************************************************
                                        TST26:  SCOPE
                                        X1:
     024530  000004
4554 024532
     024532  012737  024540  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4555 024540  012700  000200             1$:     MOV     #200,R0
4556 024544  170100                             LDFPS   R0              ;SET DOUBLE MODE
4557 024546  012700  025312                     MOV     #XPAT00,R0      ;SET AC0 TO POSITIVE
4558 024552  010037  025300                     MOV     R0,XTMP         ;NUMBER #0
4559 024556  172410                             LDD     (R0),AC0
4560 024560  012737  024572  001236             MOV     #X2,$TMP2
4561 024566  012700  025322                     MOV     #XPAT10,R0      ;FSRC=0
4562 024572  172010                     X2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
4563 024574  170205                             STFPS   R5
4564 024576  170011                             SETD
4565 024600  012700  025302                     MOV     #XDAT00,R0      ;GET RESULT.
4566 024604  174010                             STD     AC0,(R0)
4567 024606  012701  025312                     MOV     #XPAT00,R1
4568 024612  012702  000004                     MOV     #4,R2
4569 024616  022021                     X3:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4570 024620  001401                             BEQ     X4
4571 024622  000561                             BR      XERR1
4572 024624  077204                     X4:     SOB     R2,X3
4573 024626  012704  000200                     MOV     #200,R4
4574 024632  020405                             CMP     R4,R5           ;IS FPS CORRECT?
4575 024634  001402                             BEQ     X5
4576 024636  000137  025250                     JMP     XERR2
4577 024642                             X5:
     024642  012737  024650  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4578 024650  012700  000200             1$:     MOV     #200,R0
4579 024654  170100                             LDFPS   R0              ;SET DOUBLE MODE
4580 024656  012700  025332                     MOV     #XPAT20,R0      ;SET AC0 TO
4581 024662  010037  025300                     MOV     R0,XTMP         ;NEGATIVE NUMBER
4582 024666  172410                             LDD     (R0),AC0
4583 024670  012737  024702  001236             MOV     #X6,$TMP2
4584 024676  012700  025322                     MOV     #XPAT10,R0      ;FSRC=0
4585 024702  172010                     X6:     ADDD    (R0),AC0        ;TEST INSTRUCTION
4586 024704  170205                             STFPS   R5
4587 024706  170011                             SETD
4588 024710  012700  025302                     MOV     #XDAT00,R0      ;GET RESULT
4589 024714  174010                             STD     AC0,(R0)
4590 024716  012701  025332                     MOV     #XPAT20,R1
4591 024722  012702  000004                     MOV     #4,R2
4592 024726  022021                     X7:     CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4593 024730  001401                             BEQ     X10
4594 024732  000515                             BR      XERR1
4595 024734  077204                     X10:    SOB     R2,X7
4596 024736  012704  000210                     MOV     #210,R4
4597 024742  020405                             CMP     R4,R5           ;IS FPS CORRECT?
4598 024744  001401                             BEQ     X11
4599 024746  000540                             BR      XERR2
```

TEST # 26 - ADDD AND SUB WITH FSRC=0

```
4600 024750                                    x11:
     024750  012737  024756  001110                    MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4601 024756  012700  000200                    1$:     MOV     #200,R0
4602 024762  170100                                    LDFPS   F0              ;SET DOUBLE MODE
4603 024764  012700  025312                            MOV     #XPAT00,R0      ;SET AC0 TO NON-ZERO
4604 024770  010037  025300                            MOV     R0,XTMP         ;POSITIVE NUMBER
4605 024774  172410                                    LDD     (R0),AC0
4606 024776  012737  025010  001236                    MOV     #X12,$TMP2
4607 025004  012700  025322                            MOV     #XPAT10,R0      ;FSRC=0
4608 025010  173010                            x12:    SUBD    (R0),AC0        ;TEST INSTRUCTION
4609 025012  170205                                    STFPS   R5
4610 025014  170011                                    SETD
4611 025016  012700  025302                            MOV     #XDAT00,R0      ;GET RESULT
4612 025022  174010                                    STD     AC0,(R0)
4613 025024  012701  025312                            MOV     #XPAT00,R1
4614 025030  012702  000004                            MOV     #4,R2
4615 025034  022021                            x13:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4616 025036  001401                                    BEQ     X14
4617 025040  000465                                    BR      XERR3
4618 025042  077204                            x14:    SOB     R2,X13
4619 025044  012704  000200                            MOV     #200,R4         ;IS FPS CORRECT?
4620 025050  020405                                    CMP     R4,R5
4621 025052  001401                                    BEQ     X15
4622 025054  000503                                    BR      XERR4
4623 025056                                    x15:
     025056  012737  025064  001110                    MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4624 025064  012700  000200                    1$:     MOV     #200,R0
4625 025070  170100                                    LDFPS   R0              ;SET DOUBLE MODE
4626 025072  012700  025332                            MOV     #XPAT20,R0      ;SET AC0=A NEGATIVE
4627 025076  010037  025300                            MOV     R0,XTMP         ;NUMBER
4628 025102  172410                                    LDD     (R0),AC0
4629 025104  012737  025116  001236                    MOV     #X16,$TMP2
4630 025112  012700  025322                            MOV     #XPAT10,R0      ;FSRC=0
4631 025116  173010                            x16:    SUBD    (R0),AC0        ;TEST INSTRUCTION.
4632 025120  170205                                    STFPS   R5
4633 025122  170011                                    SETD
4634 025124  012700  025302                            MOV     #XDAT00,R0      ;GET RESULT
4635 025130  174010                                    STD     AC0,(R0)
4636 025132  012701  025332                            MOV     #XPAT20,R1
4637 025136  012702  000004                            MOV     #4,R2
4638 025142  022021                            x17:    CMP     (R0)+,(R1)+     ;IS RESULT CORRECT?
4639 025144  001401                                    BEQ     X20
4640 025146  000422                                    BR      XERR3
4641 025150  077204                            x20:    SOB     R2,X17
4642 025152  012704  000210                            MOV     #210,R4         ;IS FPS CORRECT?
4643 025156  020405                                    CMP     R4,R5
4644 025160  001401                                    BEQ     X21
4645 025162  000440                                    BR      XERR4
4646 025164  000466                            x21:    BR      XDONE
4647
4648                                           ;REPORT DATA ERRORS
4649
4650 025166  012737  025322  001240            XERR1:  MOV     #XPAT10,$TMP3
4651 025174  012737  025300  001242                    MOV     XTMP,$TMP4
4652 025202  012737  025302  001244                    MOV     #XDAT00,$TMP5
4653 025210  104143                            1$:     ERROR   +143
4654 025212  000453                                    BR      XDONE
```

```
4655 025214  012737  025322  001240  XERR3:  MOV     #XPAT10,$TMP3
4656 025222  013737  025300  001242          MOV     XTMP,$TMP4
4657 025230  012737  025302  001244          MOV     #XDAT00,$TMP5
4658 025236  013737  025300  001246          MOV     XTMP,$TMP6
4659 025244  104144                  1$:     ERROR   +144
4660 025246  000435                          BR      XDONE
4661
4662                                 ;REPORT FPS ERRORS
4663
4664 025250                          XERR2:
4665 025250  010537  001240                    MOV     R5,$TMP3
4666 025254  010437  001242                    MOV     R4,$TMP4
4667 025260  104145                   $:      ERROR   +145
4668 025262  000427                          BR      XDONE
4669 025264                          XERR4:
4670 025264  010537  001240                    MOV     R5,$TMP3
4671 025270  010437  001242                    MOV     R4,$TMP4
4672 025274  104146                  1$:     ERROR   +146
4673 025276  000421                          BR      XDONE
4674 025300  000000                  XTMP:   .WORD   0
4675 025302  000000                  XDAT00: .WORD   0
4676 025304  000000                  XDAT01: .WORD   0
4677 025306  000000                  XDAT02: .WORD   0
4678 025310  000000                  XDAT03: .WORD   0
4679
4680 025312  010421                  XPAT00: .WORD   010421
4681 025314  021042                  XPAT01: .WORD   021042
4682 025316  031463                  XPAT02: .WORD   031463
4683 025320  042104                  XPAT03: .WORD   042104
4684
4685 025322  000000                  XPAT10: .WORD   0
4686 025324  000000                  XAPT11: .WORD   0
4687 025326  000000                  XPAT12: .WORD   0
4688 025330  000000                  XPAT13: .WORD   0
4689 025332  104210                  XPAT20: .WORD   104210
4690 025334  114631                  XPAT21: .WORD   114631
4691 025336  125252                  XPAT22: .WORD   125252
4692 025340  135673                  XPAT23: .WORD   135673
4693
4694 025342                          XDONE:
     025342  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?).
4695
```

```
                                        .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.
                                        ;*
                                        ;;*****************************************************************
     025344  000004                     TST27:  SCOPE
4704 025346  005037  025702                     CLR     YFLAG
4705 025352  012737  025722  025704            MOV     #YPAT00,YTMP1   ;P
4706 025360  012737  025732  025706            MOV     #YPAT10,YTMP2   ;N
4707 025366  012737  000210  025710            MOV     #210,YTMP3
4708 025374                             Y1:
     025374  012737  025402  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4709 025402  012700  000200             1$:    MOV     #200,R0
4710 025406  170100                             LDFPS   R0              ;SET DOUBLE MODE
4711 025410  012700  025742                     MOV     #YPAT20,R0      ;SET AC0=0
4712 025414  172410                             LDD     (R0),AC0
4713 025416  013700  025704                     MOV     YTMP1,R0
4714 025422  173010                     Y2:     SUBD    (R0),AC0        ;TEST INSTRUCTION
4715 025424  170205                             STFPS   R5
4716 025426  170011                             SETD
4717 025430  012700  025712                     MOV     #YDAT00,R0      ;GET RESULT
4718 025434  174010                             STD     AC0,(R0)
4719 025436  012702  000004                     MOV     #4,R2
4720 025442  013701  025706                     MOV     YTMP2,R1        ;CHECK RESULT.
4721 025446  022021                     Y3:     CMP     (R0)+,(R1)+
4722 025450  001026                             BNE     Y6
4723 025452  077203                             SOB     R2,Y3
4724 025454  023705  025710                     CMP     YTMP3,R5        ;FPS CORRECT?
4725 025460  001401                             BEQ     Y4
4726 025462  000475                             BR      YERR3
4727 025464  005737  025702             Y4:     TST     YFLAG           ;FINISHED TEST?
4728 025470  001015                             BNE     Y5
4729 025472  012737  177777  025702             MOV     #-1,YFLAG
4730 025500  012737  025732  025704             MOV     #YPAT10,YTMP1
4731 025506  012737  025722  025706             MOV     #YPAT00,YTMP2
4732 025514  012737  000200  025710             MOV     #200,YTMP3
4733 025522  000724                             BR      Y1
4734 025524  000512                     Y5:     BR      YDONE
4735 025526  012702  000004             Y6:     MOV     #4,R2
4736 025532  012700  025704                     MOV     #YTMP1,R0       ;DID XOR OF SIGN BIT
4737 025536  012701  025712                     MOV     #YDAT00,R1      ;FAIL?
4738 025542  022021                     Y7:     CMP     (R0)+,(R1)+
4739 025544  001002                             BNE     YERR1
4740 025546  077203                             SOB     R2,Y7
4741 025550  000421                             BR      YERR2
4742 025552                             YERR1:                          ;DATA FAILURE
4743 025552  012737  025422  001236             MOV     #Y2,$TMP2
4744 025560  013737  025704  001240             MOV     YTMP1,$TMP3
4745 025566  012737  025742  001242             MOV     #YPAT20,$TMP4
4746 025574  012737  025712  001244             MOV     #YDAT00,$TMP5
4747 025602  013737  025706  001246             MOV     YTMP2,$TMP6
4748 025610  104147                     1$:     ERROR   +147
4749 025612  000457                             BR      YDONE
```

```
 4750 025614                                YERR2:                          ;XOR OF SIGN BIT
 4751 025614  012737  025422  001236              MOV     #Y2,$TMP2         ;FAILED
 4752 025622  013737  025704  001240              MOV     YTMP1,$TMP3
 4753 025630  012737  025742  001242              MOV     #YPAT20,$TMP4
 4754 025636  012737  025712  001244              MOV     #YDAT00,$TMP5
 4755 025644  013737  025706  001246              MOV     YTMP2,$TMP6
 4756 025652  104150                      1$:     ERROR   +150
 4757 025654  000436                              BR      YDONE
 4758 025656                                YERR3:                          ;FPS WRONG.
 4759 025656  012737  025422  001236              MOV     #Y2,$TMP2
 4760 025664  010537  001240                      MOV     R5,$TMP3
 4761 025670  013737  025710  001242              MOV     YTMP3,$TMP4
 4762 025676  104151                      1$:     ERROR   +151
 4763 025700  000424                              BR      YDONE
 4764
 4765 025702  000000                      YFLAG:  .WORD   0
 4766 025704  000000                      YTMP1:  .WORD   0
 4767 025706  000000                      YTMP2:  .WORD   0
 4768 025710  000000                      YTMP3:  .WORD   0
 4769
 4770 025712  000000                      YDAT00: .WORD   0
 4771 025714  000000                      YDAT01: .WORD   0
 4772 025716  000000                      YDAT02: .WORD   0
 4773 025720  000000                      YDAT03: .WORD   0
 4774
 4775 025722  063146                      YPAT00: .WORD   063146
 4776 025724  052525                      YPAT01: .WORD   052525
 4777 025726  042104                      YPAT02: .WORD   042104
 4778 025730  167356                      YPAT03: .WORD   167356
 4779
 4780 025732  163146                      YPAT10: .WORD   163146
 4781 025734  052525                      YPAT11: .WORD   052525
 4782 025736  042104                      YPAT12: .WORD   042104
 4783 025740  167356                      YPAT13: .WORD   167356
 4784
 4785 025742  000000                      YPAT20: .WORD   0
 4786 025744  000000                      YPAT21: .WORD   0
 4787 025746  000000                      YPAT22: .WORD   0
 4788 025750  000000                      YPAT23: .WORD   0
 4789
 4790 025752                                YDONE:
      025752  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?).
```

```
4799                                    .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.
                                        ;*
                                        ;;*****************************************************************
     025754  000004
4800 025756  005037  026212            TST30:  SCOPE
                                                CLR     ZFLAG
4801 025762  012737  026230  026214            MOV     #ZPAT00,ZTMP1   ;P
4802 025770  012737  000200  026216            MOV     #200,ZTMP2
4803 025776                            Z1:
     025776  012737  026004  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
4804 026004  012700  000200            1$:     MOV     #200,R0
4805 026010  170100                            LDFPS   R0              ;SET DOUBLE MODE
4806 026012  012700  026250                    MOV     #ZPAT20,R0      ;SET AC0=0
4807 026016  172410                            LDD     (R0),AC0
4808 026020  013700  026214                    MOV     ZTMP1,R0
4809 026024  172000                    Z2:     ADDD    (R0),AC0        ;TEST INSTRUCTION
4810 026026  170205                            STFPS   R5
4811 026030  170011                            SETD
4812 026032  012700  026220                    MOV     #ZDAT00,R0      ;GET RESULT
4813 026036  174010                            STD     AC0,(R0)
4814 026040  012702  000004                    MOV     #4,R2
4815 026044  013701  026214                    MOV     ZTMP1,R1        ;RESULT CORRECT?
4816 026050  022021                    Z3:     CMP     (R0)+,(R1)+
4817 026052  001401                            BEQ     Z4
4818 026054  000423                            BR      ZERR1
4819 026056  077204                    Z4:     SOB     R2,Z3
4820 026060  023705  026216                    CMP     ZTMP2,R5        ;FLS CORRECT?
4821 026064  001401                            BEQ     Z5
4822 026066  000437                            BR      ZERR2
4823 026070  005737  026212            Z5:     TST     ZFLAG           ;FINISHED TEST?
4824 026074  001012                            BNE     Z6
4825 026076  012737  177777  026212            MOV     #-1,ZFLAG
4826 026104  012737  026240  026214            MOV     #ZPAT10,ZTMP1
4827 026112  012737  000210  026216            MOV     #210,ZTMP2
4828 026120  000726                            BR      Z1
4829 026122  000456                    Z6:     BR      ZDONE
4830 026124                            ZERR1:                          ;DATA FAILURE
4831 026124  012737  026024  001236            MOV     #Z2,$TMP2
4832 026132  013737  026214  001240            MOV     ZTMP1,$TMP3
4833 026140  012737  026250  001242            MOV     #ZPAT20,$TMP4
4834 026146  012737  026220  001244            MOV     #ZDAT00,$TMP5
4835 026154  013737  026214  001246            MOV     ZTMP1,$TMP6
4836 026162  104152                    1$:     ERROR   +152
4837 026164  000435                            BR      ZDONE
4838 026166                            ZERR2:
4839 026166  012737  026024  001236            MOV     #Z2,$TMP2
4840 026174  010537  001240                    MOV     R5,$TMP3
4841 026200  013737  026216  001242            MOV     ZTMP2,$TMP4
4842 026206  104153                    1$:     ERROR   +153
4843 026210  000423                            BR      ZDONE
4844
```

```
4845 026212  000000          ZFLAG:  .WORD   0
4846 026214  000000          ZTMP1:  .WORD   0
4847 026216  000000          ZTMP2:  .WORD   0
4848
4849 026220  000000          ZDAT00: .WORD   0
4850 026222  000000          ZDAT01: .WORD   0
4851 026224  000000          ZDAT02: .WORD   0
4852 026226  000000          ZDAT03: .WORD   0
4853
4854 026230  031463          ZPAT00: .WORD   031463
4855 026232  010421          ZPAT01: .WORD   010421
4856 026234  146314          ZPAT02: .WORD   146314
4857 026236  156735          ZPAT03: .WORD   156735
4858
4859 026240  156735          ZPAT10: .WORD   156735
4860 026242  167356          ZPAT11: .WORD   167356
4861 026244  135673          ZPAT12: .WORD   135673
4862 026246  146314          ZPAT13: .WORD   146314
4863
4864 026250  000000          ZPAT20: .WORD   0
4865 026252  000000          ZPAT21: .WORD   0
4866 026254  000000          ZPAT22: .WORD   0
4867 026256  000000          ZPAT23: .WORD   0
4868
4869 026260                  ZDONE:
     026260  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?).
4870
487
```

```
 4879                                   .SBTTL  TEST # 31 - ADDF & ADDD E(AC)-E(FSRC) & (BUT FT) TEST
                                        ;*****************************************************************
                                        ;*TEST 31       ADDF & ADDD E(AC)=F(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.
                                        ;*
                                        ;*****************************************************************
      026262  000004                    TST31:  SCOPE
 4880 026264                            AA1:
      026264  012737  026272  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 4881 026272  012700  003240            1$:     MOV     #3240,R0
 4882 026276  170100                            LDFPS   R0              ;SET FIV FIV FD AND FT
 4883 026300  012737  026660  000244            MOV     #AAERR0,FPVECT  ;IN CASE THE OVER/UNDER
 4884 026306  012700  027236                    MOV     #AAPAT0,R0      ;FLOWS IN TRAP WILL
 4885                                                                   ;OCCUR
 4886 026312  172410                            LDD     (R0),AC0        ;SET UP AC0
 4887 026314  012737  026326  001236            MOV     #AA2,$TMP2      ;OPERAND
 4888 026322  012700  027246                    MOV     #AAPAT1,R0
 4889 026326  172010                    AA2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
 4890                                                                   ;SHOULD TRUNCATE
 4891 026330  012700  027226            AA3:    MOV     #AADATO,R0
 4892 026334  174010                            STD     AC0 (R0)        ;GET THE RESULT
 4893 026336  012701  027256                    MOV     #AAPAT2,R1
 4894 026342  012702  000004                    MOV     #4,R2
 4895 026346  022021                    AA4:    CMP     (R0)+,(R1)+     ;CORRECT?
 4896 026350  001414                            BEQ     AA7
 4897 026352  012700  027266                    MOV     #AAPAT3,R0      ;DID (BUT FT) FAIL
 4898 026356  012701  027226                    MOV     #AADATO,R1
 4899 026362  012702  000004                    MOV     #4,R2
 4900 026366  022021                    AA5:    CMP     (R0)+,(R1)+
 4901 026370  001401                            BEQ     AA6
 4902 026372  000565                            BR      AAERR1          ;DATA ERROR
 4903 026374  077204                    AA6:    SOB     R2,AA5
 4904 026376  000137  027002                    JMP     AAERR2          ;(BUT FT) ERROR
 4905 026402  077217                    AA7:    SOB     R2,AA4
 4906
 4907                                   ;NOW TEST DOUBLE FLOATING ROUND MODE.
 4908
 4909 026404                            AA10:
      026404  012737  026412  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 4910 026412  012700  003200            1$:     MOV     #3200,R0        ;SET FD FIV FIV. FT=0
 4911 026416  170100                            LDFPS   R0
 4912 026420  012700  027236                    MOV     #AAPAT0,R0
 4913 026424  172410                            LDD     (R0),AC0        ;SET UP AC0 OPERAND
 4914 026426  012737  026440  001236            MOV     #AA11,$TMP2
 4915 026434  012700  027246                    MOV     #AAPAT1,R0
 4916 026440  172010                    AA11:   ADDD    (R0),AC0        ;TEST INSTRUCTION
 4917                                                                   ;SHOULD ROUND
 4918 026442  012700  027226            AA12:   MOV     #AADATO,R0
 4919 026446  174010                            STD     AC0,(R0)        ;GET THE RESULT
 4920 026450  012701  027266                    MOV     #AAPAT3,R1
 4921 026454  012702  000004                    MOV     #4,R2
 4922 026460  022021                    AA13:   CMP     (R0)+,(R1)+     ;CORRECT?
 4923 026462  001425                            BEQ     AA20
 4924 026464  012700  027256                    MOV     #AAPAT2,R0      ;DID (BUT FT) FAIL
```

```
 4925 026470  012701  027226                AA14:   MOV     #AADAT0,R1
 4926 026474  012702  000004                        MOV     #4,R2
 4927 026500  022021                        AA15:   CMP     (R0)+,(R1)+
 4928 026502  001413                                BEQ     AA17
 4929 026504  012700  027276                        MOV     #AAPAT4,R0      ;WAS THE FLOATING
 4930 026510  012701  027226                        MOV     #AADAT0,R1      ;CONSTANT USED
 4931 026514  012702  000004                        MOV     #4,R2           ;INSTEAD OF THE
 4932 026520  022021                        AA15:   CMP     (R0)+,(R1)+     ;DOUBLE CONSTANT
 4933 026522  001401                                BEQ     AA16            ;IN THE ROUND
 4934 026524  000544                                BR      AAERR3  ;FLOWS?
 4935 026526  077204                        AA16:   SOB     R2,AA15         ;DATA ERROR
 4936 026530  000546                                BR      AAERR4  ;CONSTANT ERROR
 4937 026532  077216                        AA17:   SOB     R2,AA14
 4938 026534  000562                                BR      AAERR5  ;(BUT FT) ERROR
 4939 026536  077230                        AA20:   SOB     R2,AA13
 4940
 4941                                       ;NOW TEST ADDF WITH FT=0, ROUND MODE
 4942
 4943 026540                                AA21:
      026540  012737  026546  001110                MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
 4944 026546  012700  003200                1$:     MOV     #3200,R0                ;FIV=1, FIV-1, FT=0
 4945 026552  170100                                LDFPS   R0
 4946 026554  012700  027236                        MOV     #AAPAT0,R0      ;LOAD AC0 OPERAND
 4947 026560  172410                                LDD     (R0),AC0
 4948 026562  170001                                SETF                    ;ENTER FLOATING MODE
 4949 026564  012737  026576  001236                MOV     #AA22,$TMP2
 4950 026572  012700  027306                        MOV     #AAPAT5,R0
 4951 026576  172010                        AA22:   ADDF    (R0),AC0        ;TEST INSTRUCTION
 4952                                               ;SHOULD ROUND
 4953 026600                                AA23:
 4954 026600  170011                                SETD                    ;RESET TO DOUBLE
 4955                                               ;MODE
 4956 026602  012700  027226                        MOV     #AADAT0,R0      ;GET THE RESULT
 4957 026606  174010                                STD     AC0,(R0)
 4958 026610  012701  027316                        MOV     #AAPAT6,R1      ;CORRECT?
 4959 026614  012702  000002                        MOV     #2,R2
 4960 026620  022021                        AA24:   CMP     (R0)+,(R1)+
 4961 026622  001413                                BEQ     AA27
 4962 026624  012700  027256                        MOV     #AAPAT2,R0      ;WAS THE DOUBLE
 4963 026630  012701  027226                        MOV     #AADAT0,R1      ;CONSTANT USED INSTEAD
 4964 026634  012702  000002                        MOV     #2,R2           ;OF THE FLOATING
 4965 026640  022011                        AA25:   CMP     (R0)+,(R1)      ;CONSTANT IN THE
 4966 026642  001401                                BEQ     AA26            ;ROUND FLOWS?
 4967 026644  000534                                BR      AAERR6          ;DATA ERROR
 4968 026646  077204                        AA26:   SOB     R2,AA25
 4969 026650  000550                                BR      AAERR7          ;CONSTANT ERROR
 4970 026652  077216                        AA27:   SOB     R2,AA24
 4971 026654  000137  027326                        JMP     AADONE
 4972
 4973                                       ;COME HERE IF A TRAP OCCURS TO 244.
 4974
 4975 026660  013700  001236                AAERR0: MOV     $TMP2,R0        ;SEE IF THE TRAP WAS
 4976 026664  005720                                TST     (R0)+           ;AT A TEST INSTRUCTION
 4977 026666  020016                                CMP     R0,(SP)
 4978 026670  001402                                BEQ     1$
 4979 026672  000137  042066                10$:    JMP     FPSPUR
 4980 026676                                1$:
```

```
 4981 026676  170300                          STST    R0              ;GET FEC
 4982 026700  020027  C00010                  CMP     R0,#10
 4983 026704  001405                          BEQ     20$             ;OVERFLOW
 4984 026706  020027  000012                  CMP     R0,#12
 4985 026712  001410                          BEQ     30$             ;UNDERFLOW
 4986 026714  000766                          BR      10$
 4987 026716  026720                  20$
 4988 026720  011637  001236          20$:    MOV     (SP),$TMP2      ;REPORT OVERFLOW ERROR
 4989 026724  022626                          CMP     (SP)+,(SP)+
 4990 026726  104154                  21$:    ERROR    154
 4991 026730  000137  027326          25$:    JMP     AADONE
 4992 026734  011637  001236          30$:    MOV     (SP),$TMP2      ;REPORT UNDERFLOW
 4993 026740  022626                          CMP     (SP)+,(SP)+     ;ERROR
 4994 026742  104155                  31$:    ERROR   +155
 4995 026744  000771                          BR      25$
 4996
 4997                                  ;ADDD RESULT INCORRECT
 4998 026746  012737  027256  001246  AAERR1: MOV     #AAPAT2,$TMP6
 4999 026754  012737  027236  001242  AAER10: MOV     #AAPAT0,$TMP4
 5000 026762  012737  027246  001240          MOV     #AAPAT1,$TMP3
 5001 026770  012737  027226  001244          MOV     #AADAT0,$TMP5
 5002 026776  104162                  1$:     ERROR   +162
 5003 027000  000552                          BR      AADONE
 5004 027002  012737  027256  001246  AAERR2: MOV     #AAPAT2,$TMP6   ;(BUT FT) FAILED.
 5005 027010  012737  027236  001242          MOV     #AAPAT0,$TMP4
 5006 027016  012737  027246  001240          MOV     #AAPAT1,$TMP3
 5007 027024  012737  027226  001244          MOV     #AADAT0,$TMP5
 5008 027032  104156                  1$:     ERROR   +156
 5009 027034  000534                          BR      AADONE
 5010 027036  012737  027266  001246  AAERR3: MOV     #AAPAT3,$TMP6   ;DATA ERROR.
 5011 027044  000743                          BR      AAER10
 5012 027046  012737  027266  001246  AAERR4: MOV     #AAPAT3,$TMP6   ;BAD CONSTANT
 5013 027054  012737  027236  001242          MOV     #AAPAT0,$TMP4
 5014 027062  012737  027246  001240          MOV     #AAPAT1,$TMP3
 5015 027070  012737  027226  001244          MOV     #AADAT0,$TMP5
 5016 027076  104160                  1$:     ERROR   +160
 5017 027100  000512                          BR      AADONE
 5018 027102  012737  027266  001246  AAERR5: MOV     #AAPAT3,$TMP6   ;(BUT FT) FAILED.
 5019 027110  012737  027236  001242          MOV     #AAPAT0,$TMP4
 5020 027116  012737  027246  001240          MOV     #AAPAT1,$TMP3
 5021 027124  012737  027226  001244          MOV     #AADAT0,$TMP5
 5022 027132  104157                  1$:     ERROR   +157
 5023 027134  000474                          BR      AADONE
 5024 027136  012737  027306  001240  AAERR6: MOV     #AAPAT5,$TMP3   ;FD=0 AND
 5025 027144  012737  027236  001242          MOV     #AAPAT0,$TMP4   ;DATA ERROR
 5026 027152  012737  027226  001244          MOV     #AADAT0,$TMP5
 5027 027160  012737  027316  001246          MOV     #AAPAT6,$TMP6
 5028 027166  104160                  1$:     ERROR   +160
 5029 027170  000456                          BR      AADONE
 5030 027172  012737  027306  001240  AAERR7: MOV     #AAPAT5,$TMP3   ;CONSTANT ERROR
 5031 027200  012737  027236  001242          MOV     #AAPAT0,$TMP4
 5032 027206  012737  027226  001244          MOV     #AADAT0,$TMP5
 5033 027214  012737  027316  001246          MOV     #AAPAT6,$TMP6
 5034 027222  104161                  1$:     ERROR   -161
 5035 027224  000440                          BR      AADONE
 5036 027226  000000  000000  000000  AADAT0: .WORD   0,0,0,0
 5037 027236  000200  000000  000000  AAPAT0: .WORD   200,0,0,0
```

```
5038 027246  000200  000000  000000  AAPAT1: .WORD   200,0,0,1
5039 027256  000400  000000  000000  AAPAT2: .WORD   400,0,0,0
5040 027266  000400  000000  000000  AAPAT3: .WORD   400,0,0,1
5041 027276  000400  000000  100000  AAPAT4: .WORD   400,0,100000,0
5042 027306  000200  000001  000000  AAPAT5: .WORD   200,1,0,0
5043 027316  000400  000001  000000  AAPAT6: .WORD   400,1,0,0
5044 027326                        AADONE:
     027326  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?).
```

```
5055                                    .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 A TEST 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)
                                        ;*
                                        ;*****************************************************************
    027330  000004                      TST32:  SCOPE
5056                                                                ;EXPONENT DIFFERENCE=57 71 (OCT) FD-1
5057 027332                             CC1:
     027332  012737  027340  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5058 027340  012704  003200             1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5059 027344  170104                             LDFPS   R4
5060 027346  012737  027356  001236             MOV     #CC2,$TMP2
5061 027354  012700  031014                     MOV     #CCP0,R0        ;SET AC0 OPERAND
5062 027360  172410                             LDD     (R0),AC0                ;AC0
5063 027362  012700  031034                     MOV     #CCP2,R0
5064 027366  172010                     CC2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5065 027370  170205                             STFPS   R5              ;GET FPS
5066 027372  012700  031004                     MOV     #CCDAT0,R0      ;GET THE RESULT
5067 027376  174010                             STD     AC0,(R0)
5068 027400  012701  031034                     MOV     #CCP2,R1        ;IS IT CORRECT
5069 027404  012702  000004                     MOV     #4,R2
5070 027410  022021                     CC3:    CMP     (R0)+,(R1)+
5071 027412  001415                             BEQ     CC6
5072 027414  012700  031004                     MOV     #CCDAT0,R0      ;DID A BAD
5073 027420  012701  031014                     MOV     #CCP0,R1        ;CONSTANT (NOT 57)
5074 027424  012702  000004                     MOV     #4,R2           ;GET GENERATED
5075 027430  022021                     CC4:    CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5076 027432  001402                             BEQ     CC5             ;FLOWS?
5077 027434  000137  030402                     JMP     CCER1           ;DATA ERROR.D
5078 027440  077205                     CC5:    SOB     R2,CC4
5079 027442  000137  030440                     JMP     CCER2           ;BAD CONSTANT.D
5080 027446  077220                     CC6:    SOB     R2,CC3
5081 027450  020405                             CMP     R4,R5           ;FPS CORRECT?
5082 027452  001402                             BEQ     CC7
5083 027454  000137  030346                     JMP     CCER0           ;BAD FPS.
5084                                    ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
5085 027460                             CC7:
     027460  012737  027466  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5086 027466  012704  003200             1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5087 027472  170104                             LDFPS   R4
5088 027474  012737  027514  001236             MOV     #CC8,$TMP2
5089 027502  012700  031014                     MOV     #CCP0,R0        ;SET AC0 OPERAND
5090 027506  172410                             LDD     (R0),AC0
5091 027510  012700  031024                     MOV     #CCP1,R0        ;FSRC
5092 027514  172010                     CC8:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5093 027516  170205                             STFPS   R5              ;GET FPS
5094 027520  012700  031004                     MOV     #CCDAT0,R0      ;GET THE RESULT
5095 027524  174010                             STD     AC0,(R0)
5096 027526  012701  031104                     MOV     #CCP7,R1        ;IS IT CORRECT
5097 027532  012702  000004                     MOV     #4,R2
```

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

```
5098 027536  022021                    CC9:    CMP     (R0)+,(R1)+
5099 027540  001415                            BEQ     CC12
5100 027542  012700  031004                    MOV     #CCDAT0,R0      ;DID A BAD
5101 027546  012701  031024                    MOV     #CCP1,R1        ;CONSTANT (NOT 57)
5102 027552  012702  000004                    MOV     #4,R2           ;GET GENERATED
5103 027556  022021                    CC10:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5104 027560  001402                            BEQ     CC11            ;FLOWS?
5105 027562  000137  030476                    JMP     CCER3           ;DATA ERROR.D
5106 027566  077205                    CC11:   SOB     R2,CC10
5107 027570  000137  030514                    JMP     CCER4           ;BAD CONSTANT.D
5108 027574  077220                    CC12:   SOB     R2,CC9
5109 027576  020405                            CMP     R4,R5           ;FPS CORRECT?
5110 027600  001402                            BEQ     CC13
5111 027602  000137  030346                    JMP     CCER0           ;BAD FPS.
5112                                    ;EXPONENT DIFFERENCE=25=31 (OCT) FD 0
5113 027606                             CC13:
     027606  012737  027614  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5114 027614  012737  027642  001236    1$:     MOV     #CC14,$TMP2
5115 027622  012700  031014                    MOV     #CCP0,R0        ;SET UP AC0 OPERAND.
5116 027626  172410                            LDD     (R0),AC0
5117 027630  012704  003000                    MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5118 027634  170104                            LDFPS   R4
5119 027636  012700  031074                    MOV     #CCP6,R0        ;FSRC
5120 027642  172010                    CC14:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5121 027644  170205                            STFPS   R5
5122 027646  170011                            SETD                    ;REENTER DOUBLE MOVE
5123 027650  012700  031004                    MOV     #CCDAT0,R0      ;GET THE RESULT
5124 027654  174010                            STD     AC0,(R0)
5125 027656  012701  031074                    MOV     #CCP6,R1        ;IS THE RESULT CORRECT?
5126 027662  012702  000002                    MOV     #2,R2
5127 027666  022021                    CC15:   CMP     (R0)+,(R1)+
5128 027670  001415                            BEQ     CC18
5129 027672  012700  031004                    MOV     #CCDAT0,R0      ;WAS A BAD CONSTANT
5130 027676  012701  031044                    MOV     #CCP3,R1        ;USED (NOT 25) IN
5131 027702  012702  000002                    MOV     #2,R2           ;THE ALIGN FLOWS?
5132 027706  022021                    CC16:   CMP     (R0)+,(R1)+
5133 027710  001402                            BEQ     CC17
5134 027712  000137  030552                    JMP     CCER5           ;DATA ERROR F
5135 027716  077205                    CC17:   SOB     R2,CC16
5136 027720  000137  030606                    JMP     CCER6           ;BAD CONSTANT F
5137 027724  077220                    CC18:   SOB     R2,CC15
5138 027726  020405                            CMP     R4,R5
5139 027730  001402                            BEQ     CC19
5140 027732  000137  030364                    JMP     CCER90          ;BAD FPS.
5141                                    ;EXPONENT DIFFERENC =24=30 (OCT) FD=0
5142 027736                             CC19:
     027736  012737  027744  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5143 027744  012737  027772  001236    1$:     MOV     #CC20,$TMP2
5144 027752  012700  031044                    MOV     #CCP3,R0        ;SET UP AC0 OPERAND.
5145 027756  172410                            LDD     (R0),AC0
5146 027760  012704  003000                    MOV     #3000,R4        ;SET FIV,FIV. CLEAR FD.
5147 027764  170104                            LDFPS   R4
5148 027766  012700  031064                    MOV     #CCP5,R0        ;FSRC
5149 027772  172010                    CC20:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5150 027774  170205                            STFPS   R5
5151 027776  170011                            SETD                    ;REENTER DOUBLE MOVE
5152 030000  012700  031004                    MOV     #CCDAT0,R0      ;GET THE RESULT
```

```
5153 030004  174010                          STD     AC0,(R0)
5154 030006  012701  031114                  MOV     #CCP10,R1       ;IS THE RESLT CORRECT?
5155 030012  012702  000002                  MOV     #2,R2
5156 030016  022021                  CC21:   CMP     (R0)+,(R1)+
5157 030020  001415                          BEQ     CC24
5158 030022  012700  031004                  MOV     #CCDAT0,R0      ;WAS A BAD CONSTANT
5159 030026  012701  031064                  MOV     #CCP5,R1        ;USED (NOT 25) IN
5160 030032  012702  000002                  MOV     #2,R2           ;THE ALIGN FLOWS?
5161 030036  022021                  CC22:   CMP     (R0)+,(R1)+
5162 030040  001402                          BEQ     CC23
5163 030042  000137  030642                  JMP     CCER7           ;DATA ERROR F
5164 030046  077205                  CC23:   SOB     R2,CC22
5165 030050  000137  030660                  JMP     CCER8           ;BAD CONSTANT F
5166 030054  077220                  CC24:   SOB     R2,CC21
5167 030056  020405                          CMP     R4,R5
5168 030060  001402                          BEQ     CC25
5169 030062  000137  030364                  JMP     CCER90          ;BAD FPS.
5170                                 ;EXPONENT DIFFERENCE=1 FD-1
5171 030066                          CC25:
     030066  012737  030074  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5172 030074  012704  003200          1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5173 030100  170104                          LDFPS   R4
5174 030102  012737  030122  001236          MOV     #CC26,$TMP2
5175 030110  012700  031014                  MOV     #CCP0,R0        ;SET AC0 OPERAND
5176 030114  172410                          LDD     (R0),AC0
5177 030116  012700  031044                  MOV     #CCP3,R0        ;FSRC
5178 030122  172010                  CC26:   ADDD    (R0),AC0        ;TEST INSTRUCTION
5179 030124  170205                          STFPS   R5              ;GET FPS
5180 030126  012700  031004                  MOV     #CCDAT0,R0      ;GET THE RESULT
5181 030132  174010                          STD     AC0,(R0)
5182 030134  012701  031124                  MOV     #CCP11,R1       ;IS IT CORRECT
5183 030140  012702  000004                  MOV     #4,R2
5184 030144  022021                  CC27:   CMP     (R0)+,(R1)+
5185 030146  001415                          BEQ     CC30
5186 030150  012700  031004                  MOV     #CCDAT0,R0      ;DID A BAD
5187 030154  012701  031044                  MOV     #CCP3,R1        ;CONSTANT (NOT 57)
5188 030160  012702  000004                  MOV     #4,R2           ;GET GENERATED
5189 030164  022021                  CC28:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5190 030166  001402                          BEQ     CC29            ;FLOWS?
5191 030170  000137  030714                  JMP     CCER10          ;DATA ERROR.D
5192 030174  077205                  CC29:   SOB     R2,CC28
5193 030176  000137  030732                  JMP     CCER11          ;BAD CONSTANT.D
5194 030202  077220                  CC30:   SOB     R2,CC27
5195 030204  020405                          CMP     R4,R5           ;FPS CORRECT?
5196 030206  001402                          BEQ     CC31
5197 030210  000137  030346                  JMP     CCER0           ;BAD FPS.
5198                                 ;EXPONENT DIFFERENCE=100=144 (OCT) FD=1
5199 030214                          CC31:
     030214  012737  030222  001110          MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5200 030222  012704  003200          1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5201 030226  170104                          LDFPS   R4
5202 030230  012737  030250  001236          MOV     #CC32,$TMP2
5203 030236  012700  031014                  MOV     #CCP0,R0        ;SET AC0 OPERAND
5204 030242  172410                          LDD     (R0),AC0
5205 030244  012700  031054                  MOV     #CCP4,R0        ;FSRC
5206 030250  172010                  CC32:   ADDD    (R0),AC0        ;TEST INSTRUCTION
5207 030252  170205                          STFPS   R5              ;GET FPS
```

```
5208 030254  012700  031004                    MOV     #CCDATO,R0      ;GET THE RESULT
5209 030260  174010                            STD     AC0,(R0)
5210 030262  012701  031054                    MOV     #CCP4,R1        ;IS IT CORRECT
5211 030266  012702  000004                    MOV     #4,R2
5212 030272  022021                CC33:       CMP     (R0)+,(R1)+
5213 030274  001415                            BEQ     CC36
5214 030276  012700  031004                    MOV     #CCDATO,R0      ;DID A BAD
5215 030302  012701  031054                    MOV     #CCP4,R1        ;CONSTANT (NOT 57)
5216 030306  012702  000004                    MOV     #4,R2           ;GET GENERATED
5217 030312  022021                CC34:       CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5218 030314  001402                            BEQ     CC35            ;FLOWS?
5219 030316  000137  030750                    JMP     CCER12          ;DATA ERROR.D
5220 030322  077203                CC35:       SOB     R2,CC34
5221 030324  000137  030766                    JMP     CCER13          ;BAD CONSTANT.D
5222 030330  077220                CC36:       SOB     R2,CC33
5223 030332  020405                            CMP     R4,R5           ;FPS CORRECT?
5224 030334  001402                            BEQ     CC37
5225 030336  000137  030346                    JMP     CCER0           ;BAD FPS.
5226 030342  000137  031144        CC37:       JMP     CCDONE
5227 030346  010437  001242        CCER0:      MOV     R4,$TMP4        ;FPS ERROR D
5228 030352  010537  001240                    MOV     R5,$TMP3
5229 030356  104164                1$:         ERROR   +164
5230 030360  000137  031144                    JMP     CCDONE
5231 030364  010437  001242        CCER90:     MOV     R4,$TMP4        ;FPS ERROR F
5232 030370  010537  001240                    MOV     R5,$TMP3
5233 030374  104165                1$:         ERROR   +165
5234 030376  000137  031144                    JMP     CCDONE
5235 030402  012737  031034  001240  CCER1:    MOV     #CCP2,$TMP3     ;DATA ERROR D
5236 030410  012737  031034  001246            MOV     #CCP2,$TMP6
5237 030416  012737  031014  001242  CCER50:   MOV     #CCP0,$TMP4
5238 030424  012737  031004  001244            MOV     #CCDATO,$TMP5
5239 030432  104166                1$:         ERROR   +166
5240 030434  000137  031144                    JMP     CCDONE
5241 030440  012737  031034  001240  CCER2:    MOV     #CCP2,$TMP3     ;CONSTANT BAD D(B)
5242 030446  012737  031034  001246            MOV     #CCP2,$TMP6
5243 030454  012737  031014  001242  CCER22:   MOV     #CCP0,$TMP4
5244 030462  012737  031004  001244            MOV     #CCDATO,$TMP5
5245 030470  104172                1$:         ERROR   +172
5246 030472  000137  031144                    JMP     CCDONE
5247 030476  012737  031024  001240  CCER3:    MOV     #CCP1,$TMP3
5248 030504  012737  031104  001246            MOV     #CCP7,$TMP6
5249 030512  000741                            BR      CCER50
5250 030514  012737  031024  001240  CCER4:    MOV     #CCP1,$TMP3     ;CONSTANT BAD D(G)
5251 030522  012737  031104  001246            MOV     #CCP7,$TMP6
5252 030530  012737  031014  001242  CCER44:   MOV     #CCP0,$TMP4
5253 030536  012737  031004  001244            MOV     #CCDATO,$TMP5
5254 030544  104173                1$:         ERROR   +173
5255 030546  000137  031144                    JMP     CCDONE
5256 030552  012737  031074  001240  CCER5:    MOV     #CCP6,$TMP3     ;DATA ERROR F
5257 030560  012737  031074  001246            MOV     #CCP6,$TMP6
5258 030566  012737  031014  001242  CCER55:   MOV     #CCP0,$TMP4
5259 030574  012737  031004  001244            MOV     #CCDATO,$TMP5
5260 030602  104170                1$:         ERROR   +170
5261 030604  000557                            BR      CCDONE
5262 030606  012737  031074  001240  CCER6:    MOV     #CCP6,$TMP3     ;CONSTANT BAD F(B)
5263 030614  012737  031074  001246            MOV     #CCP6,$TMP6
5264 030622  012737  031014  001242            MOV     #CCP0,$TMP4
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5265 030630  012737  031004  001240          MOV     #CCDATO,$TMP5
5266 030636  104174                  1$:     ERROR   +174
5267 030640  000541                          BR      CCDONE
5268 030642  012737  031064  001240  CCER7:  MOV     #CCP5,$TMP3     ;DATA ERROR F
5269 030650  012737  031114  001246          MOV     #CCP10,$TMP6
5270 030656  000743                          BR      CCER55
5271 030660  012737  031064  001240  CCER8:  MOV     #CCP5,$TMP3     ;CONSTANT BAD F(G)
5272 030666  012737  031114  001246          MOV     #CCP10,$TMP6
5273 030674  012737  031004  001244          MOV     #CCDATO,$TMP5
5274 030702  012737  031014  001242          MOV     #CCP0,$TMP4
5275 030710  104175                  1$:     ERROR   +175
5276 030712  000514                          BR      CCDONE
5277 030714  012737  031044  001240  CCER10: MOV     #CCP3,$TMP3     ;DATA ERROR D
5278 030722  012737  031124  001246          MOV     #CCP11,$TMP6
5279 030730  000632                          BR      CCER50
5280 030732  012737  031044  001240  CCER11: MOV     #CCP3,$TMP3     ;CONSTANT BAD D(G)
5281 030740  012737  031124  001246          MOV     #CCP11,$TMP6
5282 030746  000670                          BR      CCER44
5283 030750  012737  031054  001240  CCER12: MOV     #CCP4,$TMP3     ;DATA ERROR D
5284 030756  012737  031054  001246          MOV     #CCP4,$TMP6
5285 030764  000614                          ER      CCER50
5286 030766  012737  031054  001240  CCER13: MOV     #CCP4,$TMP3     ;CONSTANT BAD D(B)
5287 030774  012737  031054  001246          MOV     #CCP4,$TMP6
5288 031002  000624                          BR      CCER22
5289 031004  000000  000000  000000  CCDATO: .WORD   0,0,0,0
5290 031014  000200  000000  000000  CCP0:   .WORD   200,0,0,0       ;E(AC)=1
5291 031024  016200  000000  000000  CCP1:   .WORD   16200,0,0,0     ;E(FSRC)=E(AC)+56=57
5292 031034  016400  000000  000000  CCP2:   .WORD   16400,0,0,0     ;E(FSRC)=E(AC)+57=58
5293 031044  000400  000000  000000  CCP3:   .WORD   400,0,0,0       ;E(FSRC)=E(AC)+1=2
5294 031054  031200  000000  000000  CCP4:   .WORD   31200,0,0,0     ;E(FSRC)=E(AC)+100=101=145(OCT)
5295 031064  006200  000000  000000  CCP5:   .WORD   6200,0,0,0      ;E(FSRC)=E(AC)+24=25=31(OCT)
5296 031074  006400  000000  000000  CCP6:   .WORD   6400,0,0,0      ;E(FSRC)=E(AC)+25=26=32(OCT)
5297 031104  016200  000000  000000  CCP7:   .WORD   16200,0,0,1     ;CCP1 RES
5298 031114  006200  000001  000000  CCP10:  .WORD   6200,1,0,0      ;CCP5 RES
5299 031124  000500  000000  000000  CCP11:  .WORD   500,0,0,0       ;CCP3 RES
5300 031134  000200  000000  000000  CCP12:  .WORD   200,0,0,0       ;BAD CONSTANT ;RES CCP2,CCP4
5301 031144                          CCDONE:
     031144  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?).

5302
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5313                                    .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).
                                        ;*
                                        ;;*****************************************************************
     031146  000004                     TST33:  SCOPE
5314                                    ;EXPONENT DIFFERENCE=57=71 (OCT) FD=1
5315 031150                             BB1:
     031150  012737  031156  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5316 031156  012704  003200             1$:     MOV     #3200,R4        ;SET FIV FIV, AND FD
5317 031162  170104                             LDFPS   R4
5318 031164  012737  032036  000244             MOV     #BBER0,FPVECT   ;SET UP FOR ERROR
5319 031172  012737  031212  001236             MOV     #BB2,$TMP2      ;IN CASE THE OVER\
5320                                                                     ;UNDER FLOWS FAIL.
5321 031200  012700  032400                     MOV     #BBPAT2,R0      ;SET AC0 OPERAND.
5322 031204  172410                             LDD     (R0),AC0
5323 031206  012700  032370                     MOV     #BBPAT1,R0      ;FSRC
5324 031212  172010                     BB2:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5325 031214  170205                             STFPS   R5
5326 031216  012700  032350             BB3:    MOV     #BBDAT0,R0      ;GET THE RESULT
5327 031222  174010                             STD     AC0,(R0)
5328 031224  012701  032400                     MOV     #BBPAT2,R1      ;RESULT CORRECT?
5329 031230  012702  000004                     MOV     #4,R2
5330 031234  022021                     BB4:    CMP     (R0)+,(R1)+
5331 031236  001402                             BEQ     BB5
5332 031240  000137  032076                     JMP     BBER1           ;DATA ERROR D
5333 031244  077205                     BB5:    SOB     R2,BB4
5334                                                                     ;WAS FPS CORRECT?
5335 031246  020405                             CMP     R4,R5
5336 031250  001402                             BEQ     BB6
5337 031252  000137  032036                     JMP     BBER0           ;FPS ERROR
5338                                    ;EXPONENT DIFFERENCE=56=70 (OCT) FD=1
5339 031256                             BB6:
     031256  012737  031264  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5340 031264  012704  003200             1$:     MOV     #3200,R4        ;SET FIV,FIV, AND FD
5341 031270  170104                             LDFPS   R4
5342 031272  012737  031312  001236             MOV     #BB7,$TMP2
5343 031300  012700  032420                     MOV     #BBPAT4,R0      ;SET AC0 OPERAND
5344 031304  172410                             LDD     (R0),AC0
5345 031306  012700  032370                     MOV     #BBPAT1,R0      ;FSRC
5346 031312  172010                     BB7:    ADDD    (R0),AC0        ;TEST INSTRUCTION
5347 031314  170205                             STFPS   R5              ;GET FPS
5348 031316  012700  032350                     MOV     #BBDAT0,R0      ;GET THE RESULT
5349 031322  174010                             STD     AC0,(R0)
5350 031324  012701  032460                     MOV     #BBP10,R1       ;IS IT CORRECT
5351 031330  012702  000004                     MOV     #4,R2
5352 031334  022021                     BB10:   CMP     (R0)+,(R1)+
5353 031336  001415                             BEQ     BB13
5354 031340  012700  032350                     MOV     #BBDAT0,R0      ;DID A BAD
5355 031344  012701  032420                     MOV     #BBPAT4,R1      ;CONSTANT (NOT 57)
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5356 031350  012702  000004                    MOV     #4,R2           ;GET GENERATED
5357 031354  022021                    BB11:   CMP     (R0)+,(R1)+     ;FOR THE ALIGNMENT
5358 031356  001402                            BEQ     BB12            ;FLOWS?
5359 031360  000137  032134                    JMP     BBER2           ;DATA ERROR.D
5360 031364  077205                    BB12:   SOB     R2,BB11
5361 031366  000137  032152                    JMP     BBER3           ;BAD CONSTANT.D
5362 031372  077220                    BB13:   SOB     R2,BB10
5363 031374  020405                            CMP     R4,R5           ;FPS CORRECT?
5364 031376  001402                            BEQ     BB14
5365 031400  000137  032036                    JMP     BBER0           ;BAD FPS.
5366                                ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
5367 031404                         BB14:
     031404  012737  031412  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5368 031412  012737  031440  001236  1$:       MOV     #BB15,$TMP2
5369 031420  012700  032360                    MOV     #BBPAT0,R0      ;SET UP AC0 OPERAND
5370 031424  172410                            LDD     (R0),AC0
5371 031426  012704  003000                    MOV     #3000,R4        ;SET FIV AND FIV
5372                                                                    ;CLEAR FD
5373 031432  170104                            LDFPS   R4
5374 031434  012700  032370                    MOV     #BBPAT1,R0      ;FSRC
5375 031440  172010                    BB15:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5376 031442  170205                            STFPS   R5
5377 031444  170011                            SETD                    ;REENTED DOUBLE MODE.
5378 031446  012700  032350                    MOV     #BBDAT0,R0      ;GET THE RESULT
5379 031452  174010                            STD     AC0,(R0)
5380 031454  012701  032360                    MOV     #BBPAT0,R1      ;IS THE RESULT
5381 031460  012702  000002                    MOV     #2,R2           ;CORRECT?
5382 031464  022021                    BB16:   CMP     (R0)+,(R1)+
5383 031466  001402                            BEQ     BB17
5384 031470  000137  032206                    JMP     BBER4           ;DATA FRROR F
5385 031474  077205                    BB17:   SOB     R2,BB16
5386 031476  020405                            CMP     R4,R5           ;IS FPS CORRECT?
5387 031500  001402                            BEQ     BB20
5388 031502  000137  032056                    JMP     BBER10          ;FPS ERROR.
5389                                ;EXPONENT DIFFERENCE=24=30 (OCT)
5390 031506                         BB20:
     031506  012737  031514  0011 0            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5391 031514  012737  031542  001236  1$:       MOV     #BB21,$TMP2
5392 031522  012700  032410                    MOV     #BBPAT3,R0      ;SET UP AC0 OPERAND.
5393 031526  172410                            LDD     (R0),AC0
5394 031530  012704  003000                    MOV     #3000,R4        ;SET FIU,FIV. CLEAR FD.
5395 031534  170104                            LDFPS   R4
5396 031536  012700  032370                    MOV     #BBPAT1,R0      ;FSRC
5397 031542  172010                    BB21:   ADDF    (R0),AC0        ;TEST INSTRUCTION
5398 031544  170205                            STFPS   R5
5399 031546  170011                            SETD                    ;REENTER DOUBLE MODE
5400 031550  012700  032350                    MOV     #BBDAT0,R0      ;GET THE RESULT
5401 031554  174010                            STD     AC0,(R0)
5402 031556  012701  032450                    MOV     #BBP7,R1        ;IS THE RESULT CORRECT?
5403 031562  012702  000002                    MOV     #2,R2
5404 031566  022021                    BB22:   CMP     (R0)+,(R1)+
5405 031570  001415                            BEQ     BB25
5406 031572  012700  032350                    MOV     #BBDAT0,R0      ;WAS A BAD CONSTANT
5407 031576  012701  032410                    MOV     #BBPAT3,R1      ;USED (NOT 25) IN
5408 031602  012702  000002                    MOV     #2,R2           ;THE ALLIGN FLOWS?
5409 031606  022021                    BB23:   CMP     (R0)+,(R1)+
5410 031610  001402                            BEQ     BB24
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                                        JMP     BBER5           ;DATA ERROR F
                                BB24:   SOB     R2,BB23
                                        JMP     BBER6           ;BAD CONSTANT F
                                BB25:   SOB     R2,BB22
                                        CMP     R4,R5
                                        BEQ     BB26
                                        JMP     BBER10          ;BAD FPS.
                                ;EXPONENT DIFFERENCE=1
                                BB26:
031636 012737 031644 001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
031644 012737 031672 001236     1$:     MOV     #BB27,$TMP2
031652 012704 003200                    MOV     #3200,R4
031656 170104                           LDFPS   R4              ;SET UP AC0 OPERAND
031660 012700 032430                    MOV     #BBPAT5,R0
031664 172410                           LDD     (R0),AC0
031666 012700 032370                    MOV     #BBPAT1,R0      ;FSRC
031672 172010                   BB27:   ADDD    (R0),AC0        ;TEST INSTRUCTION
031674 170205                           STFPS   R5
031676 012700 032350                    MOV     #BBDAT0,R0      ;GET THE RESULT.
031702 174010                           STD     AC0,(R0)
031704 012701 032470                    MOV     #BBP11,R1       ;IS IT CORRECT?
031710 012702 000004                    MOV     #4,R2
031714 022021                   BB30:   CMP     (R0)+,(R1)+
031716 001402                           BEQ     BB31
031720 000137 032314                    JMP     BBER7           ;DATA ERROR D
031724 077205                   BB31:   SOB     R2,BB30
031726 020405                           CMP     R4,R5           ;IS FPS CORRECT
031730 001402                           BEQ     BB32
031732 000137 032036                    JMP     BBER0
                                ;EXPONENT DIFFERENCE=100=144 (OCT)
                                BB32:
031736 012737 031744 001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
031744 012737 031772 001236     1$:     MOV     #BB33,$TMP2
031752 012704 003200                    MOV     #3200,R4
031756 170104                           LDFPS   R4              ;SET F.V,FIV AND FD
031760 012700 032440                    MOV     #BBPAT6,R0      ;SET UP AC0 OPERAND.
031764 172410                           LDD     (R0),AC0
031766 012700 032370                    MOV     #BBPAT1,R0      ;FSRC
031772 172010                   BB33:   ADDD    (R0),AC0        ;TEST INSTRUCTION
031774 170205                           STFPS   R5
031776 012700 032350                    MOV     #BBDAT0,R0      ;GET THE RESULT
032002 174010                           STD     AC0,(R0)
032004 012701 032440                    MOV     #BBPAT6,R1      ;IS IT CORRECT
032010 012702 000004                    MOV     #4,R2
032014 022021                   BB34:   CMP     (R0)+,(R1)+
032016 001402                           BEQ     BB35
032020 000137 032332                    JMP     BBER8           ;DATA ERROR D
032024 077205                   BB35:   SOB     R2,BB34
032026 020405                           CMP     R4,R5           ;IS FPS CORRECT
032030 001002                           BNE     BBER0
032032 000137 032500                    JMP     BBDONE
032036 010437 001242            BBER0:  MOV     R4,$TMP4        ;FPS ERROR D
032042 010537 001240                    MOV     R5,$TMP3
032046 104164                   $:      ERROR   +164
032050 104413                           RSETUP                  ;GO INITIALIZE THE FPS AND STACK; AND
                                                                ;SEE IF THE USER HAS EXPRESSED
                                                                ;THE DESIRE TO CHANGE THE SOFTWARE
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                                                                      ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                                                      ;THE USER TYPED CONTROL G?).
032052  000137  032500                      JMP     BBDONE
032056  010437  001242            BBER10:   MOV     R4,$TMP4          ;FPS ERROR F
032062  010537  001240                      MOV     R5,$TMP3
032066  104165                    1$:       ERROR   +165
032070  104413                              RSETUP                    ;GO INITIALIZE THE FPS AND STACK; AND
                                                                      ;SEE IF THE USER HAS EXPRESSED
                                                                      ;THE DESIRE TO CHANGE THE SOFTWARE
                                                                      ;VIRTUAL CONSOLE SWITCH PEGISTER (HAS
                                                                      ;THE USER TYPED CONTROL G?).
032072  000137  032500                      JMP     BBDONE
032076  012737  032400  001242    BBER1:    MOV     #BBPAT2,$TMP4     ;DATA ERROR D
032104  012737  032400  001246              MOV     #BBPAT2,$TMP6
032112  012737  032370  001240    BBER11:   MOV     #BBPAT1,$TMP3
032120  012737  032350  001244              MOV     #BBDAT0,$TMP5
032126  104166                    1$:       ERROR   +166
032130  000137  032500                      JMP     BBDONE
032134  012737  032420  001242    BBER2:    MOV     #BBPAT4,$TMP4
032142  012737  032460  001246              MOV     #BBP10,$TMP6
032150  000760                              BR      BBER11
032152  012737  032420  001242    BBER3:    MOV     #BBPAT4,$TMP4     ;BAD CONSTANT D
032160  012737  032460  001246              MOV     #BBP10,$TMP6
032166  012737  032370  001240              MOV     #BBPAT1,$TMP3
032174  012737  032350  001244              MOV     #BBDAT0,$TMP5
032202  104167                    1$:       ERROR   +167
032204  000535                              BR      BBDONE
032206  012737  032360  001242    BBER4:    MOV     #BBPAT0,$TMP4     ;DATA ERROR F
032214  012737  032360  001246              MOV     #BBPAT0,$TMP6
032222  012737  032370  001240    BBER40:   MOV     #BBPAT1,$TMP3
032230  012737  032350  001244              MOV     #BBDAT0,$TMP5
032236  104170                    1$:       ERROR   +170
032240  000517                              BR      BBDONE
032242  012737  032410  001242    BBER5:    MOV     #BBPAT3,$TMP4
032250  012737  032450  001246              MOV     #BBP7,$TMP6
032256  000761                              BR      BBER40
032260  012737  032410  001242    BBER6:    MOV     #BBPAT3,$TMP4     ;CONSTANT ERROR F
032266  012737  032450  001246              MOV     #BBP7,$TMP6
032274  012737  032370  001240              MOV     #BBPAT1,$TMP3
032302  012737  032350  001244              MOV     #BBDAT0,$TMP5
032310  104171                    1$:       ERROR   +171
032312  000472                              BR      BBDONE
032314  012737  032430  001242    BBER7:    MOV     #BBPAT5,$TMP4
032322  012737  032370  001246              MOV     #BBPAT11,$TMP6
032330  000670                              BR      BBER11
032332  012737  032440  001242    BBER8:    MOV     #BBPAT6,$TMP4
032340  012737  032440  001246              MOV     #BBPAT6,$TMP6
032346  000661                              BR      BBER11
032350  000000  000000  000000    BBDAT0:   .WORD   0,0,0,0
032360  006400  000000  000000    BBPAT0:   .WORD   6400,0,0,0        ;F(AC)=E(FSRC)+25=26=32(OCT)
032370  000200  000000  000000    BBPAT1:   .WORD   200,0,0,0         ;E(FSRC)=1
032400  016400  000000  000000    BBPAT2:   .WORD   16400,0,0,0       ;E(AC)=E(FSRC)+57=58=72(OCT)
032410  006200  000000  000000    BBPAT3:   .WORD   6200,0,0,0        ;E(AC)-E(FSRC)+24=25=31(OCT)
032420  016200  000000  000000    BBPAT4:   .WORD   16200,0,0,0       ;E(AC)=E(FSR6)+56=57=71(OCT)
032430  000400  000000  000000    BBPAT5:   .WORD   400,0,0,0         ;E(AC)=E(FSRC)+1=2
032440  031200  000000  000000    BBPAT6:   .WORD   31200,0,0,0       ;E(AC)=E(FSRC)+100=101=145(OCT)
032450  006200  000001  000000    BBP7:     .WORD   6200,1,0,0        ;BBPAT3 RES
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5515 032460  016200  000000  000000  BBP*0:  .WORD   16200,0,0,1      ;BBPAT4 RES
5516 032470  000500  000000  000000  BB  1:  .WOR.   500,0,0,0        ;BBPAT5 RES
5517 032500                          BBDONE:
     032500  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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5525                                    .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.
                                        ;*
                                        ;*****************************************************************
     032502  000004                     ST34:  SCOPE
5526                                    ;BOTH OPERANDS NEGATIVE
5527 032504                             DD1:
     032504  012737  032512  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5528 032512  012704  003200             1$:    MOV     #3200,R4                ;SET FIU, FIV, AND FD
5529 032516  170104                             LDFPS   R4
5530 032520  012737  032540  001236             MOV     #DD2,$TMP2
5531 032526  012700  034420                     MOV     #DDP1,R0                ;SET AC0 OPERAND
5532 032532  172410                             LDD     (R0),AC0
5533 032534  012700  034420                     MOV     #DDP1,R0                ;ESRC
5534 032540  172010                     DD2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5535 032542  170205                             STFPS   R5                      ;GET FPS
5536 032544  012700  034400                     MOV     #DDDATO,R0              ;GET THE RESULT
5537 032550  174010                             STD     AC0,(R0)
5538 032552  012701  034520                     MOV     #DDP9,R1                ;IS IT CORRECT
5539 032556  012702  000004                     MOV     #4,R2
5540 032562  022021                     DD3:    CMP     (R0)+,(R1)+
5541 032564  001415                             BEQ     DD6
5542 032566  012700  034400                     MOV     #DDDATO,R0              ;DID A ADD-SUB
5543 032572  012701  034450                     MOV     #DDP4,R1                ;FLOW A FAILURE
5544 032576  012702  000004                     MOV     #4,R2
5545 032602  022021                     DD4:    CMP     (R0)+,(R1)+
5546 032604  001402                             BEQ     DD5                     ;216,442,500
5547 032606  000137  033630                     JMP     DDER1                   ;DATA ERROR,D
5548 032612  077205                     DD5:    SOB     R2,DD4
5549 032614  000137  033666                     JMP     DDER2                   ;FLOW FAILURE,D
5550 032620  077220                     DD6:    SOB     R2,DD3
5551 032622  052704  000010                     BIS     #10,R4
5552 032626  020405                             CMP     R4,R5                   ;FPS CORRECT?
5553 032630  001402                             BEQ     DD7
5554 032632  000137  033612                     JMP     DDER0                   ;BAD,FPS
5555                                    ;AC POS FSRC NEG        AC=-FSRC
5556 032636                             DD7:
     032636  012737  032644  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5557 032644  012704  003200             1$:    MOV     #3200,R4                ;SET FIU, FIV, AND FD
5558 032650  170104                             LDFPS   R4
5559 032652  012737  032672  001236             MOV     #DD8,$TMP2
5560 032660  012700  034430                     MOV     #DDP2,R0                ;SET AC0 OPERAND
5561 032664  172410                             LDD     (R0),AC0
5562 032666  012700  034420                     MOV     #DDP1,R0                ;FSPC
5563 032672  172010                     DD8:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5564 032674  170205                             STFPS   R5                      ;GET FPS
5565 032676  012700  034400                     MOV     #DDDATO,R0              ;GET THE RESULT
5566 032702  174010                             STD     AC0,(R0)
5567 032704  012701  034410                     MOV     #DDP0,R1                ;IS IT CORRECT
5568 032710  012702  000004                     MOV     #4,R2
5569 032714  022021                     DD10:   CMP     (R0)+,(R1)+
5570 032716  001402                             BEQ     DD11
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5571 032720  000137  033724                    JMP     DDER3                   ;FLOW FAILURE
5572 032724  077205                    DD11:   SOB     R2,DD10
5573 032726  052704  000004                    BIS     #4,R4
5574 032732  020405                            CMP     R4,R5                   ;FPS CORRECT?
5575 032734  001402                            BEQ     DD12
5576 032736  000137  033612                    JMP     DDER0                   ;BAD FPS
5577                                    ;AC NEG FSRC POS                AC=-FSRC
5578 032742                             DD12:
     032742  012737  032750  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5579 032750  012704  003200            1$:     MOV     #3200,R4                ;SET FIU, FIV, AND FD
5580 032754  170104                            LDFPS   R4
5581 032756  012737  032776  001236            MOV     #DD13,$TMP2
5582 032764  012700  034420                    MOV     #DDP1,R0                ;SET AC0 OPERAND
5583 032770  172410                            LDD     (R0),AC0
5584 032772  012700  034430                    MOV     #DDP2,R0                ;FSRC
5585 032776  172010                    DD13:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5586 033000  170205                            STFPS   R5                      ;GET FPS
5587 033002  012700  034400                    MOV     #DDDAT0,R0              ;GET THE RESULT
5588 033006  174010                            STD     AC0,(R0)
5589 033010  012701  034410                    MOV     #DDP0,R1                ;IS IT CORRECT
5590 033014  012702  000004                    MOV     #4,R2
5591 033020  022021                    DD14:   CMP     (R0)+,(R1)+
5592 033022  001402                            BEQ     DD15
5593 033024  000137  033762                    JMP     DDER4                   ;FLOW FAILURE 216,440,121
5594 033030  077205                    DD15:   SOB     R2,DD14
5595 033032  052704  000004                    BIS     #4,R4
5596 033036  020405                            CMP     R4,R5                   ;EPS CORRECT?
5597 033040  001402                            BEQ     DD16
5598 033042  000137  033612                    JMP     DDER0                   ;BAD FPS
5599                                    ;AC0 POS        FSRC    NEG     /AC/ > /FSRC/
5600 033046                             DD16:
     033046  012737  033054  001110            MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5601 033054  012704  003200            1$:     MOV     #3200,R4                ;SET FIV, FIV AND FD
5602 033060  170104                            LDFPS   R4
5603 033062  012737  033102  001236            MOV     #DD17,$TMP2
5604 033070  012700  034440                    MOV     #DDP3,R0                ;SET AC0 OPERAND
5605 033074  172410                            LDD     (R0),AC0
5606 033076  012700  034470                    MOV     #DDP6,R0                ;ESPC
5607 033102  172010                    DD17:   ADDD    (R0),AC0                ;TEST INSTRUCTION
5608 033104  170205                            STFPS   R5                      ;GET FPS
5609 033106  012700  034400                    MOV     #DDDAT0,R0              ;GET THE RESULT
5610 033112  174010                            STD     AC0,(R0)
5611 033114  012701  034500                    MOV     #DDP7,R1                ;IS IT CORRECT
5612 033120  012702  000004                    MOV     #4,R2
5613 033124  022021                    DD18:   CMP     (R0)+,(R1)+
5614 033126  001415                            BEQ     DD21
5615 033130  012700  034400                    MOV     #DDDAT0,R0              ;FLOWS FAILURE
5616 033134  012701  034510                    MOV     #DDP8,R1                ;216,440,101
5617 033140  012702  000004                    MOV     #4,R2                   ;GET GENERATED
5618 033144  022021                    DD19:   CMP     (R0)+,(R1)+
5619 033146  001402                            BEQ     DD20
5620 033150  000137  034020                    JMP     DDER5                   ;DATA ERROR.
5621 033154  077205                    DD20:   SOB     R2,DD19
5622 033156  000137  034056                    JMP     DDER6
5623 033162  077220                    DD21:   SOB     R2,DD18
5624 033164  020405                            CMP     R4,R5                   ;EPS CORRECT?
5625 033166  001402                            BEQ     DD22
```

TEST # 34 - ADDD WITH NEGATIVE OPRANDS TEST

```
5626 033170  000137  033612                    JMP     DDER0                   ;BAD FPS
5627                                ;AC NEG FSRC    POS     /FSRC/ > /AC/
5628 033174                         DD22:
     033174  012737  033202  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5629 033202  012704  003200          1$:        MOV     #3200,R4                ;SET FIO,FIV, AND FD
5630 033206  170104                             LDFPS   R4
5631 033210  012737  033230  001236             MOV     #DD23,$TMP2
5632 033216  012700  034470                     MOV     #DDP6,R0                ;SET ACO OPERAND
5633 033222  172410                             LDD     (R0),AC0
5634 033224  012700  034440                     MOV     #DDP3,R0                ;FSPC
5635 033230  172010                 DD23:       ADDD    (R0),AC0                ;TEST INSTRUCTION
5636 033232  170205                             STFPS   R5                      ;GET FPS
5637 033234  012700  034400                     MOV     #DDDATO,R0              ;GET THE RESULT
5638 033240  174010                             STD     AC0,(R0)
5639 033242  012701  034500                     MOV     #DDP7,R1                ;IS IT CORRECT?
5640 033246  012702  000004                     MOV     #4,R2
5641 033252  022021                 DD24:       CMP     (R0)+,(R1)+
5642 033254  001415                             BEQ     DD27
5643 033256  012700  034400                     MOV     #DDDATO,R0              ;FLO,S FAILURE
5644 033262  012701  034510                     MOV     #DDP8,R1                ;CONSTANT (NOT 57)
5645 033266  012702  000004                     MOV     #4,R2                   ;216,042,101
5646 033272  021011                 DD25:       CMP     (R0),(R1)
5647 033274  001402                             BEQ     DD26
5648 033276  000137  034114                     JMP     DDER7                   ;DATA ERROR.
5649 033302  077205                 DD26:       SOB     R2,DD25
5650 033304  000137  034152                     JMP     DDER8
5651 033310  077220                 DD27:       SOB     R2,DD24
5652 033312  020405                             CMP     R4,R5                   ;FPS CORRECT?
5653 033314  001402                             BEQ     DD30
5654 033316  000137  033612                     JMP     DDER0                   ;BAD FPS
5655                                ;ACO POS     FSRC    NEG     /AC/</FRSRC/
5656 033322                         DD30:
     033322  012737  033330  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5657 033330  012704  003200          1$:        MOV     #3200,R4                ;SET FIO,FIV,AND FD
5658 033334  170104                             LDFPS   R4
5659 033336  012737  033356  001236             MOV     #DD31,$TMP2
5660 033344  012700  034450                     MOV     #DDP4,R0                ;SET ACO OPERAND
5661 033350  172410                             LDD     (R0),AC0
5662 033352  012700  034460                     MOV     #DDP5,R0                ;FSPC
5663 033356  172010                 DD31:       ADDD    (R0),AC0                ;TEST INSTRUCTION
5664 033360  170205                             STFPS   R5                      ;GET FPS
5665 033362  012700  034400                     MOV     #DDDATO,R0              ;GET THE RESULT
5666 033366  174010                             STD     AC0,(R0)
5667 033370  012701  034510                     MOV     #DDP8,R1                ;IS IT CORRECT
5668 033374  012702  000004                     MOV     #4,R2
5669 033400  022021                 DD32:       CMP     (R0)+,(R1)+
5670 033402  001415                             BEQ     DD35                    ;ADD-SUB
5671 033404  012700  034400                     MOV     #DDDATO,R0              ;FLOWAS FAILURE
5672 033410  012701  034500                     MOV     #DDP7,R1                ;CON 216 N440 NOT 14
5673 033414  012702  000004                     MOV     #4,R2                   ;GET GENERATED
5674 033420  022021                 DD33:       CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
5675 033422  001402                             BEQ     DD34                    ;FLOWS?
5676 033424  000137  034210                     JMP     DDER9                   ;DATA ERROR, D
5677 033430  077205                 DD34:       SOB     R2,DD33
5678 033432  000137  034246                     JMP     DDER10
5679 033436  077220                 DD35:       SOB     R2,DD32
5680 033440  052704  000010                     BIS     #10,R4
```

```
                                                CMP     R4,R5                   ;FPS CORRECT?
                                                BEQ     DD36
                                                JMP     DDER0                   ;BAD FPS
                                        ;ACO NEG        FSRC    POS     /FSRC/<0/AC/
                                        DD36:
033454  012737  033462  001110                MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
033462  012704  003200                1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
033466  170104                                LDFPS   R4
033470  012737  033510  001236                MOV     #DD37,$TMP2
033476  012700  034460                        MOV     #DDP5,R0                ;SET ACO OPERAND
033502  172410                                LDD     (R0),AC0
033504  012700  034450                        MOV     #DDP4,R0                ;FSRC
033510  172010                        DD37:   ADDD    (R0),AC0                ;TEST INSTRUCTION
033512  170205                                STFPS   R5                      ;GET FPS
033514  012700  034400                        MOV     #DDDAT0,R0              ;GET THE RESULT
033520  174010                                STD     AC0,(R0)
033522  012701  034510                        MOV     #DDP8,R1                ;IS IT CORRECT
033526  012702  000004                        MOV     #4,R2
033532  022021                        DD38:   CMP     (R0)+,(R1)+
033534  001415                                BEQ     DD41
033536  012700  034400                        MOV     #DDDAT0,R0              ;ADD SUB
033542  012701  034500                        MOV     #DDP7,R1                ;FLOWS FAILURES
033546  012702  000004                        MOV     #4,R2                   ;GET 216,042,141
033552  022021                        DD39:   CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
033554  001402                                BEQ     DD40                    ;FLOWS?
033556  000137  034304                        JMP     DDER11                  ;DATA ERROR. D
033562  077205                        DD40:   SOB     R2,DD39
033564  000137  034342                        JMP     DDER12                  ;BAD CONSTANT.D
033570  077220                        DD41:   SOB     R2,DD38
033572  052704  000010                        BIS     #10,R4
033576  020405                                CMP     R4,R5                   ;FPS CORRECT?
033600  001402                                BEQ     DD42
033602  000137  033612                        JMP     DDER0                   ;BAD FPS
033606  000137  034530                DD42:   JMP     DDDONE
033612  010437  001242                DDER0:  MOV     R4,$TMP4                ;FPS ERROR
033616  010537  001240                        MOV     R5,$TMP3
033622  104164                        1$:     ERROR   +164
033624  000137  034530                        JMP     DDDONE
033630                                  DDER1.
033630  012737  034420  001240                MOV     #DDP1,$TMP3
033636  012737  034420  001242                MOV     #DDP1,$TMP4
033644  012737  034400  001244                MOV     #DDDAT0,$TMP5
033652  012737  034520  001246                MOV     #DDP9,$TMP6
033660  104165                        1$:     ERROR   +165
033662  000137  034530                        JMP     DDDONE
033666                                  DDER2:
033666  012737  034420  001240                MOV     #DDP1,$TMP3
033674  012737  034420  001242                MOV     #DDP1,$TMP4
033702  012737  034400  001244                MOV     #DDDAT0,$TMP5
033710  012737  034520  001246                MOV     #DDP9,$TMP6
033716  104176                        1$:     ERROR   +176
033720  000137  034530                        JMP     DDDONE
033724                                  DDER3:
033724  012737  034420  001240                MOV     #DDP1,$TMP3
033732  012737  034430  001242                MOV     #DDP2,$TMP4
033740  012737  034400  001244                MOV     #DDDAT0,$TMP5
033746  012737  034410  001246                MOV     #DDP0,$TMP6
```

TEST # 34 - ADDD WITH NEGATIVE OPRANDS TEST

```
        033754  104214                          1$:     ERROR   +214
        033756  000137  034530                          JMP     DDDONE
 5721   033762                                  DDER4:
        033762  012737  034430  001240                  MOV     #DDP2,$TMP3
        033770  012737  034420  001242                  MOV     #DDP1,$   P4
        033776  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034004  012737  034410  001246                  MOV     #DDP0,$TMP6
        034012  104200                          1$:     ERROR   +200
        034014  000137  034530                          JMP     DDDONE
 5722   034020                                  DDER5:
        034020  012737  034470  001240                  MOV     #DDP6,$TMP3
        034026  012737  034440  001242                  MOV     #DDP3,$TMP4
        034034  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034042  012737  034500  001246                  MOV     #DDP7,$TMP6
        034050  104165                          1$:     ERROR   +165
        034052  000137  034530                          JMP     DDDONE
 5723   034056                                  DDER6:
        034056  012737  034470  001240                  MOV     #DDP6,$TMP3
        034064  012737  034440  001242                  MOV     #DDP3,$TMP4
        034072  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034100  012737  034500  001246                  MOV     #DDP7,$TMP6
        034106  104201                          1$:     ERROR   +201
        034110  000137  034530                          JMP     DDDONE
 5724   034114                                  DDER7:
        034114  012737  034440  001240                  MOV     #DDP3,$TMP3
        034122  012737  034470  001242                  MOV     #DDP6,$TMP4
        034130  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034136  012737  034500  001246                  MOV     #DDP7,$TMP6
        034144  104165                          1$:     ERROR   +165
        034146  000137  034530                          JMP     DDDONE
 5725   034152                                  DDER8:
        034152  012737  034440  001240                  MOV     #DDP3,$TMP3
        034160  012737  034470  001242                  MOV     #DDP6,$TMP4
        034166  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034174  012737  034500  001246                  MOV     #DDP7,$TMP6
        034202  104202                          1$:     ERROR   +202
        034204  000137  034530                          JMP     DDDONE
 5726   034210                                  DDER9:
        034210  012737  034460  001240                  MOV     #DDP5,$TMP3
        034216  012737  034450  001242                  MOV     #DDP4,$TMP4
        034224  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034232  012737  034510  001246                  MOV     #DDP8,$TMP6
        034240  104165                          1$:     ERROR   +165
        034242  000137  034530                          JMP     DDDONE
 5727   034246                                  DDER10:
        034246  012737  034460  001240                  MOV     #DDP5,$TMP3
        034254  012737  034450  001242                  MOV     #DDP4,$TMP4
        034262  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034270  012737  034510  001246                  MOV     #DDP8,$TMP6
        034276  104203                          1$:     ERROR   +203
        034300  000137  034530                          JMP     DDDONE
 5728   034304                                  DDER11:
        034304  012737  034450  001240                  MOV     #DDP4,$TMP3
        034312  012737  034460  001242                  MOV     #DDP5,$TMP4
        034320  012737  034400  001244                  MOV     #DDDAT0,$TMP5
        034326  012737  034510  001246                  MOV     #DDP8,$TMP6
        034334  104165                          1$:     ERROR   +165
```

```
        034336  000137  034530                  JMP     DDDONE
5729    034342                          DDER12:
        034342  012737  034450  001240          MOV     #DDP4,$TMP3
        034350  012737  034460  001242          MOV     #DDP5,$TMP4
        034356  012737  034400  001244          MOV     #DDDAT0,$TMP5
        034364  012737  034510  001246          MOV     #DDP8,$TMP6
        034372  104204                  1$:     ERROR   +204
        034374  000137  034530                  JMP     DDDONE
5730    034400  000000  000000  000000  DDDAT0: .WORD   0,0,0,0
5731    034410  000000  000000  000000  DDP0:   .WORD   0,0,0,0
5732    034420  100200  000000  000000  DDP1:   .WORD   100200,0,0,0    ;-DDP2
5733    034430  000200  000000  000000  DDP2:   .WORD   200,0,0,0       ;-DDP1
5734    034440  001100  000000  000000  DDP3:   .WORD   1100,0,0,0      ;EXP=4  ;FRAC=...110...
5735    034450  000600  000000  000000  DDP4:   .WORD   600,0,0,0       ;EXP=3  ;FRAC=...100...
5736    034460  101100  000000  000000  DDP5:   .WORD   101100,0,0,0    ;-DDP3
5737    034470  100600  000000  000000  DDP6:   .WORD   100600,0,0,0    ;-DDP4
5738    034500  001000  000000  000000  DDP7:   .WORD   1000,0,0,0      ;DDP3+DDP6
5739    034510  101000  000000  000000  DDP8:   .WORD   101000,0,0,0    ;DDP5+DDP4
5740    034520  100400  000000  000000  DDP9:   .WORD   100400,0,0,0    ;DDP1+DDP1
5741    034530                          DDDONE:
        034530  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?).
```

```
5749                                    .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
                                        ;*
                                        ;*****************************************************************
     034532  000004                     TST35:  SCOPE
5750                                    ;       USE POSITIVE OPERANDS
5751 034534                             EE1:
     034534  012737  034542  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5752 034542  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
5753 034546  170104                             LDFPS   R4
5754 034550  012737  034570  001236             MOV     #EE2,$TMP2
5755 034556  012700  035254                     MOV     #EEP1,R0                ;SET AC0 OPERAND
5756 034562  172410                             LDD     (R0),AC0
5757 034564  012700  035254                     MOV     #EEP1,R0                ;FSPC
5758 034570  173010                     EE2:    SUBD    (R0),AC0                ;TEST INSTRUCTION
5759 034572  170205                             STFPS   R5                      ;GET FPS
5760 034574  012700  035232                     MOV     #EEDAT0,R0              ;GET THE RESULT
5761 034600  174010                             STD     AC0,(R0)
5762 034602  012701  035242                     MOV     #EEP0,R1                ;IS IT CORRECT?
5763 034606  012702  000004                     MOV     #4,R2
5764 034612  022021                     EE3:    CMP     (R0)+,(R1)+
5765 034614  001415                             BEQ     EE6
5766 034616  012700  035232                     MOV     #EEDAT0,R0              ;DID A BAD
5767 034622  012701  035264                     MOV     #CEP2,R1                ;CONSTANT (NOT 57)
5768 034626  012702  000004                     MOV     #4,R2                   ;GET GENERATED
5769 034632  022021                     EE4:    CMP     (R0)+,(R1)+             ;FOR THE ALLIGNMENT
5770 034634  001402                             BEQ     EE5                     ;FLOWS?
5771 034636  000137  035042                     JMP     EEER1                   ;DATA ERROR.D
5772 034642  077205                     EE5:    SOB     R2,EE4
5773 034644  000137  035100                     JMP     EEER2                   ;BAD CONS ANT.D
5774 034650  077220                     EE6:    SOB     R2,FE3
5775 034652  052704  000004                     BIS     #4,R4
5776 034656  020405                             CMP     R4,R5                   ;FPS CORRECT?
5777 034660  001402                             BEQ     EE7
5778 034662  000137  035024                     JMP     EEER0                   ;BAD FPS
5779                                    ;USE NEGATIVE OPERANDS
5780 034666                             EE7:
     034666  012737  034674  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5781 034674  012704  003200             1$:     MOV     #3200,R4                ;SET FIO, FIV, AND FD
5782 034700  170104                             LDFPS   R4
5783 034702  012737  034722  001236             MOV     #EE8,$TMP2
5784 034710  012700  035274                     MOV     #EEP3,R0                ;SET AC0 OPERAND
5785 034714  172410                             LDD     (R0),AC0
5786 034716  012700  035274                     MOV     #EEP3,R0                ;FSPC
5787 034722  173010                     EE8:    SUBD    (R0),AC0                ;TEST INSTRUCTION
5788 034724  170205                             STFPS   R5                      ;GET FPS
5789 034726  012700  035232                     MOV     #EEDAT0,R0              ;GET THE RESULT
5790 034732  174010                             STD     AC0,(R0)
5791 034734  012701  035242                     MOV     #EEP0,R1                ;IS IT CORRECT?
5792 034740  012702  000004                     MOV     #4,R2
5793 034744  022021                     EE9:    CMP     (R0)+,(R1)+
5794 034746  001415                             BEQ     EE12
```

```
5795 034750  012700  035232          MOV     #EEDAT0,R0      ;DID A BAD
5796 034754  012701  035304          MOV     #EEP4,R1        ;CONSTANT (NOT 57)
5797 034760  012702  000004          MOV     #4,R2           ;GET GENERATED
5798 034764  022021          EE10:  CMP     (R0)+,(R1)+     ;FOR THE ALLIGNMENT
5799 034766  001402                 BEQ     EE11            ;FLOWS?
5800 034770  000137  035136         JMP     EEER3           ;DATA ERROR.D
5801 034774  077205          EE11:  SOB     R2,EE10
5802 034776  000137  035174         JMP     EEER4           ;BAD CONSTANT.D
5803 035002  077220          EE12:  SOB     R2,EE9
5804 035004  052704  000004         BIS     #4,R4
5805 035010  020405                 CMP     R4,R5           ;FPS CORRECT?
5806 035012  001402                 BEQ     EE13
5807 035014  000137  035024         JMP     EEER0           ;BAD FPS.
5808 035020  000137  035314  EE13:  JMP     EEDONE
5809 035024  010437  001242  EEER0: MOV     R4,$TMP4        ;BAD FPS
5810 035030  010537  001240         MOV     R5,$TMP3
5811 035034  104205          1$:    ERROR   +205
5812 035036  000137  035314         JMP     EEDONE
5813 035042                  EEER1:
     035042  012737  035254  001240         MOV     #EEP1,$TMP3
     035050  012737  035254  001242         MOV     #EEP1,$TMP4
     035056  012737  035232  001244         MOV     #EEDAT0,$TMP5
     035064  012737  035242  001246         MOV     #EEP0,$TMP6
     035072  104206          1$:    ERROR   +206
     035074  000137  035314         JMP     EEDONE
5814 035100                  EEER2:
     035100  012737  035254  001240         MOV     #EEP1.$TMP3
     035106  012737  035254  001242         MOV     #EEP1,$TMP4
     035114  012737  035232  001244         MOV     #EEDAT0,$TMP5
     035122  012737  035242  001246         MOV     #EEP0,$TMP6
     035130  104207          1$:    ERROR   +207
     035132  000137  035314         JMP     EEDONE
5815 035136                  EEER3:
     035136  012737  035274  001240         MOV     #EEP3,$TMP3
     035144  012737  035274  001242         MOV     #EEP3,$TMP4
     035152  012737  035232  001244         MOV     #EEDAT0,$TMP5
     035160  012737  035242  001246         MOV     #EEP0,$TMP6
     035166  104206          1$:    ERROR   +206
     035170  000137  035314         JMP     EEDONE
5816 035174                  EEER4:
     035174  012737  035274  001240         MOV     #EEP3,$TMP3
     035202  012737  035274  001242         MOV     #EEP3,$TMP4
     035210  012737  035232  001244         MOV     #EEDAT0,$TMP5
     035216  012737  035242  001246         MOV     #EEP0,$TMP6
     035224  104207          1$:    ERROR   +207
     035226  000137  035314         JMP     EEDONE
5817 035232  000000  000000  000000 EEDAT0: .WORD   0,0,0,0
5818 035242  000000  000000  000000 EEP0:   .WORD   0,0,0,0,0
5819 035254  000200  000000  000000 EEP1:   .WORD   200,0,0,0
5820 035264  000400  000000  000000 EEP2:   .WORD   400,0,0,0
5821 035274  100200  000000  000000 EEP3:   .WORD   100200,0,0,0
5822 035304  100400  000000  000000 EEP4:   .WORD   100400,0,0,0
5823 035314                  EEDONE:
     035314  104403          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?).

```
5833                                    .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.
                                        ;*
                                        ;*****************************************************************
     035316  000004                     TST36:  SCOPE
5834                                    ;USE DATA PATTERNS THAT REQUIRE ONLY ONE LEFT SHIFT TO NORMALIZE
5835 035320                             FF1:
     035320  012737  035326  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5836 035326  012704  003200             1$:     MOV     #3200,R4                ;SET FIU, FIV, AND FD
5837 035332  170104                             LDFPS   R4
5838 035334  012737  035354  001236             MOV     #FF2,$TMP2
5839 035342  012700  035652                     MOV     #FFP2,R0                ;SET AC0 OPERAND
5840 035346  172410                             LDD     (R0),AC0
5841 035350  012700  035662                     MOV     #FFP3,R0                ;FSPC
5842 035354  172010                     FF2:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5843 035356  170205                             STFPS   R5                      ;GET FPS
5844 035360  012700  035622                     MOV     #FFDAT0,R0              ;GET THE RESULT
5845 035364  174010                             STD     AC0,(R0)
5846 035366  012701  035672                     MOV     #FFP4, R1               ;IS IT CORRECT
5847 035372  012702  000004                     MOV     #4,R2
5848 035376  022021                     FF3:    CMP     (R0)+,(R1)+
5849 035400  001401                             BEQ     FF4
5850 035402  000470                             BR      FFER2                   ;BAD DATA
5851 035404  077204                     FF4:    SOB     R2,FF3
5852 035406  020405                             CMP     R4,R5                   ;FPS CORRECT?
5853 035410  001401                             BEQ     FF5
5854 035412  000437                             BR      FFER0                   ;BAD FPS
5855                                    ;USE DATA PATTERNS WHICH REQUIRE 56 LEFT SHIFTS TO N RMALIZE
5856                                    ;THE RESULT
5857 035414                             FF5:
     035414  012737  035422  001110             MOV     #1$,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5858 035422  012704  003200             1$:     MOV     #3200,R4                ;SET FIU, FIV, AND FD
5859 035426  170104                             LDFPS   R4
5860 035430  012737  035450  001236             MOV     #FF6,$TMP2
5861 035436  012700  035632                     MOV     #FFP0,R0                ;SET AC0 OPERAND
5862 035442  172410                             LDD     (R0),AC0
5863 035444  012700  035642                     MOV     #FFP1,R0                ;FSRC
5864 035450  172010                     FF6:    ADDD    (R0),AC0                ;TEST INSTRUCTION
5865 035452  170205                             STFPS   R5                      ;GET FPS
5866 035454  012700  035622                     MOV     #FFDAT0,R0              ;GET THE RESULT
5867 035460  174010                             STD     AC0,(R0)
5868 035462  012701  035672                     MOV     #FFP4,R1                ;IS IT CORRECT
5869 035466  012702  000004                     MOV     #4,R2
5870 035472  022021                     FF7:    CMP     (R0)+,(R1)+
5871 035474  001401                             BEQ     FF10
5872 035476  000413                             BR      FFER1                   ;BATA
5873 035500  077204                     FF10:   SOB     R2,FF7
5874 035502  020405                             CMP     R4,R5                   ;FPS CORRECT?
5875 035504  001401                             BEQ     FF11
5876 035506  000401                             BR      FFER0                   ;BAD FPS
```

```
5877 035510  000474                    FF11:   BR      FFDONE
5878
5879 035512  010537  001240            FFER0:  MOV     R5,$TMP3
5880 035516  010437  001242                    MOV     R4,$TMP4
5881 035522  104164                    1$:     ERROR   +164
5882 035524  000466                            BR      FFDONE
5883
5884 035526                            FFER1:
     035526  012737  035642  001240            MOV     #FFP1,$TMP3
     035534  012737  035632  001242            MOV     #FFP0,$TMP4
     035542  012737  035622  001244            MOV     #FFDAT0,$TMP5
     035550  012737  035672  001246            MOV     #FFP4,$TMP6
     035556  104210                    1$:     ERROR   +210
     035560  000137  035702                    JMP     FFDONE
5885
5886 035564                            FFER2:
     035564  012737  035662  001240            MOV     #FFP3,$TMP3
     035572  012737  035652  001242            MOV     #FFP2,$TMP4
     035600  012737  035622  001244            MOV     #FFDAT0,$TMP5
     035606  012737  035672  001246            MOV     #FFP4,$TMP6
     035614  104210                    1$:     ERROR   +210
     035616  000137  035702                    JMP     FFDONE
5887
5888
5889 035622  000000  000000  000000    FFDAT0: .WORD   0,0,0,0
5890 035632  016000  000000  000000    FFP0:   .WORD   ^6000,0,0,1
5891 035642  116000  000000  000000    FFP1:   .WORD   116000,0,0,0
5892 035652  000500  000000  000000    FFP2:   .WORD   500,0,0,0
5893 035662  100400  000000  000000    FFP3:   .WORD   100400,0,0,0
5894 035672  000200  000000  000000    FFP4:   .WORD   200,0,0,0       ;FFP4-FFP0+FFP1-FFP3+FFP4
5895 035702                            FFDONE:
5896 035702                            TST37:
```

END OF PASS ROUTINE

```
 5898                                   .SBTTL  END OF PASS ROUTINE
                                        ;;*****************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
                                        ;*TYPE 'END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY''
                                        ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
                                        ;*IF SW12=1 INHIBIT TRACE TRAP
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO LOOP
035702                                  $EOP:
035702  000004                                  SCOPE
035704  005037  001102                         CLR     $TSTNM          ;;ZERO THE TEST NUMBER
035710  005037  001302                         CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
035714  005237  001324                         INC     $PASS           ;;INCREMENT THE PASS NUMBER
035720  042737  100000  001324                BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
035726  005327                                  DEC     (PC)+           ;;LOOP?
035730  000001                          $EOPCT: .WORD   1
035732  003072                                  BGT     $DOAGN          ;;YES
035734  012737                                  MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
035736  000001                          $ENDCT: .WORD   1
035740  035730                                  $EOPCT
035742  104401  035750                         TYPE    ,65$            ;;TYPE ASCIZ STRING
035746  000407                                  BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <12><15>/END PASS #/
035766                                  64$:
035766  013746  001324                         MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                                                                        ;;TYPE PASS NUMBER
035772  104405                                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
035774  104401  036002                         TYPE    ,67$            ;;TYPE ASCIZ STRING
036000  000421                                  BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /
036044                                  66$:
036044  013746  001112                         MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
                                                                        ;;TOTAL NUMBER OF ERRORS
036050  104405                                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
036052  104401  001313                         TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
036056  005037  001112                         CLR     $ERTTL          ;;CLEAR ERROR TOTAL
036062  013700  000042                  $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
036066  001414                                  BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
036070  005046                                  CLR     -(SP)           ;;INSURE THE "T" BIT IS CLEAR
036072  012746  036100                         MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
036076  000426                                  BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                                                        ;;WITH A CLEARED "T" BIT
036100                                  $CLR.T:
036100  013700  000042                         MOV     @#42,R0         ;;INSURE R0 CONTAINS THE MONITORS
036104  001405                                  BEQ     $DOAGN          ;;RETURN ADDRESS
036106  000005                                  RESET                   ;;CLEAR THE WORLD
036110  004710                          $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
036112  000240                                  NOP                     ;;SAVE ROOM
036114  000240                                  NOP                     ;;FOR
036116  000240                                  NOP                     ;;ACT11
036120                                  $DOAGN:
036120  104400                                  TRAP                    ;;PUSH OLD PSW AND PC ON STACK
036122  042716  000020                         BIC     #20,(SP)        ;;CLEAR THE "T" BIT
036126  032777  010000  143004                BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
036134  001005                                  BNE     1$              ;;BR IF NO
036136  005137  036162                         COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
```

END OF PASS ROUTINE

```
036142  100402                          BMI     1$              ;;BR IF NO
036144  052716  000020                  BIS     #20,(SP)        ;;SET TRACE TRAP
036150  012746  036156          1$:     MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
036154  000002                  $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
                                                                ;;AN 'RTT' IF 'RTT' IS A LEGAL
                                                                ;;INSTRUCTION

036156                          $LOOP:
036156  000137                          JMP     @(PC)+          ;;RETURN
036160  004300                  $RTNAD: .WORD   LOOP
036162  000000                  $TBIT:  .WORD   0               ;;"T" BIT STATE INDICATOR
036164     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
                                        .EVEN
```

```
5900                                    .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

036170                                  $SCOPE:
036170  104407                                 CKSWR                           ;;TEST  FOR CHANGE IN SOFT-SWR
036172  032777  040000  142740          1$:     BIT     #BIT14,@SWR             ;;LOOP ON PRESENT TEST?
036200  001131                                 BNE     $OVER                   ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
036202  000416                         $XTSTR: BR      6$                      ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP-240)
036204  013746  000004                         MOV     @#ERRVEC,-(SP)          ;;SAVE THE CONTENTS OF THE ERROR VECTOR
036210  012737  036230  000004                 MOV     #5$,@#ERRVEC            ;;SET FOR TIMEOUT
036216  005737  177060                         TST     @#177060                ;;TIME OUT ON XOR?
036222  012637  000004                         MOV     (SP)+,@#ERRVEC          ;;RESTORE THE ERROR VECTOR
036226  000500                                 BR      $SVLAD                  ;;GO TO THE NEXT TEST
036230  022626                          5$:     CMP     (SP)+,(SP)+             ;;CLEAR THE STACK AFTER A TIME OUT
036232  012637  000004                         MOV     (SP)+,@#ERRVEC          ;;RESTORE THE ERROR VECTOR
036236  000440                                 BR      7$                      ;;LOOP ON THE PRESENT TEST
036240                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
036240  032777  000400  142672                 BIT     #BIT08,@SWR             ;;LOOP ON SPEC. TEST?
036246  001404                                 BEQ     2$                      ;;BR IF NO
036250  127737  142664  001102                 CMPB    @SWR,$TSTNM             ;;ON THE RIGHT TEST?    SWR<7:0>
036256  001502                                 BEQ     $OVER                   ;;BR IF YES
036260  013737  177766  036502          2$:     MOV     177766,CPSAVE           ;MOVE CPU ERR REG VALUE TO LOC FOR TST  ;DPM001
036266  032737  000001  036502                 BIT     #BIT00,CPSAVE           ;SEE IF THE POWER MONITOR BIT IS ON     ;DPM001
036274  001406                                 BEQ     2000$                   ;BRANCH TO CONTINUE ROUTINE IF CLEAR    ;DPM001
036276  042737  000001  177766                 BIC     #BIT00,177766           ;CLEAR THE BIT FOUND TO BE SET          ;DPM001
036304  104177                                 ERROR   +177                    ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
036306  105037  001103                         CLRB    $ERFLG                  ;CLEAR THE ERROR FLAG FOR NEXT TEST     ;DPM001
036312  105737  001103          2000$:  TSTB    $ERFLG                  ;;HAS AN ERROR OCCURRED?
036316  001421                                 BEQ     3$                      ;;BR IF NO
036320  123737  001115  001103                 CMPB    $ERMAX,$ERFLG           ;;MAX. ERRORS FOR THIS TEST OCCURRED?
036326  101015                                 BHI     3$                      ;;BR IF NO
036330  032777  001000  142602                 BIT     #BIT09,@SWR             ;;LOOP ON ERROR?
036336  001404                                 BEQ     4$                      ;;BR IF NO
036340  013737  001110  001106          7$:     MOV     $LPERR,$LPADR           ;;SET LOOP ADDRESS TO LAST SCOPE
036346  000446                                 BR      $OVER
036350  105037  001103                  4$:     CLRB    $ERFLG                  ;;ZERO THE ERROR FLAG
036354  005037  001302                         CLR     $TIMES                  ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
036360  000415                                 BR      1$                      ;;ESCAPE TO THE NEXT TEST
036362  032777  004000  142550          3$:     BIT     #BIT11,@SWR             ;;INHIBIT ITERATIONS?
036370  001011                                 BNE     1$                      ;;BR IF YES
036372  005737  001324                         TST     $PASS                   ;;IF FIRST PASS OF PROGRAM
036376  001406                                 BEQ     1$                      ;;      INHIBIT ITERATIONS
036400  005237  001104                         INC     $ICNT                   ;;INCREMENT ITERATION COUNT
036404  023737  001302  001104                 CMP     $TIMES,$ICNT            ;;CHECK THE NUMBER OF ITERATIONS MADE
```

```
036412  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
036414  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
036422  013737  036500  001302          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
036430  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
036434  113737  001102  001322          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
036442  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
036446  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
036452  005037  001304                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
036456  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
036464  013777  001102  142450  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
036472  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
036476  000002                          RTI                     ;;FIXES PS
036500  000001          $MXCNT: 1                               ;;MAX. NUMBER OF ITERATIONS
036502  000000          CPSAVE: .WORD   0                       ;LOCATION TO SAVE CPU ERR REG CONTENTS  ;DPM001
```

```
5902                                    .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 IT * NUMBER

036504  000000                  IBSAVE: .WORD   0               ;LOC'N TO HOLD $ITEMB DURING DUAL ERR   ;DPM001
036506  105037  036504          $ERROR: CLRB    IBSAVE          ;CLEAR THE ITEM BYTE SAVE LOCATION      ;DPM001
036512  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
036514  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
036520  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
036522  013777  001102  142412          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
036530  032777  002000  142402          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
036536  001402                          BEQ     1$              ;;NO - SKIP
036540  104401  001306                  TYPE    ,$BELL          ;;RING BELL
036544  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
036550  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
036554  162737  000002  001116          SUB     #2,$ERRPC
036562  117737  ??2330  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
036570  122737  000177  001114          CMPB    #177,$ITEMB     ;SEE IF THIS IS THE POWER FAIL CALL      ;DPM001
036576  001421                          BEQ     1000$           ;BRANCH AROUND PMB TEST IF IT IS        ;DPM001
036600  013737  177766  036502          MOV     177766,CPSAVE   ;MOVE CPU ERR REG TO CPSAVE FOR TEST    ;DPM001
036606  032737  000001  036502          BIT     #BIT00,CPSAVE   ;SEE IF POWER MONITOR BIT IS SET        ;DPM001
036614  001412                          BEQ     1000$           ;BRANCH IF OK                           ;DPM001
036616  042737  000001  177766          BIC     #BIT00,177766   ;CLEAR THE BIT FOUND SET                ;DPM001
036624  013737  001116  036504          MOV     $ERRPC,IBSAVE   ;SAVE $L`RPC                           ;DPM001
036632  104177                          ERROR   +177            ;CALL SPECIAL POWER MONITOR BIT ERROR    ;DPM001
036634  013737  036504  001116          MOV     IBSAVE,$ERRPC   ;RESTORE $ERRPC
036642                          1000$:
036642  032777  020000  142270          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
036650  001004                          BNE     20$             ;;SKIP TYPEOUTS
036652  004737  041342                  JSR     PC,ERTYPE       ;;GO TO USER ERROR ROUTINE
036656  104401  001313                  TYPE    ,$CRLF
036662                          20$:
036662  122737  000001  001336          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
036670  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
036672  113737  001114  036704          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
036700  004737  040174                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
036704      000                 21$:    .BYTE   0
036705      000                         .BYTE   0
036706  000777                  22$:    BR      22$             ;;APT ERROR LOOP
036710  005737  036504          2$:     TST     IBSAVE          ;SEE IF POWER FAIL ERROR CALL           ;DPM001
036714  001005                          BNE     3$              ;BRANCH IF NOT - HALT NOT ALLOWED       ;DPM001
036716  005777  142216                  TST     @SWR            ;;HALT ON ERROR
036722  100002                          BPL     3$              ;;SKIP IF CONTINUE
036724  000000                          HALT                    ;;HALT ON ERROR.
036726  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
036730  032777  001000  142202  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
036736  001405                          BEQ     4$              ;;BR IF NO
```

ERROR HANDLER ROUTINE

```
036740  005737  036504                 TST     IBSAVE          ;SEE IF THIS IS THE PWR MONITOR ERROR   ;DPM001
036744  001263                         BNE     7$              ;BRANCH BACK IF SO - NO FUDGING         ;DPM001
036746  013716  001110                 MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
036752  005737  001304         4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
036756  001405                         BEQ     5$              ;;BR IF NONE
036760  005737  036504                 TST     IBSAVE          ;SEE IF THIS IS THE PWR MONITOR ERROR   ;DPM001
036764  001253                         BNE     7$              ;BRANCH BACK IF SO - NO FUDGING         ;DPM001
036766  013716  001304                 MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
036772                          5$:
036772  022737  036110  000042         CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
037000  001001                         BNE     6$              ;;BRANCH IF NO
037002  000000                         HALT                    ;;YES
037004                          6$:
037004  032777  001000  142126         BIT     #BIT09,@SWR
037012  001013                         BNE     ERM10
037014  011637  001162                 MOV     (SP),$REGO              ;SEE IF ERROR #377
037020  062737  177776  001162         ADD     #-2,$REGO
037026  122777  000377  142126         CMPB    #377,@$REGO
037034  001002                         BNE     ERM10
037036  062716  000002                 ADD     #2,(SP)
037042  000002                 ERM10:  RTI
```

SAVE AND RESTORE R0-R5 ROUTINES

```
 5904                                   .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
037044                                  $SAVREG:
037044  010046                                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
037046  010146                                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
037050  010246                                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
037052  010346                                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
037054  010446                                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
037056  010546                                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
037060  016646  000022                          MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
037064  016646  000022                          MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
037070  016646  000022                          MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
037074  016646  000022                          MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
037100  000002                                  RTI
                                        ;*RESTORE R0-R5
                                        ;*CALL:
                                        ;*      RESREG
037102                                  $RESREG:
037102  012666  000022                          MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
037106  012666  000022                          MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
037112  012666  000022                          MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
037116  012666  000022                          MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
037122  012605                                  MOV     (SP)+,R5        ;;POP STACK INTO R5
037124  012604                                  MOV     (SP)+,R4        ;;POP STACK INTO R4
037126  012603                                  MOV     (SP)+,R3        ;;POP STACK INTO R3
037130  012602                                  MOV     (SP)+,R2        ;;POP STACK INTO R2
037132  012601                                  MOV     (SP)+,R1        ;;POP STACK INTO R1
037134  012600                                  MOV     (SP)+,R0        ;;POP STACK INTO R0
037136  000002                                  RTI
```

```
 5906                                   .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
                                        ;*
037140  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
037144  100002                          BPL     1$              ;;BR IF YES
037146  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
037150  000430                          BR      3$              ;;LEAVE
037152  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
037154  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
037160  122737  000001  001336          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
037166  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
037170  132737  000100  001337          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
037176  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
037200  010037  037210                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
037204  004737  040164                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
037210  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
037212  132737  000040  001337  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
037220  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
037222  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
037224  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
037226  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
037230  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
037232  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
037236  000002                          RTI                     ;;RETURN
037240  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
037244  001430                          BEQ     8$
037246  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
037252  001006                          BNE     5$
037254  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
037256  104401                          TYPE                    ;;TYPE A CR AND LF
037260  001313                          $CRLF
037262  105037  037500                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
037266  000755                          BR      2$              ;;GET NEXT CHARACTER
037270  004737  037352          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
037274  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
037300  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
037302  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
037306  105366  000001          7$      DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
037312  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
037314  004737  037352                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
037320  105337  037500                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
037324  000770                          BR      7$              ;;LOOP
                                        ;HORIZONTAL TAB PROCESSOR
037326  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
```

```
037332  004737  037352          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
037336  132737  000007  037500          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
037344  001372                          BNE     9$              ;;TAB STOP
037346  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
037350  000724                          BR      2$              ;;GET NEXT CHARACTER
037352                          $TYPEC:
037352  105777  141566                  TSTB    @$TKS           ;;CHAR IN KYBD BUFFER?          ;MJD001
037356  100022                          BPL     10$             ;;BR IF NOT                     ;MJD001
037360  017746  141562                  MOV     @$TKB,-(SP)     ;;GET CHAR                      ;MJD001
037364  042716  177600                  BIC     #177600,(SP)    ;;STRIP EXTRANEOUS BITS         ;MJD001
037370  122716  000023                  CMPB    #$XOFF,(SP)     ;;WAS CHAR XOFF                 ;MJD001
037374  001012                          BNE     102$            ;;BR IF NOT                     ;MJD001
037376                          101$:                                                           ;MJD001
037376  105777  141542                  TSTB    @$TKS           ;;WAIT FOR CHAR                 ;MJD001
037402  100375                          BPL     101$                                            ;MJD001
037404  117716  141536                  MOVB    @$TKB,(SP)      ;;GET CHAR                      ;MJD001
037410  042716  177600                  BIC     #177600,(SP)    ;;STRIP IT                      ;MJD001
037414  122716  000021                  CMPB    #$XON,(SP)      ;;WAS IT XON?                   ;MJD001
037420  001366                          BNE     101$            ;;BR IF NOT                     ;MJD001
037422                          102$:                                                           ;MJD001
037422  005726                          TST     (SP)+           ;;FIX STACK                     ;MJD001
037424                          10$:                                                            ;MJD001
037424  105777  141520                  TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
037430  100375                          BPL     10$                                             ;MJD001
037432  126627  000002  000021          CMPB    2(SP),#$XON     ;;IS CHARACTER A RANDOM XON?    ;RAN001
037440  001420                          BEQ     $TYPEX          ;;BRANCH IF YES                 ;RAN001
037442  116677  000002  141502          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
037450  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
037456  001003                          BNE     1$              ;;BRANCH IF NO
037460  105037  037500                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
037464  000406                          BR      $TYPEX          ;;EXI
037466  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
037474  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
037476  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
037500  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
037502  000207          $TYPEX: RTS     PC
```

```
 5908                                   .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
                                        ;*****************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BI  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
 037504  017646  000000         $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
 037510  116637  000001  037727         MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
 037516  112637  037731                 MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
 037522  062716  000002                 ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
 037526  000406                         BR      $TYPON
 037530  112737  000001  037727 $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
 037536  112737  000006  037731         MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
 037544  112737  000005  037726 $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
 037552  010346                         MOV     R3,-(SP)        ;;SAVE R3
 037554  010446                         MOV     R4,-(SP)        ;;SAVE R4
 037556  010546                         MOV     R5,-(SP)        ;;SAVE R5
 037560  113704  037731                 MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
 037564  005404                         NEG     R4
 037566  062704  000006                 ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
 037572  110437  037730                 MOVB    R4,$OMODE       ;;SAVE IT FOR USE
 037576  113704  037727                 MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
 037602  016605  000012                 MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
 037606  005003                         CLR     R3              ;;CLEAR THE OUTPUT WORD
 037610  006105                 1$:     ROL     R5              ;;ROTATE MSB INTO "C"
 037612  000404                         BR      3$              ;;GO DO MSB
 037614  006105                 2$:     ROL     R5              ;;FORM THIS DIGIT
 037616  006105                         ROL     R5
 037620  006105                         ROL     R5
 037622  010503                         MOV     R5,R3
 037624  006103                 3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
 037626  105337  037730                 DECB    $OMODE          ;;TYPE THIS DIGIT?
 037632  100016                         BPL     7$              ;;BR IF NO
 037634  042703  177770                 BIC     #177770,R3      ;;GET RID OF JUNK
 037640  001002                         BNE     4$              ;;TEST FOR 0
 037642  005704                         TST     R4              ;;SUPPRESS THIS 0?
 037644  001403                         BEQ     5$              ;;BR IF YES
 037646  005204                 4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 037650  052703  000060                 BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 037654  052703  000040         5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
```

BINARY TO OCTAL (ASCII) AND TYPE

```
037660  110337  037724                  MOVB    R3,8$           ;;SAVE FOR TYPING
037664  104401  037724                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
037670  105337  037726          7$:     DECB    $OCNT           ;;COUNT BY 1
037674  003347                          BGT     2$              ;;BR IF MORE TO DO
037676  002402                          BLT     6$              ;;BR IF DONE
037700  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
037702  000744                          BR      2$              ;;GO DO THE LAST DIGIT
037704  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
037706  012604                          MOV     (SP)+,R4        ;;RESTORE R4
037710  012603                          MOV     (SP)+,R3        ;;RESTORE R3
037712  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
037720  012616                          MOV     (SP)+,(SP)
037722  000002                          RTI                     ;;RETURN
037724     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
037725     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
037726     000                  $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
037727     000                  $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
037730  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
```

CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

```
 5910                                   .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
 037732                                 $TYPDS:
 037732  010046                                MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 037734  010146                                MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 037736  010246                                MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 037740  010346                                MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 037742  010546                                MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 037744  012746  020200                        MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 037750  016605  000020                        MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 037754  100004                                BPL     1$              ;;BR IF INPUT IS POS.
 037756  005405                                NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 037760  112766  000055  000001                MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 037766  005000                         1$:    CLR     R0              ;;ZERO THE CONSTANTS INDEX
 037770  012703  040146                        MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
 037774  112723  000040                        MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 040000  005002                         2$:    CLR     R2              ;;CLEAR THE BCD NUMBER
 040002  016001  040136                        MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 040006  16010?                         3$:    SUB     R1,R5           ;;FORM THIS BCD DIGIT
 040010  002402                                BLT     4$              ;;BR IF DONE
 040012  005202                                INC     R2              ;;INCREASE THE BCD DIGIT BY 1
 040014  000774                                BR      3$
 040016  060105                         4$:    ADD     R1,R5           ;;ADD BACK THE CONSTANT
 040020  005702                                TST     R2              ;;CHECK IF BCD DIGIT=0
 040022  001002                                BNE     5$              ;;FALL THROUGH IF 0
 040024  105716                                TSTB    (SP)            ;;STILL DOING LEADING 0'S?
 040026  100407                                BMI     7$              ;;BR IF YES
 040030  106316                         5$:    ASLB    (SP)            ;;MSD?
 040032  103003                                BCC     6$              ;;BR IF NO
 040034  116663  000001  177777                MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
 040042  052702  000060                 6$:    BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
 040046  052702  000040                 7$:    BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
 040052  110223                                MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
 040054  005720                                TST     (R0)+           ;;JUST INCREMENTING
 040056  020027  000010                        CMP     R0,#10          ;;CHECK THE TABLE INDEX
 040062  002746                                BLT     2$              ;;GO DO THE NEXT DIGIT
 040064  003002                                BGT     8$              ;;GO TO EXIT
 040066  010502                                MOV     R5,R2           ;;GET THE LSD
 040070  000764                                BR      6$              ;;GO CHANGE TO ASCII
 040072  105726                         8$:    TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
 040074  100003                                BPL     9$              ;;BR IF NO
 040076  116663  177777  177776                MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
 040104  105013                         9$:    CLRB    (R3)            ;;SET THE TERMINATOR
 040106  012605                                MOV     (SP)+,R5        ;;POP STACK INTO R5
 040110  012603                                MOV     (SP)+,R3        ;;POP STACK INTO R3
 040112  012602                                MOV     (SP)+,R2        ;;POP STACK INTO R2
 040114  012601                                MOV     (SP)+,R1        ;;POP STACK INTO R1
 040116  012600                                MOV     (SP)+,R0        ;;POP STACK INTO R0
 040120  104401  040146                        TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
```

```
.FPACO FP11F FLTG PNT PRT A    MACRO M1113  28-MAR-81 12:56  PAGE 61-1
CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

040124  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
040132  012616                          MOV     (SP)+,(SP)
040134  000002                          RTI                     ;;RETURN TO USER
040136  023420                  $DTBL:  10000.
040140  001750                          1000.
040142  000144                          100.
040144  000012                          10.
040146                          $DBLK:  .BLKW   4
```

```
5912                                    .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;*****************************************************************
040156  112737  000001  040422  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
040164  112737  000001  040420  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
040172  000403                          BR      $ATYC
040174  112737  000001  040422  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
040202                          $ATYC:
040202  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
040204  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
040206  105737  040420                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
040212  001450                          BEQ     5$              ;;IF NOT:  BR
040214  122737  000001  001336          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
040222  001031                          BNE     3$              ;;IF NOT:  BR
040224  132737  000100  001337          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
040232  001425                          BEQ     3$              ;;IF NOT:  BR
040234  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
040240  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
040246  005737  001316          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
040252  001375                          BNE     1$              ;;IF NOT:  WAIT
040254  010037  001332                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
040260  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
040262  001376                          BNE     2$
040264  163700  001332                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
040270  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
040272  010037  001334                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
040276  012737  000004  001316          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
040304  000413                          BR      5$
040306  017637  000004  040332  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
040314  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
040322  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
040326  004737  037140                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
040332  000000                  4$:     .WORD   0
040334                          5$:
040334  105737  040422          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
040340  001416                          BEQ     12$             ;;IF NOT:  BR
040342  005737  001336                  TST     $ENV            ;;RUNNING UNDER APT?
040346  001413                          BEQ     12$             ;;IF NOT:  BR
040350  005737  001316          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
040354  001375                          BNE     11$             ;;IF NOT:  WAIT
040356  017637  000004  001320          MOV     @4(SP),$FATAL   ;;GET ERROR #
040364  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
040372  005237  001316                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
040376  105037  040422          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
040402  105037  040421                  CLRB    $LFLG           ;;CLEAR LOG FLAG
040406  105037  040420                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
040412  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
040414  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
040416  000207                          RTS     PC              ;;RETURN
040420     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
040421     000          $LFLG:  .BYTE   0               ;;LOG FLAG
040422     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
                                .EVEN
            000200      APTSIZE=200
            000001      APTENV=001
            000100      APTSPOOL=100
            000040      APTCSUP=040
```

```
5914                                    .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.
040424  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
040432  001074                        BNE     15$             ;;BRANCH IF NO
040434  105777  140504                TSTB    @$TKS           ;;CHAR THERE?
040440  100071                        BPL     15$             ;;IF NO, DON'T WAIT AROUND
040442  117746  140500                MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
040446  042716  177600                BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
040452  022726  000007                CMP     #7,(SP)+        ;;IS IT A CONTROL G?
040456  001062                        BNE     15$             ;;NO, RETURN TO USER
040460  123727  001134  000001        CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
040466  001456                        BEQ     15$             ;;BRANCH IF YES
040470  104401  041043                TYPE    ,$CNT_G         ;;ECHO THE CONTROL-G (^G)
040474  104401  041050        $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
040500  013746  000176                MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
040504  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
040506  104401  041061                TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
040512  005046                19$:    CLR     -(SP)           ;;CLEAR COUNTER
040514  005046                        CLR     -(SP)           ;;THE NEW SWR
040516  105777  140422        7$:     TSTB    @$TKS           ;;CHAR THERE?
040522  100375                        BPL     7$              ;;IF NOT TRY AGAIN
040524  117746  140416                MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
040530  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
040534  021627  000025        9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
040540  001005                        BNE     10$             ;;BRANCH IF NOT
040542  104401  041036                TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
040546  062706  000006        20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
040552  000757                        BR      19$             ;;LET'S TRY IT AGAIN
040554  021627  000015        10$:    CMP     (SP),#15        ;;IS IT A <CR>?
040560  001022                        BNE     16$             ;;BRANCH IF NO
040562  005766  000004                TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
040566  001403                        BEQ     11$             ;;BRANCH IF YES
040570  016677  000002  140342        MOV     2(SP),@SWR      ;;SAVE NEW SWR
040576  062706  000006        11$:    ADD     #6,SP           ;;CLEAR UP STACK
040602  104401  001313        14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
040606  123727  001135  000001        CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
040614  001003                        BNE     15$             ;;BRANCH IF NOT
040616  012777  000100  140320        MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
040624  000002                15$:    RTI                     ;;RETURN
040626  004737  037352        16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
040632  021627  000060                CMP     (SP),#60        ;;CHAR < 0?
040636  002426                        BLT     18$             ;;BRANCH IF YES
040640  021627  000067                CMP     (SP),#67        ;;CHAR > 7?
040644  003015                        BGT     18$             ;;BRANCH IF YES
040646  042726  000060                BIC     #60,(SP)+       ;;STRIP-OFF ASCII
040652  005766  000002                TST     2(SP)           ;;IS THIS THE FIRST CHAR
040656  001403                        BEQ     17$             ;;BRANCH IF YES
040660  006316                        ASL     (SP)            ;;NO, SHIFT PRESENT
040662  006316                        ASL     (SP)            ;;    CHAR OVER TO MAKE
040664  006316                        ASL     (SP)            ;;    ROOM FOR NEW ONE.
040666  005266  000002        17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
```

```
040672  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
040676  000707                          BR      7$              ;;GET THE NEXT ONE
040700  104401  001312          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
040704  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
                                ;
040706  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
040710  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
040716  105777  140222          1$:     TSTB    @$TKS           ;;WAIT FOR
040722  100375                          BPL     1$              ;;A CHARACTER
040724  117766  140214  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
040732  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
040740  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
040746  001013                          BNE     3$              ;;BRANCH IF NO
040750  105777  140170          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
040754  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
040756  117746  140164                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
040762  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
040766  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
040772  001366                          BNE     2$              ;;IF NOT DISCARD IT
040774  000750                          BR      1$              ;;YES, RESUME
040776  026627  000004  000021  3$:     CMP     4(SP),#$XON     ;;IS IT A RANDOM XON?           ;RAN001
041004  001744                          BEQ     1$              ;;BRANCH IF YES                 ;RAN001
041006  026627  000004  000140          CMP     4(SP),#140      ;;IS IT UPPER CASE?
041014  002407                          BLT     4$              ;;BRANCH IF YES
041016  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
041024  003003                          BGT     4$              ;;BRANCH IF YES
041026  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
041034  000002                  4$:     RTI                     ;;GO BACK TO USER
041036     136     125     015  $CNTLU: .ASCIZ   /^U/<15><12>    ;;CONTROL "U"
041043     136     107     015  $CNTLG: .ASCIZ   /^G/<15><12>    ;;CONTROL "G"
041050     015     012     123  $MSWR:  .ASCIZ   <15><12>/SWR = /
041061     040     040     116  $MNEW:  .ASCIZ   /  NEW = /
```

```
                                .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.
041072  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
041074  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
041100  005740                          TST     -(R0)           ;;BACKUP BY 2
041102  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
041104  006300                          ASL     R0              ;;POSITION FOR INDEXING
041106  016000  041126                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
041112  000200                          RTS     R0              ;;GO TO ROUTINE
                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
041114  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
041116  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
041124  000002                          RTI                     ;;RESTORE THE PSW
                                .SBTTL  TRAP TABLE
                                ;+*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.
                                ;       ROUTINE
                                ;       -------
041126  041114                  $TRPAD: .WORD   $TRAP2
041130  037140                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
041132  037530                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
041134  037504                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
041136  037544                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
041140  037732                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
041142  040474                          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
041144  040424                          $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
041146  040706                          $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
041150  037044                          $SAVREG ;;CALL=SAVREG   TRAP+11(104411) SAVE R0-R5 ROUTINE
041152  037102                          $RESREG ;;CALL=RESREG   TRAP+12(104412) RESTORE R0-R5 ROUTINE
5917 041154  042154                     .RSET   ;;CALL=RSETUP   TRAP+13(104413) ROUTINE TO RESET STACK AND FPS
5918         000030             $TERM .-$TRPAD
```

```
5920                                    .SBTTL  POWER DOWN AND UP ROUTINES
                                        ;;*****************************************************************
                                        ;POWER DOWN ROUTINE
041156  012737  041334  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
041164  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
041172  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
041174  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
041176  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
041200  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
041202  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
041204  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
041206  017746  137726                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
041212  010637  041340                  MOV     SP,$SAVR6       ;;SAVE SP
041216  012737  041230  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
041224  000000                          HALT
041226  000776                          BR      .-2             ;;HANG UP
                                        ;;*****************************************************************
                                        ;POWER UP ROUTINE
041230  012737  041334  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
041236  013706  041340                  MOV     $SAVR6,SP       ;;GET SP
041242  005037  041340                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
041246  005237  041340          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
041252  001375                          BNE     1$              ;;OF  WORD
041254  012677  137660                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
041260  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
041262  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
041264  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
041266  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
041270  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
041272  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
041274  012737  041156  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
041302  012737  000340  000026          MOV     #340,@#PWRV C+2 ;;PRIO:7
041310  104401                          TYPE                    ;;REPOP' THE POWER FAILURE
041312  042224          $PWRMG: .WORD   POWERM                  ;;POWER FAIL MESSAGE POINTER
041314  012716                  MOV     (PC)+,(SP)              ;;RESTAR, AT START
041316  003616          $PWRAD: .WORD   START                   ;;RESTART ADDRESS
041320  042766  000020  000002          BIC     #20,2(SP)       ;;CLEAR "T" BIT
041326  005037  036162                  CLR     $TBIT           ;;CLEAR THE "T" BIT FLAG
041332  000002                          RTI
041334  000000          $ILLUP: HALT                            ;;THE POWER UP SEQUENCE WAS STARTED
041336  000776                  BR      .-2                     ;; BEFORE THE POWER DOWN WAS COMPLETE
041340  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 $ERROR ROUTINE
                                ;*OR BY FIRST SETTING $ITEMB EQUAL TO THE ERROR TABLE ITEM TO BE PRINTED
                                ;*OUT AND THEN EXECUTING A:
                                ;*              JSR     PC,ERTYPE
                                ;*
041342  104401  001313          ERTYPE: TYPE    ,$CRLF          ;TYPE A CRLF
041346  113737  001102  001232          MOVB    $TSTNM,$TMP0
041354  042737  177400  001232          BIC     #177400,$TMP0
041362  013737  001116  001234          MOV     $ERRPC,$TMP1    ;GET PC OF CALL
041370  010046                        MOV     R0,-(SP)        ;SAVE R0
041372  113700  001114                MOVB    $ITEMB,R0       ;GET THE ITEM NUMBER.
041376  042700  177400                BIC     #177400,R0      ;CLEAR UPPER BYTE EXPOSING OFFSET
041402  001005                        BNE     1$              ;BRANCH IF OFFSET EXISTS
041404  013746  001116                MOV     $ERRPC,-(SP)    ;IF ZERO THEN JUST
041410  104402                        TYPOC                   ;PRINT THE PC
041412  000137  041740                JMP     ERT5
041416  022700  000377        1$:     CMP     #377,R0
041422  001005                        BNE     20$
041424  016600  000004                MOV     4(SP),R0
041430  011000                        MOV     (R0),R0
041432  062700  000400                ADD     #400,R0
041436  010037  001320        20$:    MOV     R0,$FATAL       ;MOVE ITEM NUMBER TO $FATAL FOR APT     ;DPM001
041442  005300                        DEC     R0              ;OTHERWISE MAKE R0 AN
041444  006300                        ASL     R0              ;INDEX FOR THE TABLE.
041446  006300                        ASL     R0
041450  006300                        ASL     R0
041452  062700  001442                ADD     #$ERRTB,R0
041456  012037  041466        110$:   MOV     (R0)+,2$        ;PICK UP THE ADDRESS OF THE EM, ERROR MESSAGE
041462  001404                        BEQ     3$              ;BRANCH IF NONE
041464  104401                        TYPE
041466  000000          2$:     .WORD   0
041470  104401                        TYPE
041472  001313                        .WORD   $CRLF
041474  012037  041504        3$:     MOV     (R0)+,4$        ;GET THE DH,DATA HEADER
041500  001404                        BEQ     5$
041502  104401                        TYPE
041504  000000          4$:     .WORD   0
041506  104401                        TYPE
041510  001313                        .WORD   $CRLF
041512  010146          5$:     MOV     R1,-(SP)        ;SAVE R1,R2 AND R3
041514  010246                        MOV     R2,-(SP)
041516  010346                        MOV     R3,-(SP)
041520  012001                        MOV     (R0)+,R1        ;GET THE ADDRESS OF THE DATA TABLE
041522  001501                        BEQ     ERT4            ;RETURN IF NO DATA.
041524  011000                        MOV     (R0),R0         ;GET A POINTER TO THE DATA FORMAT TABLE
```

```
5978 041526  105710            ERT1:   TSTB    (R0)            ;FORMAT ZERO?
5979 041530  001003                    BNE     8$              ;BRANCH IF NOT
5980
5981 041532  013146                    MOV     @(R1)+,-(SP)    ;FORMAT ZERO SO TYPE
5982 041534  104402                    TYPOC                   ;AN OCTAL NUMBER.
5983 041536  000465                    BR      ERT2
5984
5985 041540  122710  000002      8$:   CMPB    #2,(R0)         ;FORMAT TWO?
5986 041544  001006                    BNE     9$
5987
5988 041546  013102                    MOV     @(R1)+,R2       ;FORMAT TWO SO TYPE TWO OCTAL NUMBERS
5989 041550  004737  042054            JSR     PC,TOCTNM       ;TYPE 1 NUMBER
5990 041554  004737  042054            JSR     PC,TOCTNM       ;TYPE 2ND NUMBER
5991 041560  000454                    BR      ERT2
5992
5993 041562  122710  000003      9$:   CMPB    #3,(R0)         ;FORMAT THREE?
5994 041566  001007                    BNE     10$             ;BRANCH IF NOT
5995
5996 041570  013102                    MOV     @(R1)+,R2       ;FORMAT THREE SO TYPE FOUR OCTAL NUMBERS.
5997 041572  012703  000004            MOV     #4,R3           ;TYPE 4 NUMBERS
5998 041576  004737  042054      90$:  JSR     PC,TOCTNM       ;TYPE AN OCTAL NUMBER
5999 041602  077303                    SOB     R3,90$          ;SUBTRACT 1 AND BRANCH IF NOT DONE
6000 041604  000442                    BR      ERT2
6001
6002 041606  122710  000004      10$:  CMPB    #4,(R0)         ;FORMAT FOUR?
6003 041612  001004                    BNE     11$             ;BRANCH IF NOT
6004
6005 041614  013146                    MOV     @(R1)+,-(SP)    ;FORMAR FOUR SO TYPE
6006 041616  104403                    TYPOS                   ;AN OCTAL NUMBER
6007 041620     016                    .BYTE   16              ;SUPPRESSING LEADING ZEROES.
6008 041621     000                    .BYTE   0
6009 041622  000433                    BR      ERT2
6010
6011 041624  122710  000005      11$:  CMPB    #5,(R0)         ;FORMAT FIVE?
6012 041630  001005                    BNE     13$
6013
6014 041632  012137  041640            MOV     (R1)+,12$       ;FORMAT FIVE SO TYPE AN
6015 041636  104401                    TYPE                    ;ASCIZ STRING.
6016 041640  000000      12$:  .WORD   0
6017 041642  000425                    BR      ERT3
6018
6019 041644  122710  000011      13$:  CMPB    #11,(R0)        ;FORMAT ELEVEN?
6020 041650  001005                    BNE     15$             ;BRANCH IF NOT
6021 041652  013137  041660            MOV     @(R1)+,14$      ;FORMAT ELEVEN SO PICK
6022 041656  104401                    TYPE                    ;A POINTER TO AN ASCIZ
6023 041660  000000      14$:  .WORD   0                       ;STRING.
6024 041662  000415                    BR      ERT3
6025
6026 041664  122710  000012      15$:  CMPB    #12,(R0)        ;FORMAT TWELVE?
6027 041670  001007                    BNE     17$             ;BRANCH IF NOT
6028
6029 041672  013102                    MOV     @(R1)+,R2       ;FORMAT TWELVE SO TYPE
6030 041674  012703  000006            MOV     #6,R3           ;TYPE SIX OCTAL NUMBERS
6031 041700  004737  042054      16$:  JSR     PC TOCTNM       ;TYPE AN OCTAL NUMBER
6032 041704  077303                    SOB     R3,16$          ;SUBTRACT 1 AND BRANCH IF NOT DONE YET
6033 041706  000401                    BR      ERT2
6034
```

```
 6035 041710  000000                 17$:    HALT                    ;UNDEFINED FORMAT FOR DATA?????
 6036
 6037 041712  104401                 ERT2:   TYPE                    ;PRINT A TAB AFTER TYPING
 6038 041714  042272                         .WORD   $TAB            ;AN DATA TABLE ENTRY
 6039                                                                 ;OF ALL FORMATS EXCEPT
 6040                                                                 ;ASCIZ, FORMATS 5 OR 11
 6041
 6042 041716  005200                 ERT3:   INC     R0              ;POINT TO THE NEXT FORMAT
 6043 041720  005711                         TST     (R1)            ;END OF DATA TABLE.
 6044 041722  001401                         BEQ     ERT4
 6045 041724  000700                         BR      ERT1
 6046
 6047 041726  104401                 ERT4:   TYPE                    ;DONE.
 6048 041730  001313                         .WORD   $CRLF
 6049 041732  012603                         MOV     (SP)+,R3        ;RESTORE R1,R2 AND R3
 6050 041734  012602                         MOV     (SP)+,R2
 6051 041736  012601                         MOV     (SP)+,R1
 6052 041740  012600                 ERT5:   MOV     (SP)+,R0        ;RESTORE R0.
 6053 041742  000207                         RTS     PC              ;AND RETURN.
 6054
 6055
 6056 041744  041754  042010  042040 PFECWS: .WORD   PFECEM,PFECDH,PFECAD,PFECFT ;ADRSES OF DATA/ASCII BELOW ;DPM001
 6057 041754    120     117     127 PFECEM: .ASCIZ  ?POWER MONITOR BIT FOUND SET? ;ERROR MESSAGE             ;DPM001
 6058 042010    124     105     123 PFECDH: .ASCIZ  ?TESTNO  ERR PC  CPUERR? ;ERROR DATA HEADER             ;DPM001
 6059                                        .EVEN
 6060 042040  001202  001116  036502 PFECAD: .WORD   $TESTN,$ERRPC,CPSAVE,0 ;ADDRESSES OF DATA             ;DPM001
 6061 042050    000     000     000 PFECFT: .BYTE   0,0,0,0             ;FORMAT TABLE                       ;DPM001
 6062
 6063 042054  012246                 TOCTNM: MOV     (R2)+,-(SP)     ;MOVE THE NUMBER TO THE STACK FOR PRINTING
 6064 042056  104402                         TYPOC                   ;TYPE AN OCTAL NUMBER
 6065 042060  104401  042274                 TYPE    ,SPACE          ;TYPE A SPACE CHARACTER
 6066 042064  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.
                                ;*
6073 042066  011637  001236    FPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
6074 042072  022626                    CMP     (SP)+,(SP)+             ;RESTORE SP.
6075 042074  170200                    STFPS   R0                      ;GET FPS
6076 042076  010037  001240            MOV     R0,$TMP3
6077 042102  170300                    STST    R0                      ;GET FEC
6078 042104  010037  001242            MOV     R0,$TMP4
6079 042110  104211            1$:     ERROR   +211
6080 042112  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?).

6081 042114  000137  035702            JMP     $EOP
```

```
                                .SBTTL  CPU SPURIOUS TRAP TO 4 HANDLER
                        ;;**************************************************************
                        ;;**************************************************************
                        ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 4.
                        ;*
042120  011637  001236  CPSPUR: MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
042124  022626                  CMP     (SP)+,(SP)+
042126  104212          1$:     ERROR   +212
042130  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?).
042132  000137  035702                  JMP     $EOP
```

CPU SPURIOUS TRAP TO 10 HANDLER

```
                                        .SBTTL  CPU SPURIOUS TRAP TO 10 HANDLER
                                ;;**************************************************************
                                ;;**************************************************************
                                ;*THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 10.
                                ;*
042136  011637  001236          CPTW0:  MOV     (SP),$TMP2              ;SAVE PC OF TRAP.
042142  022626                          CMP     (SP)+,(SP)+
042144  104213                  1$:     ERROR   +213
042146  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?).
042150  000137  035702                  JMP     $EOP
```

FLAG RESET AND CONSOLE TEST ROUTINE

```
                                        .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.
                                ;*
6109 042154  023727  001140  177570  .RSET:  CMP     SWR,#177570     ;SEE IF THERE IS A PHYSICAL
6110                                                                 ;CONSOLE SWITCH REGISTER.
6111 042162  001001                          BNE     1$              ;BRANCH IF NO.
6112 042164  104407                          CKSWR                   ;OTHERWISE TYPE THE CONTENTS
6113                                                                 ;OF THE PROGRAM VIRTUAL SWITCH REGISTER
6114                                                                 ;AND GIVE THE USER A CHANCE TO
6115                                                                 ;MODIFY IT.
6116 042166  012737  042066  000244  1$:     MOV     #FPSPUR,FPVECT
6117 042174  012737  042120  000004          MOV     #CPSPUR,ERRVECT
6118 042202  012737  042136  000010          MOV     #CPTWO,10
6119 042210  011600                          MOV     (SP),R0         ;SAVE RETURN ADDRESS.
6120 042212  012706  001100                  MOV     #STACK,SP       ;RESET THE STACK POINTER.
6121 042216  005004                          CLR     R4              ;CLEAR THE FPS.
6122 042220  170104                          LDFPS   R4
6123 042222  000110                          JMP     (R0)            ;RETURN.
```

SPECIAL MESSAGES

```
6124                                            .SBTTL  SPECIAL MESSAGES
6125 042224  200  120  117  POWERM: .ASCIZ  <CRLF>'POWER FAILURE. PROGRAM RESTARTING.'<CRLF>
6126 042271  000       000  NULL:   .BYTE   0
6127 042272  011  000       $TAB:   .ASCIZ  <TAB>
6128 042274  040  040  000  SPACE:  .ASCIZ  ' '
6129 042277  200  120  103  LFIEX1: .ASCIZ  <CRLF>'PC OF LAST FPP INSTRUCTION EXECUTED: '<TAB>
6130 042347  200  114  101  LFIEX2: .ASCIZ  <CRLF>'LAST FPP INSTRUCTION EXECUTED: '<TAB>
6131 042411  200  106  114  FPSMS:  .ASCIZ  <CRLF>'FLOATING POINT STATUS REGISTER:  '
6132 042455  200  106  105  FECMS:  .ASCIZ  <CRLF>'FEC:  '
6133 042466  124  110  105  $THE:   .ASCIZ  'THE '
6134 042473  011  040  111  NOOP1:  .ASCIZ  <TAB>' INSTRUCTION FAILED.'<CRLF>
6135 042522  105  111  124  NOOP15: .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR MICROPROGRAM FLOW WENT'
6136 042617  200  106  122  NOOP2:  .ASCIZ  <CRLF>'FROM STATE '
6137 042634  124  117  040  NOOP3:  .ASCIZ  'TO STATE '
6138 042646  200  111  116  NOOP4:  .ASCIZ  <CRLF>'INSTEAD OF '
6139 042663  200  124  110  NOOP5:  .ASCIZ  <CRLF>'THEREBY EXECUTING A '
6140 042717  011  040  111  NOOP6:  .ASCIZ  <TAB>' INSTEAD OF A '
6141 042731  011  040  111  NOOP7:  .ASCIZ  <TAB>' INSTRUCTION.'<CRLF>
6142 042751  040  040  124  NOOP10: .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
6143 043012  107  117  124       .ASCIZ  'GOT FPS. EXPECTED FPS.'<CRLF>
6144 043042  101  040  102  NOOP11: .ASCIZ  'A BAD CONSTANT MAY HAVE BEEN USED.'<CRLF>
6145 043106  011  114  104  LFPS1:  .ASCIZ  <TAB>'LDFPS'<TAB>'REG'
6146 043121  011  114  104  LD1:    .ASCIZ  <TAB>'LDD'<TAB>'(REG),A'<TAB>'//FSRC#0//'
6147 043151  011  114  104  LD2:    .ASCIZ  <TAB>'LDD'<TAB>'A,A'
6148 043162  011  123  124  STFS1:  .ASCIZ  <TAB>'STFPS'<TAB>'REG'
6149 043175  011  123  124  ST1:    .ASCIZ  <TAB>'STD'<TAB>'A,(REG)'
6150 043212  011  123  124  ST2:    .ASCIZ  <TAB>'STD'<TAB>'A,A'
6151 043223  011  103  106  CFCC1:  .ASCIZ  <TAB>'CFCC'
6152 043231  011  123  105  SETF1:  .ASCIZ  <TAB>'SETF'
6153 043237  011  123  105  SETD1:  .ASCIZ  <TAB>'SETD'
6154 043245  011  123  105  SETI1:  .ASCIZ  <TAB>'SETI'
6155 043253  011  123  105  SETL1:  .ASCIZ  <TAB>'SETL'
6156 043261  011  111  114  ILL1:   .ASCIZ  <TAB>'ILLEGAL FPP INSTRUCTION'
6157 043312  011  123  124  STST1:  .ASCIZ  <TAB>'STST'<TAB>'REG'
6158 043324  011  111  114  ILL2:   .ASCIZ  <TAB> ILLEGAL FPP INSTRUCTION (FID-1)'
6159 043365  040  040  124  ILLMS:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FPS.'<CRLF>
6160 043433  105  130  120  MS1:    .ASCIZ  'EXPECTED '
6161 043445  107  117  124  MS2:    .ASCIZ  'GOT '
6162 043452  103  117  116  MS3:    .ASCIZ  'CONTENTS OF LOCATIONS '
6163 043501  040  124  110  MS4:    .ASCIZ  ' THROUGH '
6164 043513  106  101  111  MS5:    .ASCIZ  'FAILURE IN THE MICROPROGRAM FLOW.'
6165 043555  103  117  116  MS6:    .ASCIZ  'CONTROL WENT '
6166 043573  106  122  117  MS7:    .ASCIZ  'FROM STATE '
6167 043607  040  124  117  MS10:   .ASCIZ  ' TO STATE '
6168 043622  102  125  124  MS11:   .ASCIZ  'BUT SHOULD HAVE GONE'
6169 043647  103  117  116  MS12:   .ASCIZ  'CONTROL FLOW SHOULD HAVE GONE'
6170 043705  102  125  124  MS13:   .ASCIZ  'BUT DID NOT.'
6171 043722  040  040  124  MS14:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
6172 043763  107  117  124       .ASCIZ  'GOT PC.'<TAB>'EXPECTED PC.'
6173 044010  111  116  123  MS15:   .ASCIZ  'INSTRUCTION TESTED: '
6174 044035  040  117  122  MS16:   .ASCIZ  ' OR '
6175 044042  124  105  123  MS17:   .ASCIZ  'TESTING ACCUMULATOR '
6176 044067  132  105  122  MNUM0:  .ASCIZ  'ZERO '
6177 044075  117  116  105  MNUM1:  .ASCIZ  'ONE '
6178 044102  124  127  117  MNUM2:  .ASCIZ  'TWO '
6179 044107  124  110  122  MNUM3:  .ASCIZ  'THREE '
6180 044116  106  117  125  MNUM4:  .ASCIZ  'FOUR '
```

SPECIAL MESSAGES

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6181 044124  106  111  126  MNUM5:  .ASCIZ  'FIVE '
6182 044132  040  040  124  MS20:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
6183 044173  104  101  124  MS21:   .ASCIZ  'DATA (FLOATING POINT NUMBER): '
6184 044232  114  117  107  MS22:   .ASCIZ  'LOGICAL AND OF FAILING '
6185 044262  114  117  107  MS23:   .ASCIZ  'LOGICAL OR OF FAILING '
6186 044311  040  040  124  MS24:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERRORS.'<TAB>
6187 044353  116  125  115         .ASCIZ  'NUMBER OF ERRORS(OCTAL).'
6188 044404  105  130  120  MS25:   .ASCIZ  'EXPECTED DATA IN '
6189 044426  107  117  124  MS26:   .ASCIZ  'GOT DATA IN '
6190 044443  200  101  103  MS27:   .ASCIZ  <CRLF>'AC0= '
6191 044452  200  101  103  MS30:   .ASCIZ  <CRLF>'AC1= '
6192 044461  200  101  103  MS31:   .ASCIZ  <CRLF>'AC2= '
6193 044470  200  101  103  MS32:   .ASCIZ  <CRLF>'AC3= '
6194 044477  200  101  103  MS33:   .ASCIZ  <CRLF>'AC4= '
6195 044506  200  101  103  MS34:   .ASCIZ  <CRLF>'AC5= '
6196 044515  123  105  124  MS35:   .ASCIZ  'SET '
6197 044522  103  114  105  MS36:   .ASCIZ  'CLEAR '
6198 044531  114  117  101  MS37:   .ASCIZ  'LOADED DATA: '
6199 044547  122  105  101  MS40:   .ASCIZ  'READ DATA: '
6200 044563  105  130  120  MS415:  .ASCIZ  'EXPECTED DATA: '
6201 044603  104  101  124  MS41:   .ASCIZ  'DATA IN (R0) FSRC: '
6202 044627  104  101  124  MS42:   .ASCIZ  'DATA IN AC0: '
6203 044645  107  117  124  MS43:   .ASCIZ  'GOT RESULT: '
6204 044662  105  130  120  MS44:   .ASCIZ  'EXPECTED RESULT: '
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ERROR MESSAGES

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                                        .SBTTL  ERROR MESSAGES
044704  114  104  106  EM1:    .ASCIZ  'LDFPS AND STFPS TEST FAILED.'
044741  114  104  106  EM2:    .ASCIZ  'LDFPS AND STFPS TEST ERROR SUMMARY.'
045005  103  106  103  EM3:    .ASCIZ  'CFCC TRANSFERED BAD DATA TO THE PSW.'
045052  103  106  103  EM4:    .ASCIZ  'CFCC MODIFIED THE FPS REGISTER.'
045112  125  116  105  EM5:    .ASCIZ  'UNEXPECTED FPP TRAP TO 244.'
045146  125  116  105  EM6:    .ASCIZ  'UNEXPECTED CPU TRAP TO 4.'
045200  125  116  105  EM7:    .ASCIZ  'UNEXPECTED CPU TRAP TO 10.'
        045112                EM10=EM7
045233  125  116  101  EM11:   .ASCIZ  'UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 10.'
        000000                EM12=0
        000000                EM13=0
045314  114  104  106  EM14:   .ASCII  'LDFPS R0 FAILED IN THE FSRC FLOWS.'
045356  040  124  122          .ASCII  ' TRAPPED TO 4.'
045374  200  104  111          .ASCIZ  <CRLF>'DID NOT GO FROM STATE 400 TO 670.'
045437  123  124  106  EM15:   .ASCII  'STFPS R1 FAILED IN THE FDST FLOWS.'
045501  040  124  122          .ASCII  ' TRAPPED TO 4.'
045517  200  104  111          .ASCIZ  <CRLF>'DID NOT GO FROM STATE 634 TO 710.'
045562  101  116  040  EM16:   .ASCIZ  'AN ILLECAL FPP INSTRUCTION DID NOT TRAP.'
045633  101  116  040  EM17:   .ASCII  'AN ILLEGAL FPP INSTRUCTION'
045665  200  124  122          .ASCII  <CRLF>'TRAPPED TO 244, BUT FAILED TO SET '
045730  124  110  105          .ASCII  'THE FPS CORRECTLY.'<CRLF>'EITHER A BAD CONSTANT '
046001  127  101  123          .ASCIZ  'WAS GENERATED OR THE ALU LOGICAL OR FUNCTION FAILED.'
046066  101  116  040  EM20:   .ASCII  'AN ILLEGAL FPP INSTRUCTION'
046120  040  124  122          .ASCII  ' TRAPPED TO 244, BUT A SUBSEQUENT '
046162  040  123  124          .ASCII  ' STST'<CRLF>
046170  106  101  111          .ASCIZ  'FAILED TO PICK UP THE CORRECT FEC CODE - 2.'
046244  123  124  123  EM21:   .ASCII  'STST R4 FAILED IN THE DESTINATION FLOWS.'
046314  040  124  122          .ASCII  ' TRAPPED TO 4.'<CRLF>
046333  104  111  104          .ASCIZ  'DID NOT GO FROM STATE 636 TO 710.'
046375  101  116  040  EM22:   .ASCII  'AN ILLEGAL FPP INSTRUCTION,'
046430  127  111  124          .ASCIZ  'WITH INTERRUPTS DISABLED.'
        046375                EM23=EM22
        046375                EM24=EM22
046462  123  117  125  EM25:   .ASCII  'SOURCE LOCATIONS MODIFIED BY, LDD.'
046524  200  101  040          .ASCIZ  <CRLF>'A DATO WAS PERFORMED INSTEAD OF A DATI.'
046575  114  104  104  EM26:   .ASCII  'LDD (R0),AC0 FAILED.'<CRLF>
046622  122  060  040          .ASCIZ  'R0 WAS MODIFIED.'
        046575                EM27=EM26
046643  124  110  105  EM30:   .ASCII  'THE PC WAS BAD AFTER  '
046671  101  116  040          .ASCIZ  'AN FPP INSTRUCTION.'
046715  123  124  104  EM31:   .ASCII  'STD AC0,(R0) FAILED.'<CRLF>
046742  122  060  040          .ASCIZ  'R0 WAS MODIFIED.'
        046715                EM32=EM31
046763  123  124  104  EM33:   .ASCII  'STD AC0,(R0) FAILED.'<CRLF>
047010  117  125  124          .ASCIZ  'OUTPUT BAD.'
047024  123  124  104  EM34:   .ASCII  'STD AC0,(R0) FAILED IN THE FDST FLOWS.'
047072  200  124  110          .ASCIZ  <CRLF>'THE (BUT GR7) FORK FAILED.'
047126  114  104  104  EM35:   .ASCII  'LDD (R0),AC0 FAILED IN THE FSRC FLOWS.'
047174  200  124  110          .ASCIZ  <CRLF>'THE (BUT GR7) FORK FAILED.'
047230  123  124  104  EM36:   .ASCII  'STD AC0,(R0) FAILED IN THE FDST FLOWS.'
047276  200  124  110          .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
047331  114  104  104  EM37:   .ASCII  'LDD (R0),AC0 FAILED IN THE FSRC FLOWS.'
047377  200  124  110          .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
047432  114  104  104  EM40:   .ASCII  'LDD (R0),AC0 OR THE STD AC0,(R0) FAILED.'
047502  200  102  101          .ASCIZ  <CRLF>'BAD DATA WAS DETECTED AFTER A SEQUENCE OF THE TWO INSTRUCTIONS.'
047603  106  120  123  EM41:   .ASCIZ  'FPS BAD AFTER EXECUTION OF: '
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ERROR MESSAGES

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6266 047640                          EM42:
     047640   114   104   104               .ASCII  /LDD (R0),AC0 FAILED IN THE FSRC FLOWS./<CRLF>
     047707   124   110   105               .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6267 047761                          EM43:
     047761   123   124   104               .ASCII  /STD AC0,(R0) FAILED IN THE FDST FLOWS./<CRLF>
     050030   124   110   105               .ASCIZ  /THE (BUT FDST) FORK FAILED. TRAPPED TO 4./
6268 050102   106   120   120  EM44:        .ASCIZ  'FPP ACCUMULATORS DATA TEST FAILED.'
6269          050102          EM45=EM44
6270 050145   106   120   120  EM46:        .ASCIZ  'FPP ACCUMULATORS DUAL ADDRESSING TEST FAILED.'
6275 050223                          EM47:
     050223   114   104   040               .ASCII  /LD AC1,AC0 FAILED IN THE FSRC FLOWS./
     050267   124   110   105               .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6276 050341   114   104   040  EM50:        .ASCII  'LD AC1,AC0 FAILED IN THE FSRC FLOWS.'
6277 050405   124   110   105               .ASCIZ  'THE (BUT FD) FORK FAILED.'
6278 050437   114   104   040  EM51:        .ASCIZ  'LD AC1,AC0 TRANSFERRED BAD DATA.'
6288 050500                          EM52:
     050500   114   104   104               .ASCII  /LDD (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     050547   124   110   105               .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6289 050621                          EM53:
     050621   114   104   104               .ASCII  /LDD (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     050670   200   122   060               .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     050705   105   111   124               .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     050754   104   111   104               .ASCIZ  \DID NOT GO FROM STATE 627 TO 322.\
6290 051016                          EM54:
     051016   114   104   104               .ASCIZ  /LDD (R0)+,AC0 TRANSFERRED BAD DATA./
6291 051062                          EM55:
     051062   114   104   104               .ASCII  /LDD -(R0),AC0 FAILED IN THE FSRC FLOWS./
     051131   124   110   105               .ASCIZ  /THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6292 051203                          EM56:
     051203   114   104   104               .ASCII  /LDD -(R0),AC0 FAILED IN THE FSRC FLOWS./
     051252   200   122   060               .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     051267   105   111   124               .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     051336   104   111   104               .ASCIZ  \DID NOT GO FROM STATE 627 TO 324.\
6293 051400                          EM57:
     051400   114   104   104               .ASCIZ  /LDD -(R0),AC0 TRANSFERRED BAD DATA./
6294 051444                          EM60:
     051444   114   104   106               .ASCII  /LDF (R0)+,AC0 FAILED IN THE FSRC FLOWS./
     051513   200   122   060               .ASCII  <CRLF>'R0 WAS BAD.'<CRLF>
     051530   105   111   124               .ASCII  'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
     051577   104   111   104               .ASCIZ  \DID NOT GO FROM STATE 627 TO 322.\
6295 051641                          EM61:
     051641   114   104   105               .ASCIZ  /LDF (R0)+,AC0 TRANSFERRED BAD DATA./
6296 051705   114   104   106  EM62:        .ASCII  'LDF (R0)+,AC0 FAILED IN THE FSRC FLOWS.'
6297 051754   200   124   110               .ASCII  <CRLF>'THE (BUT FD) FORK FAILED.'<CRLF>
6298 052007   127   105   116               .ASCII  'WENT FROM STATE 441 TO 077.'<CRLF>
6299 052043   111   116   123               .ASCIZ  'INSTEAD OF FROM 441 TO 076.'
6300 052077   114   104   104  EM63:        .ASCII  'LDD #NUM,AC0 FAILED IN THE FSRC FLOWS.'
6301 052145   200   124   110               .ASCII  <CRLF>'THE (BUT GR7) FORK FAILED.'<CRLF>
6302 052201   127   105   116               .ASCII  'WENT FROM STATE 207 TO 174.'<CRLF>
6303 052235   111   116   123               .ASCIZ  'INSTEAD OF FROM 207 TO 176.'
6304 052271   114   104   104  EM64:        .ASCII  'LDD #NUM,AC0 FAILED IN THE FSRC FLOWS.'
6305 052337   200   101   040               .ASCIZ  <CRLF>'A BAD CONSTANT WAS USED WHEN THE PC WAS INCREMENTED.'
6306          052271          EM65-EM64
6307 052425                          EM66:
     052425   114   104   104               .ASCIZ  /LDD #NUM,AC0 TRANSFERRED BAD DATA./
6329 052470                          EM67:
     052470   114   104   104               .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
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ERROR MESSAGES

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        052540  200  124  110          .ASCII  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
        052612  200  127  105          .ASCII  <CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326.\
        052664  200  111  116          .ASCIZ  <CRLF>\INSTEAD OF FROM 627 TO 323.\
  6330  052721                  EM70:
        052721  114  104  104          .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
        052771  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
  6331  053044                  EM71:
        053044  114  104  104          .ASCII  'LDD @(R0)+,AC0 FAILED IN THE FSRC FLOWS.'
        053114  124  110  1..          .ASCIZ  'THE (BUT FD) FORK FAILED.'
  6332  053146                  EM72:
        053146  114  104  104          .ASCII  'LDD @(R0)+,AC0'<CRLF>
        053165  106  101  111          .ASCIZ  'FAILED TO INCREMENT R0 BY 2.'
  6333  053222                  EM73:
        053222  114  104  104          .ASCIZ  'LDD @(R0)+,AC0 LOADED BAD DATA.'
  6334  053262                  EM74:
        053262  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
        053332  200  124  110          .ASCII  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
        053404  200  127  105          .ASCII  <CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326.\
        053456  200   11  116          .ASCIZ  <CRLF>\INSTEAD OF FROM 627 TO 325.\
  6335  053513                  EM75:
        053513  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
        053563  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
  6336  053636                  EM76:
        053636  114  104  104          .ASCII  'LDD @-(R0),AC0 FAILED IN THE FSRC FLOWS.'
        053706  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
  6337  053740                  EM77:
        053740  114  104  104          .ASCII  'LDD @-(R0),AC0'<CRLF>
        053757  106  101  111          .ASCIZ  'FAILED TO DECREMENT R0 BY 2.'
  6338  054014                  EM100:
        054014  114  104  104          .ASCIZ  'LDD @-(R0),AC0 LOADED BAD DATA.'
  6339  054054                  EM101:
        054054  114  104  104          .ASCII  'LDD NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
        054125  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
  6340  054200                  EM102:
        054200  114  104  104          .ASCII  'LDD NUM(R0),AC0'<CRLF>
        054220  106  101  111          .ASCIZ  'FAILED TO AFFECT R0 BY 2.'
  6341  054252                  EM103:
        054252  114  104  104          .ASCII  'LDD NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
        054323  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
  6342  054355                  FM104:
        054355  114  104  104          .ASCIZ  'LDD NUM(R0),AC0 LOADED BAD DATA.'
  6343  054416                  EM105:
        054416  114  104  104          .ASCII  'LDD @NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
        054470  200  124  110          .ASCIZ  <CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
  6344  054543                  EM106:
        054543  114  104  104          .ASCII  'LDD @NUM(R0),AC0'<CRLF>
        054564  106  101  111          .ASCIZ  'FAILED TO AFFECT R0 BY 2.'
  6345  054616                  EM107:
        054616  114  104  104          .ASCII  'LDD @NUM(R0),AC0 FAILED IN THE FSRC FLOWS.'
        054670  124  110  105          .ASCIZ  'THE (BUT FD) FORK FAILED.'
  6346  054722                  EM110:
        054722  114  104  104          .ASCIZ  'LDD @NUM(R0),AC0 LOADED BAD DATA.'
  6362  054764                  EM111:
        054764  114  104  104          .ASCII  /LDD AC7,AC0 FAILED TO TRAP TO 244./
        055026  200  101  103          .ASCIZ  <CRLF>/AC7 IS AN ILLEGAL ACCUMULATOR./
  6363        054764            EM112=EM111
  6364  055066                  EM113:
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ERROR MESSAGES

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        055066     114     104     104          .ASCII  /LDD AC6,AC0 FAILED TO TRAP TO 244./
        055130     200     101     103          .ASCIZ  <CRLF>/AC6 IS AN ILLEGAL ACCUMULATOR./
 6365           055066                  EM114=EM113
 6366           054764                  EM115=EM111
 6367           055066                  EM116=EM113
 6368 055170                            EM117:
        055170     125     123     105          .ASCII  'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO,'
        055252     200     124     122          .ASCIZ  <CRLF>'TRAPPED BUT FAILED TO SET FPS CORRECTLY.'
 6369 055324                            EM120:
        055324     125     123     105          .ASCII  'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO,'
        055406     200     124     122          .ASCIZ  <CRLF>'TRAPPED BUT FAILED TO SET FEC CORRECTLY.'
 6370 055460     123     124     040  EM121:  .ASCII  'ST AC0,AC1 FAILED IN THE FDST FLOWS.'
 6371 055524     200     124     110          .ASCIZ  <CRLF>'THE (BUT FDST) FORK FAILED. TRAPPED TO 4.'
 6372 055577     123     124     040  EM122:  .ASCII  'ST AC0,AC1 FAILED IN THE FDST FLOWS.'
 6373 055643     200     124     110          .ASCIZ  <CRLF>'THE (BUT FD) FORK FAILED.'
 6374 055676     123     124     040  EM123:  .ASCIZ  'ST AC0,AC1 TRANSFERRED BAD DATA.'
 6375 055737                            EM124:
        055737     106     120     123          .ASCII  'FPS BAD AFTER LDD (R0),AC0.'
        055772     200     124     110          .ASCIZ  <CRLF>\THE (BUT EZBT Y8) FORK FAILED.\
 6376 056032                            EM125:
        056032     106     120     123          .ASCII  'FPS BAD AFTER LDD (R0),AC0.'
        056065     200     124     110          .ASCIZ  <CRLF>\THE (BUT ENBT) FORK FAILED.\
 6377 056122     114     104     104  EM126:  .ASCII  'LDD (R0),AC0 TRAPPED TO 244.'
 6378 056156     040     106     123          .ASCII  ' FSRC= -0 AND FIUV= 0.'<CRLF>
 6379 056205     124     110     105          .ASCII  'THE (BUT FIUV) FORK FAILED.'
 6380 056240     200     127     105          .ASCII  <CRLF>'WENT FROM STATE 256 TO 354.'
 6381 056274     200     111     116          .ASCIZ  <CRLF>'INSTEAD OF FROM 256 TO 254.'
 6382 056331     114     104     104  EM127:  .ASCII  'LDD (R0),AC0 FAILED TO TRAP TO 244.'
 6383 056374     040     106     123          .ASCII  ' FSRC= -0, FIUV= 1.'
 6384 056417     200     124     110          .ASCII  <CRLF>'THE (BUT FIUV) FOR FAILED.'<CRLF>
 6385 056453     127     105     116          .ASCII  'WENT FROM STATE 256 TO 254.'
 6386 056506     200     111     116          .ASCIZ  <CRLF>'INSTEAD OF FROM 256 THE 354.'
 6387 056544     114     104     104  EM130:  .ASCII  'LDD (R0),AC0 TRAPPED TO 244.'
 6388 056600     106     123     122          .ASCII  'FSRC= -0, FIUV= 1.'<CRLF>
 6389 056623     102     125     124          .ASCIZ  'BUT FEC WAS BAD.'
 6390 056644                            EM131:
        056644     114     104     103          .ASCIZ  /LDCFD (R0),AC0 LOADED BAD DATA./
 6391 056704                            EM132:
        056704     114     104     103          .ASCIZ  /LDCDF (R0),AC0 LOADED BAD DATA./
 6432 056744                            EM133:
        056744     101     104     104          .ASCIZ  /ADDD (R0),AC0 WITH (R0)=AC0-0 /
 6433 057003                            EM134:
        057003     101     104     104          .ASCIZ  /ADDF (R0),AC0 WITH (R0)=AC0=0 /
 6434 057042                            EM135:
        057042     123     125     102          .ASCIZ  /SUBD (R0),AC0 WITH (R0)=AC0=0 /
 6435 057101                            EM136:
        057101     123     125     102          .ASCIZ  /SUBF (R0),AC0 WITH (R0)=AC0=0 /
 6436           056744                  EM137=EM133
 6437           057003                  EM140=EM134
 6438           057042                  EM141=EM135
 6439           057101                  EM142=EM136
 6440 057140                            EM143:
        057140     101     104     104          .ASCIZ  /ADDD (R0),AC0 WITH (R0)=0 /
 6441 057173                            EM144:
        057173     123     125     102          .ASCIZ  /SUBD (R0),AC0 WITH (R0)=0 /
 6442           057140                  EM145=EM143
 6443           057173                  EM146 EM144
```

ERROR MESSAGES

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6444 057226
     057226    123    125    102    EM147:  .ASCIZ  /SUBD (R0),AC0 WITH AC0=0 /
6445           057226                EM150=EM147
6446           057226                EM151=EM147
6447 057260                          EM152:
     057260    101    104    104            .ASCIZ  /ADDD (R0),AC0 WITH AC0=0 /
6448           057260                EM153=EM152
6449 057312                          EM154:
     057312    101    116    040            .ASCII  'AN OVERFLOW ERROR OCCURRED ON ADD'<CRLF>
     057354    103    101    125            .ASCII  'CAUSING A TRAP TO 244.'
     057402    200    050    102            .ASCII  <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
     057473    200    123    110            .ASCIZ  <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
6450 057544                          EM155:
     057544    101    116    040            .ASCII  'AN UNDERFLOW ERROR OCCURRED ON ADD'<CRLF>
     057607    103    101    125            .ASCII  'CAUSING A TRAP TO 244.'
     057635    200    050    102            .ASCII  <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
     057726    200    123    110            .ASCIZ  <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
6451 057777                          EM156:
     057777    101    104    104            .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./
     060035    200    124    110            .ASCII  <CRLF>'THE (BUT FD) FORK FAILED. WENT'
     060114    106    122    117            .ASCII  \FROM STATE 665 TO 113.\<CRLF>
     060143    111    116    123            .ASCIZ  \INSTEAD OF FROM 665 TO 313.\<CRLF>\WITH FT SET.\
6452 060214                          EM157:
     060214    101    104    104            .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./
     060272    200    124    110            .ASCII  <CRLF>'THE (BUT FD) FORK FAILED. WENT'
     060331    106    122    117            .ASCII  \FROM STATE 665 TO 313.\<CRLF>
     060360    111    116    123            .ASCIZ  \INSTEAD OF FROM 665 TO 113.\<CRLF>\WITH FT CLEAR.\
6453 060433                          EM160:
     060433    101    104    104            .ASCII  /ADDD (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
     060512    124    110    105            .ASCII  'THE FLOATING CONSTANT WAS USED INSTEAD OF THE DOUBLE CONSTANT'<CRLF>
     060610    111    116    040            .ASCIZ  'IN THE ROUND ALGORITHM.'
6454 060640                          EM161:
     060640    101    104    104            .ASCII  /ADDF (R0),AC0 FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
     060717    124    110    105            .ASCII  'THE DOUBLE CONSTANT WAS USED INSTEAD OF THE FLOATING CONSTANT'<CRLF>
     061015    111    116    040            .ASCIZ  'IN THE ROUND ALGORITHM.'
6455 061045                          EM162:
     061045    101    104    104            .ASCIZ  /ADDD (R0),AC0 PRODUCED A BAD RESULT./
6456 061112                          EM163:
     061112    101    104    104            .ASCIZ  /ADDF (R0),AC0 PRODUCED A BAD RESULT./
6457 061157                          EM164:
     061157    124    110    105            .ASCIZ  \THE FPS WAS BAD AFTER ADDD (R0),AC0.\
6458 061224                          EM165:
     061224    124    110    105            .ASCIZ  \THE FPS WAS BAD AFTER ADDF (R0),AC0.\
6459 061271                          EM166:
     061271    101    104    104            .ASCII  /ADDD (R0),AC0 PRODUCED A BAD RESULT./<CRLF>
     061336    120    122    117            .ASCIZ  'PROBABLE ERROR IN THE ALIGN FLOWS.'
6460 061401                          EM167:
     061401    101    104    104            .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
     061452    106    114    117            .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 111, TO 014.\
     061542    200    101    040            .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
     061577    127    101    123            .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
6461 061640                          EM170:
     061640    101    104    104            .ASCII  /ADDF (R0),AC0 PRODUCED A BAD RESULT./<CRLF>
     061705    120    122    117            .ASCIZ  'PROBABLE ERROR IN THE ALIGN FLOWS.'
6462 061750                          EM171:
     061750    101    104    104            .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
     062021    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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        062111  200  101  040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
        062146  127  101  123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6463 062207                    EM172:
        062207  101  104  104          .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
        062260  106  114  117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
        062350  200  101  040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
        062405  127  101  123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6464 062446                    EM173:
        062446  101  104  104          .ASCII  /ADDD (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
        062517  106  114  117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
        062607  200  101  040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
        062644  127  101  123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6465 062705                    EM174:
        062705  101  104  104          .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
        062756  106  114  117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
        063046  200  101  040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
        063103  127  101  123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6466 063144                    EM175:
        063144  101  104  104          .ASCII  /ADDF (R0),AC0 FAILED IN THE ALIGN FLOWS./<CRLF>
        063215  106  114  117          .ASCII  \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
        063305  200  101  040          .ASCII  <CRLF>\A BAD CONSTANT (NOT 25 DEC) \
        063342  127  101  123          .ASCIZ  'WAS USED IN THE ALIGN ALGORITHM.'
 6467 063403                    EM176:
        063403  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        063456  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 442, TO 500.\
 6468 063540  120  117  127  EM177:   .ASCIZ  'POWER MONITOR BIT FOUND SET'
 6469 063574                    EM200:
        063574  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        063647  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 121.\
 6470 063731                    EM201:
        063731  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        064004  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 101.\
 6471 064066                    EM202:
        064066  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        064141  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 042, TO 101.\
 6472 064223                    EM203:
        064223  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        064276  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 440, TO 141.\
 6473 064360                    EM204:
        064360  101  104  104          .ASCII  'ADDD (R0),AC0 FAILED IN THE ADD-SUB FLOWS.'<CRLF>
        064433  104  111  104          .ASCIZ  \DID NOT TAKE THE PATH: STATE 216, TO 042, TO 141.\
 6474 064515                    EM205:
        064515  124  110  105          .ASCIZ  \THE FPS WAS BAD AFTER SUBD (R0),AC0.\
 6475 064562                    EM206:
        064562  123  125  102          .ASCIZ  /SUBD (R0),AC0 PRODUCED A BAD RESULT./
 6476 064627  123  125  102  EM207:   .ASCII  'SUBD (R0),AC0 PRODUCED A BAD RESULT.'
 6477 064673  200  124  110          .ASCIZ  <CRLF>'THE XOR OF THE SIGN BIT FAILED IN STATE 024.'
 6478 064751  101  104  104  EM210:   .ASCIZ  'ADDD (R0),AC0 FAILED IN THE NORMALIZE FLOWS.'
 6479       045112                    EM211=EM5
 6480       045146                    EM212=EM6
 6481       045200                    EM213=EM7
 6482 065026                    EM214:
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ERROR MESSAGES

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        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 121.\
   6483                                             .SBTTL  DATA HEADERS
   6484 065163      040     040     124  DH1:       .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6485 065223      011     127     122             .ASCIZ  <TAB>'WROTE.'<TAB>'READ.'<TAB>'EXPECTED.'
   6486 065253      040     040     124  DH2:       .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6487 065313      101     116     104             .ASCIZ  'AND BAD DATA.'<TAB>'OR BAD DATA.'
   6488 065346      040     040     124  DH3:       .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6489 065406      011     122     105             .ASCIZ  <TAB>'READ PSW.'<TAB>'EXPECTED PSW.'
   6490 065437      040     040     124  DH4:       .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6491 065477      011     127     122             .ASCIZ  <TAB>'WROTE FPS.'<TAB>'FPS AFTER CFCC.'
   6492 065533      040     040     124  DH5:       .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
   6493         065533                  DH6=DH5
   6494         065533                  DH7=DH5
   6495         065533                  DH10=DH5
   6496         065533                  DH11=DH5
   6497         000000                  DH12=0
   6498         000000                  DH13=0
   6499         065533                  DH14=DH5
   6500         065533                  DH15=DH5
   6501 065573      040     040     124  DH16:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6502 065633      011     117     120             .ASCIZ  <TAB>'OP CODE.  FPS.'
   6503 065653      040     040     124  DH17:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6504 065713      011     107     117             .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
   6505 065743      040     040     124  DH20:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
   6506 066002      011     120     103             .ASCIZ  <TAB>'PC OF STST.'<TAB>'READ FEC.'
   6507         065533                  DH21=DH5
   6508 066031      106     101     111  DH22:      .ASCIZ  'FAILED TO CORRECTLY SET FPS.'
   6509 066066      106     101     111  DH23:      .ASCII  'FAILED TO CORRECTLY SET FEC TO 000002.'<CRLF>
   6510 066135      040     040     124             .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6511 066175      011     120     103             .ASCIZ  <TAB>'PC OF STST.'<TAB>'READ FEC.'
   6512 066224      124     122     101  DH24:      .ASCII  'TRAPPED TO 244. FLOW WENT FROM STATE 554 TO STATE 430.'
   6513 066312      200     111     116             .ASCIZ  <CRLF>'INSTEAD OF FROM STATE 554 TO STATE 432.'
   6514 066363      040     040     124  DH25:      .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
   6515 066425      040     040     124  DH26:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6516 066465      011     107     117             .ASCIZ  <TAB>'GOT R0.'<TAB>'EXPECTED R0.'
   6517         066425                  DH27=DH26
   6518         000000                  DH30=0
   6519         066425                  DH31=DH26
   6520         066425                  DH32=DH26
   6521 066513      040     040     124  DH33:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6522 066553      011     122     060             .ASCIZ  <TAB>'R0 (TARGET LOCATIONS FOR OUTPUT).'
   6523         066513                  DH34=DH33
   6524         066513                  DH35=DH33
   6525         066513                  DH36=DH33
   6526         066513                  DH37=DH33
   6527         066513                  DH40=DH33
   6528         000000                  DH41=0
   6529 066616      040     040     124  DH42:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
   6530 066655      011     122     060             .ASCIZ  <TAB>'R0 (TARGET LOCATIONS FOR OUTPUT).'
   6531         066616                  DH43=DH42
   6532         000000                  DH44=0
   6533 066720      105     122     122  DH45:      .ASCIZ  'ERROR SUMMARY.'
   6534 066737      040     040     124  DH46:      .ASCIZ  '  TEST.'<TAB>'CALL AT PC.'
   6535         066720                  DH47=DH45
   6536 066763      040     040     124  DH50:      .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
   6537 067023      011     127     111             .ASCIZ  <TAB>'WITH FD.'
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DATA HEADERS

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6538            066763                  DH51=DH50
6539            065533                  DH52=DH5
6540            066425                  DH53=DH26
6541 067035      040      040     124   DH54:   .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
6542            065533                  DH55=DH5
6543            066425                  DH56=DH26
6544            067035                  DH57 DH54
6545            066425                  DH60=DH26
6546            067035                  DH61=DH54
6547            067035                  DH62=DH54
6548            067035                  DH63=DH54
6549 067076      122      105     123   DH65:   .ASCII  'RESULTING IN AN ODD ADDRESS TRAP TO 4.'
6550 067144      200                    .ASCII  <CRLF>
6551 067145      040      040     124   DH64:   .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
6552 067205      011      107     117           .ASCIZ  <TAB>'GOT PC.'<TAB>'EXPECTED PC.'
6553            067035                  DH66=DH54
6554            065533                  DH67=DH5
6555            065533                  DH70=DH5
6556            066363                  DH71=DH25
6557            066425                  DH72=DH26
6558            067035                  DH73=DH54
6559            065533                  DH74=DH5
6560            065533                  DH75=DH5
6561            066363                  DH76=DH25
6562            066425                  DH77=DH26
6563            067035                  DH100=DH54
6564            065533                  DH101=DH5
6565            066425                  DH102=DH26
6566            066363                  DH103=DH25
6567            067035                  DH104=DH54
6568            065533                  DH105=DH5
6569            066425                  DH106=DH26
6570            066363                  DH107=DH25
6571            067035                  DH110=DH54
6572            066363                  DH111=DH25
6573 067233      124      110     105   DH112:  .ASCII  'THE (BUT FSRC) FORK FAILED.'<CRLF>
6574 067267      103      117     116           .ASCII  'CONTROL WENT FROM STATE 762 TO STATE 627.'
6575 067340      200      111     116           .ASCII  <CRLF>'INSTEAD OF FROM STATE 762 TO STATE 637.'<CRLF>
6576 067411      040      040     124           .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
6577            066363                  DH113=DH25
6578            067233                  DH114=DH112
6579 067452      124      110     105   DH115:  .ASCII  'THE (BUT FSRC) FORK FAILED RESULTING IN AN ODD ADDRESS TRAP TO 4.'
6580 067553      200      103     117           .ASCII  <CRLF>'CONTROL WENT FROM STATE 762 TO STATE 627.'<CRLF>
6581 067626      111      116     123           .ASCII  'INSTEAD OF FROM STATE 762 TO STATE 627.'<CRLF>
6582 067676      040      040     124           .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
6583            067452                  DH116=DH115
6584            065653                  DH117=DH17
6585 067736      040      040     124   DH120:  .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
6586 067776      011      107     117           .ASCIZ  <TAB>'GOT PEC.'<TAB>'EXPECTED PEC.'
6587            065533                  DH121=DH5
6588            066763                  DH122=DH50
6589            066763                  DH123=DH50
6590            065653                  DH124=DH17
6591            065653                  DH125=DH17
6592            065533                  DH126=DH5
6593            067035                  DH127 DH54
6594            067736                  DH130=DH120
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DATA HEADERS

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                067035                  DH131=DH54
                067035                  DH132=DH54
070026    106   101   111   DH133:  .ASCII  'FAILED TO PRODUCE THE CORRECT RESULTS.'<CRLF>
070075    040   040   124           .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
                070026                  DH134=DH133
                070026                  DH135=DH133
                070026                  DH136=DH133
070136    120   122   117   DH137:  .ASCII  'PRODUCED THE CORRECT RESULT BUT FAILED TO SET THE FPS CORRECTLY.'
070236    040   040   124           .ASCII  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
070276    011   107   117           .ASCIZ  <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
                070136                  DH140=DH137
                070136                  DH141=DH137
                070136                  DH142=DH137
                070026                  DH143=DH133
                070026                  DH144=DH133
                070136                  DH145=DH137
                070136                  DH146=DH137
                067035                  DH147=DH54
070326    130   117   122   DH150:  .ASCII  'XOR OF SIGN BIT FAILED.'<CRLF>
070356    040   040   124           .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
                070136                  DH151=DH137
                070026                  DH152=DH133
                070136                  DH153=DH137
070417    040   040   124   DH154:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
                070417                  DH155=DH154
                067035                  DH156=DH54
                067035                  DH157=DH54
                067035                  DH160=DH54
                067035                  DH161=DH54
                067035                  DH162=DH54
                067035                  DH163=DH54
                065653                  DH164=DH17
                065653                  DH165=DH17
                067035                  DH166=DH54
                067035                  DH167=DH54
                067035                  DH170=DH54
                067035                  DH171=DH54
                067035                  DH172=DH54
                067035                  DH173=DH54
                067035                  DH174=DH54
                067035                  DH175=DH54
                067035                  DH176=DH54
070457    040   040   124   DH177:  .ASCIZ  '  TEST.  ERR PC  CPU ERROR REGISTER'
                067035                  DH200=DH54
                067035                  DH201=DH54
                067035                  DH202=DH54
                067035                  DH203=DH54
                067035                  DH204=DH54
                065653                  DH205=DH17
                067035                  DH206=DH54
                067035                  DH207=DH54
                067035                  DH210=DH54
070523    040   040   124   DH211:  .ASCIZ  '  TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'PSW.'
                065533                  DH212=DH5
                065533                  DH213=DH5
                067035                  DH214=DH54
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DATA FORMATS

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6651                                            .SBTTL  DATA FORMATS
6652 070570     004     000     005    DF1:     .BYTE   4,0,5,0,5,0,0,0
6653 070600     004     000     005    DF2:     .BYTE   4,0,5,4,5,0,5,0
6654 070610     004     000     005    DF3:     .BYTE   4,0,5,0,5,0,5,0
6655            070610                 DF4=DF3
6656 070620     004     000     005    DF5:     .BYTE   4,0,5,0,5,0,5,11,5,0,5,0
6657            070620                 DF6=DF5
6658            070620                 DF7=DF5
6659            070620                 DF10=DF5
6660            070620                 DF11=DF5
6661 070634     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
6662 070666     005     011     005    DF13:    .BYTE   5,11,5,5,5,4,0,5,0,5,0,0
6663            070620                 DF14=DF6
6664            070620                 DF15=DF6
6665 070702     004     000     005    DF16:    .BYTE   4,0,5,0,5  ,0
6666            070610                 DF17=DF3
6667 070711     004     000     005    DF20:    .BYTE   4,0,5,  ,0,5,0
6668 070721     004     000     005    DF21:    .BYTE   4,0,5,0
6669 070725     005     005     004    DF22:    .BYTE   5,5,4,0,5,0,5,0,5,0
6670 070737     004     000     005    DF23:    .BYTE   4,0,5,0,5,0,5,0
6671 070747     005     004     000    DF24:    .BYTE   5,4,0,5,0,5,0
6672 070756     004     000     005    DF25:    .BYTE   4,0,5,0,5,5,5,0,5,0,5,0,5,5,5,0,5,0,5,0
6673 071002     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
6674 071027     004     000     005    DF27:    .BYTE   4,0,5,0,5,0,0,5,5,5,5,4,5,4,5,5
6675 071047     005     011     005    DF30:    .BYTE   5,11,5,5,5,4,0,5,0,5,0,0
6676            071002                 DF31=DF26
6677            071027                 DF32=DF27
6678 071063     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
6679 071111     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
6680            071111                 DF35=DF34
6681            071111                 DF36=DF34
6682            071111                 DF37=DF34
6683 071135     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
6684 071163     011     005     005    DF41:    .BYTE   11,5,5,5,4,0,5,0,5,0,5,0
6685 071177     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
6686            071177                 DF43=DF42
6687 071225     005     011     005    DF44:    .BYTE   5,11,5,5,5,4,0,5,0,5,5,5,5,3,5,5,5,5,3
6688 071250     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
6689 071275     004     000     005    DF46:    .BYTE   4,0,5,5,5,3,5,3,5,3,5,3,5,3,5,5,5,3,5,3,5,3,5,3,5,3
6690 071327     004     000     005    DF47:    .BYTE   4,0,5,0,5,5,5,4,5,4,5,5,
6691 071344     004     000     005    DF50:    .BYTE   4,0,5,0,5,11,5,  ,5,5,4,5,4,5,5,5,5,4,5,4
6692 071370     004     000     005    DF51:    .BYTE   4,0,5,0,5,11,5,5,5,3,5,5,5,3
6693            071327                 DF52=DF47
6694 071406     004     000     005    DF53:    .BYTE   4,0,5,0,5,0,0
6695 071415     004     000     005    DF54:    .BYTE   4,0 5,0,5,5,5,5,3,5,5,5,5,3
6696            071327                 DF55=DF47
6697            071406                 DF56=DF53
6698            071415                 DF57=DF54
6699            071406                 DF60=DF53
6700            071415                 DF61=DF54
6701            071415                 DF62=DF54
6702            071415                 DF63=DF54
6703 071433     004     000     005    DF64:    .BYTE   4,0,5,0,5,0,0
6704            071433                 DF65=DF64
6705            071415                 DF66=DF54
6706            070721                 DF67=DF21
6707 071442     004     000     005    DF70:    .BYTE   4,0,5,0,5,5,5,5,4,5,4,5,5,5,5,4,5,4
```

DATA FORMATS

```
6708                071442                          DF71=DF70
6709 071464          004        000        005      DF72:    .BYTE   4,0,5,0,5,0,0
6710                071415                          DF73=DF54
6711                070721                          DF74=DF21
6712                071442                          DF75=DF70
6713                071442                          DF76=DF70
6714                071464                          DF77=DF72
6715                071415                          DF100=DF54
6716                071442                          DF101=DF70
6717                071464                          DF102=DF72
6718                071442                          DF103=DF70
6719                071415                          DF104=DF54
6720                071442                          DF105=DF70
6721                071464                          DF106=DF72
6722                071442                          DF107=DF70
6723                071415                          DF110=DF54
6724 071473          004        000        005      DF111:   .BYTE   4,0,5,0
6725                071473                          DF112=DF111
6726                071473                          DF113=DF111
6727                071473                          DF114=DF111
6728                071473                          DF115=DF111
6729                071473                          DF116=DF111
6730                070610                          DF117=DF3
6731                070610                          DF120=DF3
6732                071327                          DF121=DF47
6733                071344                          DF122=DF50
6734                071370                          DF123=DF51
6735 071477          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
6736                071477                          DF125=DF124
6737                071473                          DF126=DF111
6738                071473                          DF127=DF111
6739                070610                          DF130=DF3
6740 071530          004        000        005      DF131:   .BYTE   4,0,5,0,5,5,5,3,5,5,5,3,5,5,5,3
6741                071530                          DF132=DF131
6742 071550          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
6743                071550                          DF134=DF133
6744                071550                          DF135=DF133
6745                071550                          DF136=DF133
6746 071574          004        000        005      DF137:   .BYTE   4,0,5,0,5,0,5,0
6747                071574                          DF140=DF137
6748                071574                          DF141=DF137
6749                071574                          DF142=DF137
6750                071550                          DF143=DF133
6751                071550                          DF144=DF133
6752                071574                          DF145=DF137
6753                071574                          DF146=DF137
6754                071550                          DF147=DF133
6755                071550                          DF150=DF133
6756                071574                          DF151=DF137
6757                071550                          DF152=DF133
6758                071574                          DF153=DF137
6759 071604          004        000        005      DF154:   .BYTE   4,0,5,0
6760                071604                          DF155=DF154
6761                071550                          DF156=DF133
6762                071550                          DF157=DF133
6763                071550                          DF160=DF133
6764 071610          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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 6765            071550                  DF162=DF133
 6766            071610                  DF163=DF161
 6767            070610                  DF164=DF3
 6768            070610                  DF165=DF3
 6769            071550                  DF166=DF133
 6770            071550                  DF167=DF133
 6771            071610                  DF170=DF161
 6772            071610                  DF171=DF161
 6773            071550                  DF172=DF133
 6774            071550                  DF173=DF133
 6775            071610                  DF174=DF161
 6776            071610                  DF175=DF161
 6777            071550                  DF176=DF133
 6778 071634       004       000   000   DF177:  .BYTE   4,0,0
 6779            071550                  DF200=DF133
 6780            071550                  DF201=DF133
 6781            071550                  DF202=DF133
 6782            071550                  DF203=DF133
 6783            071550                  DF204=DF133
 6784            070610                  DF205=DF3
 6785            071550                  DF206=DF133
 6786            071550                  DF207=DF133
 6787            071550                  DF210=DF133
 6788 071637       004       000   005   DF211:  .BYTE   4,0,5,0,5,0
 6789            071637                  DF212=DF211
 6790            071637                  DF213=DF211
 6791            071550                  DF214=DF133
 6792                                    .EVEN
```

DATA TABLES

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                                                .SBTTL  DATA TABLES
071646  001232  001234  042272  DT1:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
071662  001242  001244  000000          .WORD   $TMP4,$TMP5,0
071670  001232  001234  042272  DT2:    .WORD   $TMP0,$TMP1,$TAB,AERFLG,$TAB,$TMP2,$TAB,$TMP3,0
071712  001232  001234  042272  DT3:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
071726  042272  001242  000000          .WORD   $TAB,$TMP4,0
        071712                  DT4=DT3
071734  001232  001234  042272  DT5:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,LFIEX1,$TMP21,LFIEX2
071752  001272  042411  001240          .WORD   $TMP20,FPSMS,$TMP3,FECMS,$TMP4,0
071766  001232  001234  042272  DT6:    .WORD   $TMP0,$TMP1,$TAB,$TMP2,LFIEX1,$TMP21,LFIEX2,$TMP20,0
        071766                  DT7=DT6
        071766                  DT10=DT6
        071766                  DT11=DT6
072010  042466  001252  042473  DT12:   .WORD   $THE,$TMP10,NOOP1,NOOP15,NOOP2,$TMP5
072024  042634  001246  042646          .WORD   NOOP3,$TMP6,NOOP4,NOOP2,$TMP5,NOOP3,$TMP7,NOOP5,$TMP11
072046  042711  001252  042731          .WORD   NOOP6,$TMP10,NOOP7,NOOP10,$TMP0,$TMP1,$TAB,$TMP2
072066  042272  001240  001242          .WORD   $TAB,$TMP3,$TMP4,0
072076  042466  001252  042473  DT13:   .WORD   $THE,$TMP10,NOOP1,NOOP11,NOOP10,$TMP0,$TMP1,$TAB
072116  001236  042272  001240          .WORD   $TMP2,$TAB,$TMP3,$TMP4,0
        071766                  DT14=DT6
        071766                  DT15=DT6
072130  001232  001234  042272  DT16:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP5,$TMP3,0
        071712                  DT17=DT3
072150  001232  001234  042272  DT20:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072164  042272  001242  000000          .WORD   $TAB,$TMP4,0
072172  001232  001234  042272  DT21:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
072204  065346  001313          DT22:   .WORD   DH3,$CRLF
072210  001232  001234  042272          .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072224  042272  001242  000000          .WORD   $TAB,$TMP4,0
072232  001232  001234  042272  DT23:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072246  042272  001242  000000          .WORD   $TAB,$TMP4,0
072254  043365                  DT24:   .WORD   ILLMS
072256  001232  001234  042272          .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072272  042272  001242  000000          .WORD   $TAB,$TMP4,0
072300  001232  001234  042272  DT25:   .WORD   $TMP0,$TMP1,$TAB,$CRLF,MS1,MS3,$TMP3,MS4,$TMP4,$CRLF
072324  001242  001313  043445          .WORD   $TMP4,$CRLF,MS2,MS3,$TMP5,MS4,$TMP6,$CRLF,$TMP5,0
072350  001232  001234  042272  DT26:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,$CRLF
072370  043555  001313  043573          .WORD   MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
072406  043622  001313  043573          .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
072424  001232  001234  042272  DT27:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072440  001242  001313  043647          .WORD   $TMP4,$CRLF,MS12,$CRLF,MS7,$TMP5,MS10,$TMP7,$CRLF,MS13,0
072466  044010  001272  001313  DT30:   .WORD   MS15,$TMP20,$CRLF,MS14,$CRLF
072500  001232  001234  042272          .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072514  001242  000000                  .WORD   $TMP4,0
        072350                  DT31 DT26
        072424                  DT32-DT27
072520  001232  001234  042272  DT33:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072534  001313  043433  043452          .WORD   $CRLF,MS1,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP6,$CRLF
072556  043445  043452  001242          .WORD   MS2,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP4,0
072576  001232  001234  042272  DT34:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
072612  001313  043555  001313          .WORD   $CRLF,MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
072632  043622  001313  043573          .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
        072576                  DT35=DT34
        072576                  DT36=DT34
        072576                  DT37=DT34
        072520                  DT40=DT33
072650  001272  001313  065346  DT41:   .WORD   $TMP20,$CRLF,DH3,$CRLF
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DATA TABLES

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6850 072660  001232  001234  042272          .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
6851 072674  042272  001242  000000          .WORD   $TAB,$TMP4,0
6852 072702  001232  001234  042272  DT42:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
6853 072716  001313  043555  001313          .WORD   $CRLF,MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$TMP15,$TMP10
6854 072740  001313  043622  001313          .WORD   $CRLF,MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
6855         072702                  DT43=DT42
6856 072760  044042  001244  001313  DT44:   .WORD   MS17,$TMP5,$CRLF,MS20,$CRLF,$TMP0,$TMP1,$TAB,$TMP2
6857 073002  001313  043433  044173          .WORD   $CRLF,MS1,MS21,$CRLF,$TMP3,$CRLF,MS2,MS21,$CRLF,$TMP4,0
6858 073030  044042  001244  001313  DT45:   .WORD   MS17,$TMP5,$CRLF,MS24,$CRLF,$TMP0,$TMP1,$TAB,$TMP2,$TAB
6859 073054  001246  001313  044232          .WORD   $TMP6,$CRLF,MS22,MS21,$CRLF,$TMP3,$CRLF
6860 073072  044262  044173  001313          .WORD   MS23,MS21,$CRLF,$TMP4,0
6861 073104  001232  001234  001313  DT46:   .WORD   $TMP0,$TMP1,$CRLF,MS25,MS30,$TMP2,MS31,$TMP3
6862 073124  044470  000242  044477          .WORD   MS32,$TMP4,MS33,$TMP5,MS34,$TMP6,$CRLF,MS26
6863 073144  044452  000250  044461          .WORD   MS30,$TMP7,MS31,$TMP10
6864 073154  044470  001254  044477          .WORD   MS32,$TMP11,MS33,$TMP12,MS34,$TMP13,0
6865 073172  001232  001234  042272  DT47:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS12,MS7,$TMP3,MS10
6866 073214  001242  001313  043705          .WORD   $TMP4,$CRLF,MS13,0
6867         072576                  DT50-DT34
6868 073224  001232  001234  042272  DT51:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
6869 073240  001313  044404  044443          .WORD   $CRLF,MS25,MS27,$TMP4,$CRLF,MS26,MS27,$TMP5,0
6870         073172                  DT52=DT47
6871 073262  001232  001234  042272  DT53:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
6872 073276  001242  000000                  .WORD   $TMP4,0
6873 073302  001232  001234  042272  DT54:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS1,MS21,$CRLF,$TMP3
6874 073324  001313  043445  044173          .WORD   $CRLF,MS2,MS21,$CRLF,$TMP3,0
6875         073172                  DT55=DT47
6876         073262                  DT56=DT53
6877         073302                  DT57=DT54
6878         073262                  DT60=DT53
6879         073302                  DT61=DT54
6880         073302                  DT62=DT54
6881         073302                  DT63=DT54
6882 073340  001232  001234  042272  DT64:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
6883 073354  001242  000000                  .WORD   $TMP4,0
6884         073340                  DT65=DT64
6885         073302                  DT66=DT54
6886         072172                  DT67=DT21
6887 073360  001232  001234  042272  DT70:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS6,$CRLF,MS7,$TMP5
6888 073402  043607  001246  001313          .WORD   MS10,$TMP6,$CRLF,MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
6889         073360                  DT71=DT70
6890 073426  001232  001234  042272  DT72:   .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,0
6891         073302                  DT73=DT54
6892         072172                  DT74=DT21
6893         073360                  DT75=DT70
6894         073360                  DT76=DT70
6895         073426                  DT77=DT72
6896         073302                  DT100=DT54
6897         073360                  DT101=DT70
6898         073360                  DT102=DT71
6899         073360                  DT103=DT70
6900         073302                  DT104=DT54
6901         073360                  DT105=DT70
6902         073426                  DT106=DT72
6903         073360                  DT107=DT70
6904         073302                  DT110=DT54
6905 073446  001232  001234  042272  DT111:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
6906         073446                  DT112=DT111
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DATA TABLES

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6907                073446                      DT113=DT111
6908                073446                      DT114=DT111
6909                073446                      DT115=DT111
6910                073446                      DT116=DT111
6911                071712                      DT117=DT3
6912                071712                      DT120=DT3
6913                073172                      DT121=DT47
6914                072576                      DT122=DT34
6915                073224                      DT123=DT51
6916 073460  001232 001234  042272  DT124:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,$CRLF
6917 073500  043555 001313  043573          .WORD   MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
6918 073516  043622 001313  043573          .WORD   MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,$CRLF,MS37,$CRLF,$TMP10,0
6919                073460                      DT125=DT124
6920                073446                      DT126=DT111
6921                073446                      DT127=DT111
6922                071712                      DT130=DT3
6923 073544  001232 001234  042272  DT131:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS37,$CRLF,$TMP3
6924 073564  001313 044547  001313          .WORD   $CRLF,MS40,$CRLF,$TMP4,$CRLF,MS415,$CRLF,$TMP5,0
6925                073544                      DT132=DT131
6926 073606  001232 001234  042272  DT133:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$CRLF,MS41,$CRLF,$TMP3
6927 073626  001313 044627  001313          .WORD   $CRLF,MS42,$CRLF,$TMP4,$CRLF,MS43,$CRLF,$TMP5
6928 073646  001313 044662  001313          .WORD   $CRLF,MS44,$CRLF,$TMP6,0
6929                073606                      DT134=DT133
6930                073606                      DT135=DT133
6931                073606                      DT136=DT133
6932 073660  001232 001234  042272  DT137:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TMP10,$TAB,$TMP11,0
6933                073660                      DT140=DT137
6934                073660                      DT141=DT137
6935                073660                      DT142=DT137
6936                073606                      DT143=DT133
6937                073606                      DT144=DT133
6938                073660                      DT145=DT137
6939                073660                      DT146=DT137
6940                073606                      DT147=DT133
6941                073606                      DT150=DT133
6942                073660                      DT151=DT137
6943                073606                      DT152=DT133
6944                073660                      DT153=DT137
6945 073700  001232 001234  042272  DT154:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
6946                073700                      DT155=DT154
6947                073606                      DT156=DT133
6948                073606                      DT157=DT133
6949                073606                      DT160=DT133
6950                073606                      DT161=DT133
6951                073606                      DT162=DT133
6952                073606                      DT163=DT133
6953                071712                      DT164=DT3
6954                071712                      DT165=DT3
6955                073606                      DT166=DT133
6956                073606                      DT167=DT133
6957                073606                      DT170=DT133
6958                073606                      DT171=DT133
6959                073606                      DT172=DT133
6960                073606                      DT173=DT133
6961                073606                      DT174=DT133
6962                073606                      DT175=DT133
6963                073606                      DT176=DT133
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DATA TABLES

```
 6964 073712  001232  001234  036502  DT177:  .WORD   $TMP0,$TMP1,CPSAVE,0
 6965         073606                  DT200=DT133
 6966         073606                  DT201=DT133
 6967         073606                  DT202=DT133
 6968         073606                  DT203=DT133
 6969         073606                  DT204=DT133
 6970         071712                  DT205=DT3
 6971         073606                  DT206=DT133
 6972         073606                  DT207=DT133
 6973         073606                  DT210=DT133
 6974 073722  001232  001234  042272  DT211:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,0
 6975 073740  001232  001234  042272  DT212:  .WORD   $TMP0,$TMP1,$TAB,$TMP2,0
 6976         073740                  DT213=DT212
 6977         073606                  DT214=DT133
 6978         000000                          .END
```

SYMBOL TABLE

```
AADATO  027226        ADDW12= 000000        A6      004526        BERR1   004762        CCP2    031034
AADONE  027326        ADDW13= 000000        A7      004552        BITSTS  014072        CCP3    031044
AAERR0  026660        ADDW14= 000000        BBDATO  032350        BIT0  = 000001        CCP4    031054
AAERR1  026746        ADDW15= 000000        BBDONE  032500        BIT00 = 000001        CCP5    031064
AAERR2  027002        ADDW2 = 000000        BBER0   032036        BIT01 = 000002        CCP6    031074
AAERR3  027036        ADDW3 = 000000        BBER1   032076        BIT02 = 000004        CCP7    031104
AAERR4  027046        ADDW4 = 000000        BBER10  032056        BIT03 = 000010        CC1     027332
AAERR5  027102        ADDW5 = 000000        BBER11  032112        BIT04 = 000020        CC10    027556
AAERR6  027136        ADDW6 = 000000        BBER2   032134        BIT05 = 000040        CC11    027566
AAERR7  027172        ADDW7 = 000000        BBER3   032152        BIT06 = 000100        CC12    027574
AAER10  026754        ADDW8 = 000000        BBER4   032206        BIT07 = 000200        CC13    027606
AAPAT0  027236        ADDW9 = 000000        BBER40  032222        BIT08 = 000400        CC14    027642
AAPAT1  027246        ADEVCT= 000000        BBER5   032242        BIT09 = 001000        CC15    027666
AAPAT2  027256        ADEVM = 000000        BBER6   032260        BIT1  = 000002        CC16    027706
AAPAT3  027266        ADONE   004670        BBER7   032314        BIT10 = 002000        CC17    027716
AAPAT4  027276        AENV  = 000000        BBER8   032332        BIT11 = 004000        CC18    027724
AAPAT5  027306        AENVM = 000000        BBPAT0  032360        BIT12 = 010000        CC19    027736
AAPAT6  027316        AERFLG  004560        BBPAT1  032370        BIT13 = 020000        CC2     027366
AA1     026264        AERR1   004562        BBPAT2  032400        BIT14 = 040000        CC20    027772
AA10    026404        AERR2   004574        BBPAT3  032410        BIT15 = 100000        CC21    030016
AA11    026440        AERR3   004626        BBPAT4  032420        BIT2  = 000004        CC22    030036
AA12    026442        AFATAL= 000000        BBPAT5  032430        BIT3  = 000010        CC23    030046
AA13    026460        AMADR1= 000000        BBPAT6  032440        BIT4  = 000020        CC24    030054
AA14    026500        AMADR2= 000000        BBP10   032460        BIT5  = 000040        CC25    030066
AA15    026520        AMADR3= 000000        BBP11   032470        BIT6  = 000100        CC26    030122
AA16    026526        AMADR4= 000000        BBP7    032450        BIT7  = 000200        CC27    030144
AA17    026532        AMAMS1= 000000        BB1     031150        BIT8  = 000400        CC28    030164
AA2     026326        AMAMS2= 000000        BB10    031334        BIT9  = 001000        CC29    030174
AA20    026536        AMAMS3= 000000        BB11    031354        BPTVEC= 000014        CC3     027410
AA21    026540        AMAMS4= 000000        BB12    031364        B1      004706        CC30    030202
AA22    026576        AMSGAD= 000000        BB13    031372        B2      004710        CC31    030214
AA23    026600        AMSGLG= 000000        BB14    031404        B3      004726        CC32    030250
AA24    026620        AMSGTY= 000000        BB15    031440        CCDATO  031004        CC33    030272
AA25    026640        AMTYP1= 000000        BB16    031464        CCDONE  031144        CC34    030312
AA26    026646        AMTYP2= 000000        BB17    031474        CCER0   030346        CC35    030322
AA27    026652        AMTYP3= 000000        BB2     031212        CCER1   030402        CC36    030330
AA3     026330        AMTYP4= 000000        BB20    031506        CCER10  030714        CC37    030342
AA4     026346        APASS = 000000        BB21    031542        CCER11  030732        CC4     027430
AA5     026366        APRIOR= 000000        BB22    031566        CCER12  030750        CC5     027440
AA6     026374        APTCSU= 000040        BB23    031606        CCER13  030766        CC6     027446
AA7     026402        APTENV= 000001        BB24    031616        CCER2   030440        CC7     027460
ABASE = 000000        APTSIZ= 000200        BB25    031624        CCER22  030454        CC8     027514
ACDW1 = 000000        APTSPO= 000100        BB26    031636        CCER3   030476        CC9     027536
ACDW2 = 000000        ASWREG= 000000        BB27    031672        CCER4   030514        CDONE   005742
ACPUOP= 000000        ATESTN= 000000        BB3     031216        CCER44  030530        CERR1   005476
AC0   =%000000        AUNIT = 000000        BB30    031714        CCER5   030552        CERR2   005574
AC1   =%000001        AUSWR = 000000        BB31    031724        CCER50  030416        CERR3   005674
AC2   =%000002        AVECT1= 000000        BB32    031736        CCER55  030566        CERR4   005716
AC3   =%000003        AVECT2= 000000        BB33    031772        CCER6   030606        CFCC1   043223
AC4   =%000004        A05     004476        BB34    032014        CCER7   030642        CHFNUM  013772
AC5   =%000005        A1      004350        BB35    032024        CCER8   030660        CKSWR = 104407
AC6   =%000006        A11     004350        BB4     031234        CCER90  030364        CNT   = 000214
AC7   =%000007        A12     004364        BB5     031244        CCP0    031014        CPC     005740
ADDW0 = 000000        A2      004422        BB6     031256        CCP1    031024        CPSAVE  036502
ADDW1 = 000000        A3      004426        BB7     031312        CCP10   031114        CPSPUR  042120
ADDW10= 000000        A4      004474        BDONE   004776        CCP11   031124        CPTWO   042136
ADDW11  000000        A5      004500        BERR    004732        CCP12   031134        CR      000015
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SYMBOL TABLE

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CRLF  = 000200
C1      005016
C15     005044
C2      005070
C25     005104
C3      005132
C35     005162
C4      005210
C45     005222
C5      005250
C55     005276
C6      005322
C65     005336
C7      005364
C75     005414
C8      005442
C85     005454
DDDATO  034400
DDDONE  034530
DDERO   033612
DDER1   033630
DDER10  034246
DDER11  034304
DDER12  034342
DDER2   033666
DDER3   033724
DDER4   033762
DDER5   034020
DDER6   034056
DDER7   034114
DDER8   034152
DDER9   034210
DDISP = 177570
DDONE   006210
DDP0    034410
DDP1    034420
DDP2    034430
DDP3    034440
DDP4    034450
DDP5    034460
DDP6    034470
DDP7    034500
DDP8    034510
DDP9    034520
DD1     032504
DD10    032714
DD11    032724
DD12    032742
DD13    032776
DD14    033020
DD15    033030
DD16    033046
DD17    033102
DD18    033124
DD19    033144
DD2     032540
DD20    033154
DD21    033162
DD22    033174
DD23    033230
DD24    033252
DD25    033272
DD26    033302
DD27    033310
DD3     032562
DD30    033322
DD31    033356
DD32    033400
DD33    033420
DD34    033430
DD35    033436
DD36    033454
DD37    033510
DD38    033532
DD39    033552
DD4     032602
DD40    033562
DD41    033570
DD42    033606
DD5     032612
DD6     032620
DD7     032636
DD8     032672
DERR1   006070
DERR2   006164
DF1     070570
DF10  = 070620
DF100 = 071415
DF101 = 071442
DF102 = 071464
DF103 = 071442
DF104 = 071415
DF105 = 071442
DF106 = 071464
DF107 = 071442
DF11  = 070620
DF110 = 071415
DF111   071473
DF112 = 071473
DF113 = 071473
DF114 = 071473
DF115 = 071473
DF116 = 071473
DF117 = 070610
DF12    070634
DF120 = 070610
DF121 = 071327
DF122 = 071344
DF123 = 071370
DF124   071477
DF125 = 071477
DF126 = 071473
DF127 = 071473
DF13    070666
DF130 = 070610
DF131   071530
DF132 = 071530
DF133   071550
DF134 = 071550
DF135 = 071550
DF136 = 071550
DF137   071574
DF14  = 070620
DF140 = 071574
DF141 = 071574
DF142 = 071574
DF143 = 071550
DF144 = 071550
DF145 = 071574
DF146 = 071574
DF147 = 071550
DF15  = 070620
DF150 = 071550
DF151 = 071574
DF152 = 071550
DF153 = 071574
DF154   071604
DF155 = 071604
DF156 = 071550
DF157 = 071550
DF16    070702
DF160 = 071550
DF161   071610
DF162 = 071550
DF163 = 071610
DF164 = 070610
DF165 = 070610
DF166 = 071550
DF167 = 071550
DF17  = 070610
DF170 = 071610
DF171 = 071610
DF172 = 071550
DF173 = 071550
DF174 = 071610
DF175 = 071610
DF176 = 071550
DF177   071634
DF2     070600
DF20    070711
DF200 = 071550
DF201 = 071550
DF202 = 071550
DF203 = 071550
DF204 = 071550
DF205 = 070610
DF206 = 071600
DF207 = 071550
DF21    070721
DF210 = 071550
DF211   071637
DF212 = 071637
DF213 = 071637
DF214 = 071550
DF22    070725
DF23    070737
DF24    070747
DF25    070756
DF26    071002
DF27    07102
DF3     070610
DF30    071047
DF31  = 071002
DF32  = 071027
DF33    071063
DF34    071111
DF35  = 071111
DF36  = 071111
DF37  = 071111
DF4   = 070610
DF40    071135
DF41    071163
DF42    071177
DF43  = 071177
DF44    071225
DF45    071250
DF46    071275
DF47    071327
DF5     070620
DF50    071344
DF51    071370
DF52  = 071327
DF53    071406
DF54    071415
DF55  = 071327
DF56  = 071406
DF57  = 071415
DF6   = 070620
DF60  = 071406
DF61  = 071415
DF62  = 071415
DF63  = 071415
DF64    071433
DF65  = 071433
DF66  = 071415
DF67  = 070721
DF7   = 070620
DF70    071442
DF71  = 071442
DF72    071464
DF73  = 071415
DF74  = 070721
DF75  = 071442
DF76  = 071442
DF77  = 071464
DH1     065163
DH10  = 065533
DH100 = 067035
DH101 = 065533
DH102 = 066425
DH103 = 066363
DH104 = 067035
DH105 = 065533
DH106 = 066425
DH107 = 066363
DH11  = 065533
DH110 = 067035
DH111 = 066363
DH112   067233
DH113 = 066363
DH114 = 067233
DH115   067452
DH116 = 067452
DH117 = 065653
DH12  = 000000
DH120   067736
DH121 = 065533
DH122 = 066763
DH123 = 066763
DH124 = 065653
DH125 = 065653
DH126 = 065533
DH127 = 067035
DH13  = 000000
DH130 = 067736
DH131 = 067035
DH132 = 067035
DH133   070026
DH134 = 070026
DH135 = 070026
DH136 = 070026
DH137   070136
DH14  = 065533
DH140 = 070136
DH141 = 070136
DH142 = 070136
DH143 = 070026
DH144 = 070026
DH145 = 070136
DH146 = 070136
DH147 = 067035
DH15  = 065533
DH150   070326
DH151 = 070136
DH152 = 070026
DH153 = 070136
DH154   070417
DH155 = 070417
DH156 = 067035
DH157 = 067035
DH16    065573
DH160 = 067035
DH161 = 067035
DH162 = 067035
DH163 = 067035
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SYMBOL TABLE

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DH164 = 065653
DH165 = 065653
DH166 = 067035
DH167 = 067035
DH17    065653
DH170 = 067035
DH171 = 067035
DH172 = 067035
DH173 = 067035
DH174 = 067035
DH175 = 067035
DH176 = 067035
DH177   070457
DH2     065253
DH20    065743
DH200 = 067035
DH201 = 067035
DH202 = 067035
DH203 = 067035
DH204 = 067035
DH205 = 065653
DH206 = 067035
DH207 = 067035
DH21  = 065533
DH210 = 067035
DH211   070523
DH212 = 065533
DH213 = 065533
DH214 = 067035
DH22    066031
DH23    066066
DH24    066224
DH25    066363
DH26    066425
DH27  = 066425
DH3     065346
DH30  = 000000
DH31  = 066425
DH32  = 066425
DH33    066513
DH34  = 066513
DH35  = 066513
DH36  = 066513
DH37  = 066513
DH4     065437
DH40  = 066513
DH41  = 000000
DH42    066616
DH43  = 066616
DH44  = 000000
DH45    066720
DH46    066737
DH47  = 066720
DH5     065533
DH50    066763
DH51  = 066763
DH52  = 065533
DH53  = 066425
DH54    067035
DH55  = 065533
DH56  = 066425
DH57  = 067035
DH6   = 065533
DH60  = 066425
DH61  = 067035
DH62  = 067035
DH63  = 067035
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DH65    067076
DH66  = 067035
DH67  = 065533
DH7   = 065533
DH70  = 065533
DH71  = 066363
DH72  = 066425
DH73  = 067035
DH74  = 065533
DH75  = 065533
DH76  = 066363
DH77  = 066425
DISPLA  001142
DISPRE  000174
DPAT3   017322
DSWR  = 177570
DT1     071646
DT10  = 071766
DT100 = 073302
DT101 = 073360
DT102 = 073360
DT103 = 073360
DT104 = 073302
DT105 = 073360
DT106 = 073420
DT107 = 073360
DT11  = 071766
DT110 = 073302
DT111   073446
DT112 = 073446
DT113 = 073446
DT114 = 073446
DT115 = 073446
DT116 = 073446
DT117 = 071712
DT12    072010
DT120 = 071712
DT121 = 073172
DT122 = 072576
DT123 = 073224
DT124   073460
DT125 = 073460
DT126 = 073446
DT127 = 073446
DT13    072076
DT130 = 071712
DT131   073544
DT132 = 073544
DT133   073606
DT134 = 073606
DT135 = 073606
DT136 = 073606
DT137   073600
DT14  = 071766
DT140 = 073660
DT141 = 073660
DT142 = 073660
DT143 = 073606
DT144 = 073606
DT145 = 073660
DT146 = 073660
DT147 = 073606
DT15  = 071766
DT150 = 073606
DT151 = 073660
DT152 = 073606
DT153 = 073660
DT154   073700
DT155 = 073700
DT156 = 073606
DT157 = 073606
DT16    072130
DT160 = 073606
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DT162 = 073606
DT163 = 073606
DT164 = 071712
DT165 = 071712
DT166 = 073606
DT167 = 073606
DT17  = 071712
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DT173 = 073606
DT174 = 073606
DT175 = 073606
DT176 = 073606
DT177   073712
DT2     071670
DT20    072150
DT200 = 073606
DT201 = 073606
DT202 = 073606
DT203 = 073606
DT204 = 073606
DT205 = 071712
DT206 = 073606
DT207 = 073606
DT21    072172
DT210 = 073606
DT211   073722
DT212   073740
DT213 = 073740
DT214 = 073606
DT22    072204
DT23    072232
DT24    072254
DT25    072300
DT26    072350
DT27    072424
DT3     071712
DT30    072466
DT31  = 072350
DT32  = 072424
DT33    072520
DT34    072576
DT35  = 072576
DT36  = 072576
DT37  = 072576
DT4   = 071712
DT40  = 072520
DT41    072650
DT42    072702
DT43  = 072702
DT44    072760
DT45    073030
DT46    073104
DT47    073172
DT5     071734
DT50  = 072576
DT51    073224
DT52  = 073172
DT53    073262
DT54    073302
DT55  = 073172
DT56  = 073262
DT57  = 073302
DT6     071766
DT60  = 073262
DT61  = 073302
DT62  = 073302
DT63  = 073302
DT64    073340
DT65  = 073340
DT66  = 073302
DT67  = 072172
DT7   = 071766
DT70    073360
DT71  = 073360
DT72    073426
DT73  = 073302
DT74  = 072172
DT75  = 073360
DT76  = 073360
DT77  = 073426
D1      005774
D10     006176
D2      006020
D3      006022
D4      006026
D5      006040
D6      006054
D7      006064
D8      006134
D9      006146
EDONE   006354
EEDATO  035232
EEDONE  035314
EEER0   035024
EEER1   035042
EEER2   035100
EEER3   035136
EEER4   035174
EEP0    035242
EEP1    035254
EEP2    035264
EEP3    035274
EEP4    035304
EERR0   006272
EERR1   006310
EERR2   006324
EE1     034534
EE10    034764
EE11    034774
EE12    035002
EE13    035020
EE2     034570
EE3     034612
EE4     034632
EE5     034642
EE6     034650
EE7     034666
EE8     034722
EE9     034744
EMTVEC= 000030
EM1     044704
EM10  = 045112
EM100   054014
EM101   054054
EM102   054200
EM103   054252
EM104   054355
EM105   054416
EM106   054543
EM107   054616
EM11    045233
EM110   054722
EM111   054764
EM112 = 054764
EM113   055066
EM114 = 055066
EM115 = 054764
EM116 = 055066
EM117   055170
EM12  = 000000
EM120   055324
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SYMBOL TABLE

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EM123   055676
EM124   055737
EM125   056032
EM126   056122
EM127   056331
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EM131   056644
EM132   056704
EM133   056744
EM134   057003
EM135   057042
EM136   057101
EM137 = 056744
EM14    045314
EM140 = 057003
EM141 = 057042
EM142 = 057101
EM143   057140
EM144   057173
EM145 = 057140
EM146 = 057173
EM147   057226
EM15    045437
EM150 = 057226
EM151 = 057226
EM152   057260
EM153 = 057260
EM154   057312
EM155   057544
EM156   057777
EM157   060214
EM16    045562
EM160   060433
EM161   060640
EM162   061045
EM163   061112
EM164   061157
EM165   061224
EM166   061271
EM167   061401
EM17    045633
EM170   061640
EM171   061750
EM172   062207
EM173   062446
EM174   062705
EM175   063144
EM176   063403
EM177   063540
EM2     044741
EM20    046066
EM200   063574
EM201   063731
EM202   064066
EM203   064223
EM204   064360
EM205   064515
EM206   064562
EM207   064627
EM21    046244
EM210   064751
EM211 = 045112
EM212 = 045146
EM213 = 045200
EM214   045026
EM22    046375
EM23  = 046375
EM24  = 046775
EM25    046462
EM26    046575
EM27  = 046575
EM3     045005
EM30    046643
EM31    046715
EM32  = 046715
EM33    046763
EM34    047024
EM35    047126
EM36    047230
EM37    047331
EM4     045052
EM40    047432
EM41    047603
EM42    047640
EM43    047761
EM44    050102
EM45  = 050102
EM46    050145
EM47    050223
EM5     045112
EM50    050341
EM51    050437
EM52    050500
EM53    050621
EM54    051016
EM55    051062
EM56    051203
EM57    051400
EM6     045146
EM60    051444
EM61    051541
EM62    051705
EM63    052077
EM64    052227
EM65  = 052271
EM66    052425
EM67    052470
EM7     045200
EM70    052721
EM71    053044
EM72    053146
EM73    053222
EM74    053262
EM75    053513
EM76    053636
EM77    053740
ERM10   037042
ERROR = 104000
ERRVEC= 000004
ERTYPE  041342
ERT1    041526
ERT2    041712
ERT3    041716
ERT4    041726
ERT5    041740
F1      006230
F2      006244
F3      006244
F4      006246
FDATI0  010174
FDATI1  010176
FDATI2  010200
FDATI3  010202
FDATI4  010204
FDATI5  010206
FDATI6  010210
FDATI7  010212
FDATO0  010216
FDATO1  010220
FDATO2  010222
FDATO3  010224
FDATO4  010226
FDATO5  010230
FDATO6  010232
FDATO7  010234
FDONE   010260
FECMS   042455
FERR0   006766
FERR1   007024
FERR10  007604
FERR11  007640
FERR2   007122
FERR20  007660
FERR21  007776
FERR25  010026
FERR26  010144
FERR3   007162
FERR4   007154
FERR5   007260
FERR6   007314
FERR7   007450
FER2    007126
FFDATO  035622
FFDONE  035702
FFER0   035512
FFER1   035526
FFER2   035564
FFP0    035632
FFP1    035642
FFP2    035652
FFP3    035662
FFP4    035672
FF1     035320
FF10    035500
FF11    035510
FF2     035354
FF3     035376
FF4     035404
FF5     035414
FF6     035450
FF7     035472
FPSMS   042411
FPSPUR  042066
FPVECT= 000244
FXDAT0  010240
FXDAT1  010242
FXDAT2  010244
FXDAT3  010246
FXDAT4  010250
FXDAT5  010252
FXDAT6  010254
FXDAT7  010256
F1      006360
F10     006602
F11     006604
F12     006622
F13     006654
F135    006634
F14     006664
F15     006674
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F17     006714
F2      006416
F20     006724
F21     006734
F22     006744
F23     006762
F3      006436
F4      006440
F5      006456
F6      006532
F7      006562
GADR    015030
GAND0   015000
GAND1   015002
GAND2   015004
GAND3   015006
GCMP    014210
GDAT00  015020
GDAT01  015022
GDAT02  015024
GDAT03  015026
GDONE   015032
GERR1   014236
GFLAG   014754
GFLAG2  014756
GOR0    015010
GOR1    015012
GOR2    015014
GOR3    015016
GPAT00  014760
GPAT01  014762
GPAT02  014764
GPAT03  014766
GPAT10  014770
GPAT11  014772
GPAT12  014774
GPAT13  014776
GRESET  014170
GSETUP  014112
GSUM    014322
GS1     014142
GTSWR = 104406
G1      012020
G10     012326
G11     012330
G12     012422
G13     012454
G14     012456
G15     012550
G16     012602
G17     012604
G2      012052
G20     012676
G21     012730
G22     012732
G23     013024
G24     013056
G25     013060
G26     013152
G27     013204
G3      012054
G30     013206
G31     013300
G32     013332
G33     013334
G34     013426
G35     013460
G36     013462
G37     013554
G4      012146
G40     013606
G41     013610
G42     013702
G43     013734
G44     013736
G5      012200
G6      012202
G7      012274
HADR    015566
HATR    015642
HATW    015572
```

SYMBOL TABLE

HA2R	015652	IPAT20	011102	KDATI0	017264	MDATO1	020174	MS5	043513		
HA2W	015602	IPAT21	011104	KDATI1	017266	MDATO2	020176	MS6	043555		
HA3R	015662	IPAT22	011106	KDATI2	017270	MDATO3	020200	MS7	043573		
HA3W	015612	IPAT23	011110	KDATI3	017272	MDONE	020202	M1	017656		
HA4R	015672	I1	010272	KDATO0	017304	MERR0	020026	M15	017676		
HA4W	015622	I10	010454	KDATO1	017306	MERR1	020064	M2	017702		
HA5R	015702	I105	010462	KDATO2	017310	MERR2	020000	M3	017704		
HA5W	015632	I106	010456	KDATO3	017312	MERR3	020112	M4	017706		
HCLR	015516	I11	010464	KDONE	017324	MNUMBE=	000214	M5	017742		
HCLR1	015526	I12	010472	KERR0	017146	MNUM0	044067	M6	017746		
HCMP	015460	I13	010506	KERR1	017212	MNUM1	044075	M7	017756		
HCMP1	015500	I14	010550	KERR2	017236	MNUM2	044102	M8	017766		
HCMP2	015510	I15	010552	KPAT0	017314	MNUM3	044107	M9	017776		
HDAT1	015712	I16	010554	KPAT1	017316	MNUM4	044116	NDATI0	020700		
HDAT2	015722	I17	010572	KPAT2	017320	MNUM5	044124	NDATI1	020702		
HDAT3	015732	I2	010310	K1	017040	MPAT10	020152	NDATI2	020704		
HDAT4	015742	I20	010632	K10	017166	MPAT11	020154	NDATI3	020706		
HDAT5	015752	I21	010646	K2	017064	MPAT12	020156	NDATO0	020636		
HDONE	015762	I22	010652	K3	017066	MPAT13	020160	NDATO1	020640		
HERROR	015534	I23	010666	K4	017070	MPAT20	020162	NDATO2	020642		
HFLAG	015570	I3	010356	K5	017124	MPAT21	020164	NDATO3	020644		
HSTD	015402	I4	010360	K6	017132	MPAT22	020166	NDONE	020710		
HT =	000011	I5	010362	K7	017144	MPAT23	020170	NERR0	020400		
H1	015044	I6	010406	LDATI0	017630	MS1	043433	NERR1	020500		
H10	015306	I7	010422	LDATI1	017632	MS10	043607	NERR10	020432		
H11	015340	JBUF0	016766	LDATI2	017634	MS11	043622	NERR11	020444		
H12	015372	JBUF1	016770	LDATI3	017636	MS12	043647	NERR2	020534		
H2	015064	JBUF2	016772	LDATO0	017642	MS13	043705	NERR20	020506		
H3	015074	JBUF3	016774	LDATO1	017644	MS14	043722	NERR3	020544		
H4	015146	JDATI0	016776	LDATO2	017646	MS15	044010	NERR4	020554		
H5	015170	JDATI1	017000	LDATO3	017650	MS16	044035	NERR5	020564		
H6	015222	JDATI2	017002	LDONE	017652	MS17	044042	NERR6	020610		
H7	015254	JDATI3	017004	LD1	043121	MS2	043445	NOOP1	042473		
IBSAVE	036504	JDATO0	017006	LD2	043151	MS20	04[illegible]-132	NOOP10	042751		
IDATI0	011122	JDATO	017016	LERR1	017464	MS21	044173	NOOP11	043042		
IDATI1	011124	JDATO1	017010	LERR2	017536	MS22	044232	NOOP15	042522		
IDATI2	011126	JDATO2	017012	LERR3	017510	MS23	044262	NOOP2	042617		
IDATI3	011130	JDATO3	017014	LF =	000012	MS24	044311	NOOP3	042634		
IDATO0	011112	JDAT1	017020	LFIEX1	042277	MS25	044404	NOOP4	042646		
IDATO1	011114	JDAT2	017022	LFIEX2	042347	MS26	044426	NOOP5	042663		
IDATO2	011116	JDAT3	017024	LFPS1	043106	MS27	044443	NOOP6	042711		
IDATO3	011120	JDONE	017026	LOOP	004300	MS3	043452	NOOP7	042731		
IDONE	011132	JERR0	016646	LPAT10	017606	MS30	044452	NPAT10	020670		
IERR0	010672	JERR1	016714	LPAT11	017610	MS31	044461	NPAT11	020672		
IERR1	010754	JERR2	016740	LPAT12	017612	MS32	044470	NPAT12	020674		
IERR2	010774	J1	016540	LPAT13	017614	MS33	044477	NPAT13	020676		
IERR25	011016	J10	016666	LPAT20	017616	MS34	044506	NPAT20	020656		
IERR3	011046	J2	016564	LPAT21	017620	MS35	044515	NPAT21	020660		
IERR4	011022	J3	016566	LPAT22	017622	MS3[illegible]	044522	NPAT22	020662		
ILLMS	043365	J4	016570	LPAT23	017624	MS3[illegible]	044531	NPAT23	020664		
ILL1	043261	J5	016624	I1	017336	MS4	043501	NULL	042271		
ILL2	043324	J6	016632	L2	017376	MS40	044547	N1	020206		
IOTVEC=	000020	J7	016644	L3	017400	MS41	044603	N10	020340		
IPAT10	011072	KBUF0	017274	L4	017402	MS415	044563	N11	020350		
IPAT11	011074	KBUF1	017276	L5	017452	MS42	044627	N12	020352		
IPAT12	011076	KBUF2	017300	L6	017460	MS43	044645	N13	020366		
IPAT13	011100	KBUF3	017302	MDATO0	020172	MS44	044662	N14	020376		

SYMBOL TABLE

```
N2      020232  PDAT03  022066  QERR0   022236  SERR7   016404  TAB    = 000011
N3      020234  PDONE   022070  QERR1   022502  SETD1   043237  TBITVE= 000014
N4      020236  PERR0   021536  QERR11  022246  SETF1   043231  TDAT10  011740
N5      020254  PERR1   021556  QERR12  022264  SETI1   043245  TDAT11  011742
N6      020264  PERR10  021556  QERR13  022302  SETL1   043253  TDAT12  011744
N7      020274  PERR11  021566  QERR14  022320  SPACE   042274  TDAT13  011746
N8      020312  PERR12  021604  QERR15  022336  SPAT10  016506  TDAT00  011730
N9      020324  PERR13  021622  QERR16  022346  SPAT11  016510  TDAT01  011732
ODAT10  021404  PERR14  021640  QERR17  022354  SPAT12  016512  TDAT02  011734
ODAT11  021406  PERR15  021656  QERR2   022436  SPAT13  016514  TDAT03  011736
ODAT12  021410  PERR16  021666  QERR20  022402  STACK = 001100  TDONE   011750
ODAT13  021412  PERR17  021674  QERR21  022412  START   003616  TERR0   011516
ODAT00  021342  PERR2   022004  QERR22  022420  STFS1   043162  TERR1   011600
ODAT01  021344  PERR20  021722  QERR3   022446  STKLMT= 177774  TERR2   011620
ODAT02  021346  PERR21  021732  QERR4   022454  STST1   043312  TERR25  011634
ODAT03  021350  PERR22  021740  QPAT10  022530  ST1     043175  TERR3   011664
ODONE   021474  PFECAD  042040  QPAT11  022532  ST2     043212  TERR4   011646
OERR0   021104  PFECDH  042010  QPAT12  022534  SWR     001140  TKVEC = 000060
OERR1   021204  PFECEM  041754  QPAT13  022536  SWREG   000176  TOCTNM  042054
OERR10  021156  PFECFT  042050  QPAT20  022540  SW0   = 000001  TPAT10  011710
OERR11  021150  PFECWS  041744  QPAT21  022542  SW00  = 000001  TPAT11  011712
OERR2   021240  PIRQ  = 177772  QPAT22  022544  SW01  = 000002  TPAT12  011714
OERR20  021212  PIRQVE= 000240  QPAT23  022546  SW02  = 000004  TPAT13  011716
OERR3   021250  POWERM  042224  Q1      022074  SW03  = 000010  TPAT20  011720
OERR4   021260  PPAT10  022040  Q10     022232  SW04  = 000020  TPAT21  011722
OERR5   021270  PPAT11  022042  Q2      022116  SW05  = 000040  TPAT22  011724
OERR6   021314  PPAT12  022044  Q3    = 022120  SW06  = 000100  TPAT23  011726
OPAT10  021374  PPAT13  022046  Q4      022122  SW07  = 000200  TPVEC = 000064
OPAT11  021376  PROGNU= 000001  Q5      022144  SW08  = 000400  TRAPVE= 000034
OPAT12  021400  PR0   = 000000  Q6      022166  SW09  = 001000  TRTVEC= 000014
OPAT13  021402  PR1   = 000040  Q7      022176  SW1   = 000002  TST1    004300
OPAT20  021360  PR2   = 000100  Q8      022210  SW10  = 002000  TST10   011134
OPAT21  021362  PR3   = 000140  Q9      022224  SW11  = 004000  TST11   011752
OPAT22  021364  PR4     000200  RDCHR = 104410  SW12  = 010000  TST12   015034
OPAT23  021366  PR5   = 000240  RESREG= 104412  SW13  = 020000  TST13   015764
OPAT24  021370  PR6   = 000300  RESVEC= 000010  SW14  = 040000  TST14   016530
O1      020714  PR7   = 000340  RSETUP= 104413  SW15  = 100000  TST15   017030
O10     021044  PS    = 177776  R6    =%000006  SW2   = 000004  TST16   017326
O11     021054  PSW   = 177776  R7    =%000007  SW3   = 000010  TST17   017654
O12     021056  PWRVEC= 000024  SADR    016502  SW4   = 000020  TST2    004672
O13     021072  P1      021420  SAVREG= 104411  SW5   = 000040  TST20   020204
O14     021102  P2      021442  SCOPE = 000004  SW6   = 000100  TST21   020712
O2      020740  P3    = 021444  SDAT00  016516  SW7   = 000200  TST22   021416
O3      020742  P4      021446  SDAT01  016520  SW8   = 000400  TST23   022072
O4      020744  P5      021470  SDAT02  016522  SW9   = 001000  TST24   022572
O5      020762  P6      021512  SDAT03  016524  S1      015766  TST25   023732
O6      020772  P7      021522  SDONE   016526  S10     016144  TST26   024530
O7      021002  P8      021532  SERR0   016206  S11     016170  TST27   025344
O8      021016  QDAT10  022560  SERR1   016416  S12     016200  TST3    005000
O9      021030  QDAT11  022562  SERR10  016226  S2      016026  TST30   025754
PDAT10  022050  QDAT12  022564  SERR15  016306  S3      016030  TST31   026262
PDAT11  022052  QDAT13  022566  SERR2   016346  S4      016034  TST32   027330
PDAT12  022054  QDAT00  022550  SERR20  016326  S5      016060  TST33   031146
PDAT13  022056  QDAT01  022552  SERR3   016372  S6      016070  TST34   032502
PDAT00  022060  QDAT02  022554  SERR4   016264  S7      016076  TST35   034532
PDAT01  022062  QDAT03  022556  SERR5   016450  S8      016136  TST36   035316
PDAT02  022064  QDONE   022570  SERR6   016360  S9      016140  TST37   035702
```

SYMBOL TABLE

```
TST4     005744        UPAT41   023710        XERR3    025214        Y3       025446        $DBLK    040146
TST5     006212        UPAT42   023712        XERR4    025264        Y4       025464        $DDW0    001402
TST6     006356        UPAT43   023714        XPAT00   025312        Y5       025524        $DDW1    001404
TST7     010262        UROM1    023724        XPAT01   025314        Y6       025526        $DDW10   001426
TYPDS  = 104405        UROM2    023726        XPAT02   025316        Y7       025542        $DDW11   001430
TYPE   = 104401        UROM3    023730        XPAT03   025320        ZDAT00   026220        $DDW12   001432
TYPOC  = 104402        UTMP1    023720        XPAT10   025322        ZDAT01   026222        $DDW13   001434
TYPON  = 104404        UTMP2    023722        XPAT12   025326        ZDAT02   026224        $DDW14   001436
TYPOS  = 104403        U0       022610        XPAT13   025330        ZDAT03   026226        $DDW15   001440
T1       011136        U1       022640        XPAT20   025332        ZDONE    026260        $DDW2    001402
T10      011304        U10      023216        XPAT21   025334        ZERR1    026124        $DDW3    001404
T105     011312        U11      023220        XPAT22   025336        ZERR2    026166        $DDW4    001412
T11      011314        U12      023252        XPAT23   025340        ZFLAG    026212        $DDW5    001414
T12      011322        U13      023270        XTMP     025300        ZPAT00   026230        $DDW6    001416
T13      011336        U14      023322        X1       024532        ZPAT01   026232        $DDW7    001420
T14      011400        U15      023356        X10      024734        ZPAT02   026234        $DDW8    001422
T15      011402        U16      023360        X11      024750        ZPAT03   026236        $DDW9    001424
T16      011404        U2       022710        X12      025010        ZPAT10   026240        $DEVCT   001326
T17      011422        U3       022742        X13      025034        ZPAT11   026242        $DEVM    001374
T2       011162        U4       023012        X14      025042        ZPAT12   026244        $DOAGN   036120
T20      011462        U5       023044        X15      025056        ZPAT13   026246        $DTBL    040136
T21      011476        U6       023114        X16      025116        ZPAT20   026250        $ENDAD   036110
T22      011500        U7       023146        X17      025142        ZPAT21   026252        $ENDCT   035736
T23      011512        WDAP00   024516        X2       024572        ZPAT22   026254        $ENULL   036164
T3       011230        WDAT01   024520        X20      025150        ZPAT23   026256        $ENV     001336
T4       011232        WDAT02   024522        X21      025164        ZTMP1    026214        $ENVM    001337
T5       011234        WDAT03   024524        X3       024616        ZTMP2    026216        $EOP     035702
T6       011260        WDONE    024526        X4       024624        Z1       025776        $EOPCT   035730
T7       011274        WPAT00   024506        X5       024642        Z2       026024        $ERFLG   001103
UDONE    023732        WPAT01   024510        X6       024702        Z3       026050        $ERMAX   001115
UERR0    023376        WPAT02   024512        X7       024726        Z4       026056        $ERROR   036506
UERR1    023422        WPAT03   024514        YDAT00   025712        Z5       026070        $ERRPC   001116
UERR10   023430        WSETUP   024454        YDAT01   025714        Z6       026122        $ERRTB   001442
UERR11   023472        W1       023734        YDAT02   025716        $APTHD   003602        $ERTTL   001112
UERR2    023506        W10      024156        YDAT03   025720        $ATYC    040202        $ESCAP   001304
UERR20   023514        W11      024204        YDONE    025752        $ATY1    040156        $ETABL   001336
UERR21   023556        W12      024240        YERR1    025552        $ATY3    040164        $ETEND   001442
UERR3    023572        W13      024264        YERR2    025614        $ATY4    040174        $FATAL   001320
UERR4    023622        W14      024300        YERR3    025656        $AUTOB   001134        $FFLG    040422
UFLAG    023716        W15      024326        YFLAG    025702        $BASE    001372        $FILLC   001156
UPAT00   023646        W16      024366        YPAT00   025722        $BDADR   001122        $FILLS   001155
UPAT01   023650        W17      024412        YPAT01   025724        $BDDAT   001126        $GDADR   001120
UPAT02   023652        W2       023770        YPAT02   025726        $BELL    001306        $GDDAT   001124
UPAT03   023654        W20      024426        YPAT03   025730        $CDW1    001376        $GET42   036062
UPAT10   023656        W3       024014        YPAT10   025732        $CDW2    001400        $GTSWR   040474
UPAT11   023660        W4       024032        YPAT11   025734        $CHARC   037500        $HD    = 000003
UPAT12   023662        W5       024062        YPAT12   025736        $CKSWR   040424        $HIBTS   003602
UPAT13   023664        W6       024122        YPAT13   025740        $CLR.T   036100        $ICNT    001104
UPAT20   023666        W7       024146        YPAT20   025742        $CMTAG   001100        $ILLUP   041334
UPAT21   023670        XAPT11   025324        YPAT21   025744        $CM1   = 000024        $INTAG   001135
UPAT22   023672        XDAT00   025302        YPAT22   025746        $CM2   = 000050        $ITEMB   001114
UPAT23   023674        XDAT01   025304        YPAT23   025750        $CM3   = 000024        $LF      001314
UPAT30   023676        XDAT02   025306        YTMP1    025704        $CM4   = 000024        $LFLG    040421
UPAT31   023700        XDAT03   025310        YTMP2    025706        $CNTLG   041043        $LOOP    036156
UPAT32   023702        XDONE    025342        YTMP3    025710        $CNTLU   041036        $LPADR   001106
UPAT33   023704        XERR1    025166        Y1       025374        $CPUOP   001344        $LPERR   001110
UPAT40   023706        XERR2    025250        Y2       025422        $CRLF    001313        $MADR1   001350
```

SYMBOL TABLE

```
$MADR2  001354        $PASTM  003610        $REG4   001172        $TKS    001144        $TRAP   041072
$MADR3  001360        $PWRAD  041316        $REG5   001174        $TMP0   001232        $TRAP2  041114
$MADR4  001364        $PWRDN  041156        $REG6   001176        $TMP1   001234        $TRP  = 000014
$MAIL   001316        $PWRMG  041312        $REG7   001200        $TMP10  001252        $TRPAD  041126
$MAMS1  001346        $PWRUP  041230        $RESRE  037102        $TMP11  001254        $TSTM   003606
$MAMS2  001352        $QUES   001312        $RTNAD  036160        $TMP12  001256        $TSTNM  001102
$MAMS3  001356        $RDCHR  040706        $RTRN   036154        $TMP13  001260        $TYPDS  037732
$MAMS4  001362        $RDSZ = 000001        $SAVRE  037044        $TMP14  001262        $TYPE   037140
$MBADR  003604        $REGAD  001160        $SAVR6  041340        $TMP15  001264        $TYPEC  037352
$MFLG   040420        $REG0   001162        $SCOPE  036170        $TMP16  001266        $TYPEX  037502
$MNEW   041061        $REG1   001164        $SETUP= 000137        $TMP17  001270        $TYPOC  037530
$MSGAD  001332        $REG10  001202        $STUP = 177777        $TMP2   001236        $TYPON  037544
$MSGLG  001334        $REG11  001204        $SVLAD  036430        $TMP20  001272        $TYPOS  037504
$MSGTY  001316        $REG12  001206        $SVPC = 003602        $TMP21  001274        $UNIT   001330
$MSWR   041050        $REG13  001210        $SWR  = 177400        $TMP22  001276        $UNITM  003612
$MTYP1  001347        $REG14  001212        $SWREG  001340        $TMP23  001300        $USWR   001342
$MTYP2  001353        $REG15  001214        $SWRMK= 000000        $TMP3   001240        $VECT1  001366
$MTYP3  001357        $REG16  001216        $SWRMS= 000200        $TMP4   001242        $VECT2  001370
$MTYP4  001363        $REG17  001220        $TAB    042272        $TMP5   001244        $XOFF = 000023
$MXCNT  036500        $REG2   001166        $TBIT   036162        $TMP6   001246        $XON  = 000021
$NULL   001154        $REG20  001222        $TERM = 000030        $TMP7   001250        $XTSTR  036202
$NWTS = 000001        $REG21  001224        $TESTN  001322        $TN   = 000037        $$GET4= 000001
$OCNT   037726        $REG22  001226        $THE    042466        $TPB    001152        $OFILL  037727
$OMODE  037730        $REG23  001230        $TIMES  001302        $TPFLG  001157        .RSET   042154
$OVER   036464        $REG3   001170        $TKB    001146        $TPS    001150        .$X   = 003602
$PASS   001324

. ABS.  073752      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  58024 WORDS  ( 227 PAGES)
DYNAMIC MEMORY:  20034 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:13:11
CKFPAC.BIN,CKFPAC/CR/-SP/NL:TOC=CKFPAC.MLB/ML,CKFPAC.P11
```

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
AADATO	027226	49-4891	49-4898	49-4918	49-4925	49-4930	49-4956	49-4963	49-5001	49-5007
		49-5015	49-5021	49-5026	49-5032	#49-5036				
A.DONE	027326	49-4971	49-4991	49-5003	49-5009	49-5017	49-5023	49-5029	49-5035	#49-5044
AAERR0	026660	49-4883	#49-4975							
AAERR1	026746	49-4902	#49-4998							
AAERR2	027002	49-4904	#49-5004							
AAERR3	027036	49-4934	#49-5010							
AAERR4	027046	49-4936	#49-5012							
AAERR5	027102	49-4938	#49-5018							
AAERR6	027136	49-4967	#49-5024							
AAERR7	027172	49-4969	#49-5030							
AAERR0	026754	#49-4999	49-5011							
AAPAT0	027236	49-4884	49-4912	49-4946	49-4999	49-5005	49-5013	49-5019	49-5025	49-5031
		#49-5037								
AAPAT1	027246	49-4888	49-4915	49-5000	49-5006	49-5014	49-5020	#49-5038		
AAPAT2	027256	49-4893	49-4924	49-4962	49-4998	49-5004	#49-5039			
AAPAT3	027266	49-4897	49-4920	49-5010	49-5012	49-5018	#49-5040			
AAPAT4	027276	49-4929	#49-5041							
AAPAT5	027306	49-4950	49-5024	49-5030	#49-5042					
AAPAT6	027316	49-4958	49-5027	49-5033	#49-5043					
AA1	026264	#49-4880								
AA10	026404	#49-4909								
AA11	026440	49-4914	#49-4916							
AA12	026442	#49-4918								
AA13	026460	#49-4922	49-4939							
AA14	026500	#49-4927	49-4937							
AA15	026520	#49-4932	49-4935							
AA16	026526	49-4933	#49-4935							
AA17	026532	49-4928	#49-4937							
AA2	026326	49-4887	#49-4889							
AA20	026536	49-4923	#49-4939							
AA21	026540	#49-4943								
AA22	026576	49-4949	#49-4951							
AA23	026600	#49-4953								
AA24	026620	#49-4960	49-4970							
AA25	026640	#49-4965	49-4968							
AA26	026646	49-4966	#49-4968							
AA27	026652	49-4961	#49-4970							
AA3	026330	#49-4891								
AA4	026346	#49-4895	49-4905							
AA5	026366	#49-4900	49-4903							
AA6	026374	49-4901	#49-4903							
AA7	026402	49-4896	#49-4905							
ABASE	= 000000	20-1427	20-1427							
ACDW1	= 000000	20-1427	20-1427							
ACDW2	= 000000	20-1427	20-1427							
ACPUOP	= 000000	20-1427	20-1427							
ACO	=%000000	#19-1417	*30-1981	30-2020	*31-2349	*31-2355	31-2360	*31-2398	*31-2405	31-2418
		*32-2523	32-2532	*32-2566	32-2575	*33-2811	33-2811	*33-2811	33-2811	*33-2811
		33-2811	*33-2812	33-2812	*33-2812	33-2812	*33-2812	33-2812	*33-2813	33-2813
		*33-2813	33-2813	*33-2814	33-2814	*33-2814	33-2814	*33-2815	33-2815	*33-2815
		33-2815	*33-2816	33-2816	*33-2816	33-2816	*33-2817	33-2817	*33-2817	33-2817

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		*33-2818	33-2818	*33-2818	33-2818	*33-2819	33-2819	*33-2819	33-2819	*33-2820
		33-2820	*33-2820	33-2820	*33-2821	33-2821	*33-2821	33-2821	*33-2822	33-2822
		*33-2822	33-2822	*34-3000	34-3000	*34-3001	34-3001	*34-3002	34-3002	*34-3003
		34-3003	*34-3004	34-3004	*34-3010	34-3010	*34-3011	34-3011	*34-3012	34-3012
		*34-3013	34-3013	*34-3014	34-3014	*34-3025	34-3025	*34-3026	34-3026	*34-3027
		34-3027	*34-3028	34-3028	*34-3029	34-3029	*35-3096	*35-3106	35-3112	*35-3129
		*35-3136	35-3142	*36-3257	*36-3263	36-3268	*37-3356	*37-3362	37-3367	*38-3453
		*38-3466	38-3473	*39-3552	*39-3557	39-3571	*40-3655	*40-3662	40-3667	*41-3795
		*41-3803	41-3808	*42-3936	*42-3942	42-3946	*43-4057	*43-4065	43-4069	*44-4213
		*44-4219	*44-4235	*44-4242	*44-4254	*44-4260	*44-4272	*44-4277	*44-4303	*44-4305
		*45-4416	*45-4419	45-4423	*45-4444	*45-4449	45-4453	*45-4472	*45-4475	45-4479
		*45-4500	*45-4505	45-4509	*46-4559	*46-4562	46-4566	*46-4582	*46-4585	46-4589
		*46-4605	*46-4608	46-4612	*46-4628	*46-4631	46-4635	*47-4712	*47-4714	47-4718
		*48-4807	*48-4809	48-4813	*49-4886	*49-4889	49-4892	*49-4913	*49-4916	49-4919
		*49-4947	*49-4951	49-4957	*50-5062	*50-5064	50-5067	*50-5090	*50-5092	50-5095
		*50-5116	*50-5120	50-5124	*50-5145	*50-5149	50-5153	*50-5176	*50-5178	50-5181
		*50-5204	*50-5206	50-5209	*51-5322	*51-5324	51-5327	*51-5344	*51-5346	51-5349
		*51-5370	*51-5375	51-5379	*51-5393	*51-5397	51-5401	*51-5424	*51-5426	51-5429
		*51-5445	*51-5447	51-5450	*52-5532	*52-5534	52-5537	*52-5561	*52-5563	52-5566
		*52-5583	*52-5585	52-5588	*52-5605	*52-5607	52-5610	*52-5633	*52-5635	52-5638
		*52-5661	*52-5663	52-5666	*52-5690	*52-5692	52-5695	*53-5756	*53-5758	53-5761
		*53-5785	*53-5787	53-5790	*54-5840	*54-5842	54-5845	*54-5862	*54-5864	54-5867
AC1	=%000001	#19-1418	*31-2346	31-2355	*31-2395	31-2405	*32-2526	*32-2532	32-2537	*32-2569
		*32-2575	32-2589	*33-2813	33-2813	*33-2814	33-2814	*34-3000	*34-3010	34-3025
AC2	=%000002	#19-1419	*33-2815	33-2815	*33-2816	33-2816	*34-3001	*34-3011	34-3026	
AC3	=%000003	#19-1420	*33-2817	33-2817	*33-2818	33-2818	*34-3002	*34-3012	34-3027	
AC4	=%000004	#19-1421	*33-2819	33-2819	*33-2820	33-2820	*34-3003	*34-3013	34-3028	
AC5	=%000005	#19-1422	*33-2821	33-2821	*33-2822	33-2822	*34-3004	*34-3014	34-3029	
AC6	=%000006	#19-1423	35-3136							
AC7	=%000007	#19-1424	35-3106							
ADDWC	= 000000	20-1427	20-1427							
ADDW1	= 000000	20-1427	20-1427							
ADDW10	= 000000	20-1427	20-1427							
ADDW11	= 000000	20-1427	20-1427							
ADDW12	= 000000	20-1427	20-1427							
ADDW13	= 000000	20-1427	20-1427							
ADDW14	= 000000	20-1427	20-1427							
ADDW15	= 000000	20-1427	20-1427							
ADDW2	= 000000	20-1427	20-1427							
ADDW3	= 000000	20-1427	20-1427							
ADDW4	= 000000	20-1427	20-1427							
ADDW5	= 000000	20-1427	20-1427							
ADDW6	= 000000	20-1427	20-1427							
ADDW7	= 000000	20-1427	20-1427							
ADDW8	= 000000	20-1427	20-1427							
ADDW9	= 000000	20-1427	20-1427							
ADEVCT	= 000000	20-1427	20-1427							
ADEVM	= 000000	20-1427	20-1427							
ADONE	004670	25-1515	25-1519	25-1527	25-1535	25-1548	25-1561	#25-1567		
AENV	= 000000	20-1427	20-1427							
AENVM	= 000000	20-1427	20-1427							
AERFLG	004560	*25-1465	*25-1496	25-1502	25-1514	#25-1529	75-6796			

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
AERR1	004562	25-1468	#25-1532						
AERR2	004574	25-1469	#25-1538						
AERR3	004626	25-1473	#25-1551						
AFATAL =	000000	20-1427	20-1427						
AMADR1 =	000000	20-1427	20-1427						
AMADR2 =	000000	20-1427	20-1427						
AMADR3 =	000000	20-1427	20-1427						
AMADR4 =	000000	20-1427	20-1427						
AMAMS1 =	000000	20-1427	20-1427						
AMAMS2 =	000000	20-1427	20-1427						
AMAMS3 =	000000	20-1427	20-1427						
AMAMS4 =	000000	20-1427	20-1427						
AMSGAD =	000000	20-1427	20-1427						
AMSGLG =	000000	20-1427	20-1427						
AMSGTY =	000000	20-1427	20-1427						
AMTYP1 =	000000	20-1427	20-1427						
AMTYP2 =	000000	20-1427	20-1427						
AMTYP3 =	000000	20-1427	20-1427						
AMTYP4 =	000000	20-1427	20-1427						
APASS =	000000	20-1427	20-1427						
APRIOR =	000000	20-1427							
APTCSU =	00004C	59-5906	#62-5912						
APTENV =	000001	57-5902	59-5906	62-5912	#62-5912				
APTSIZ =	000200	24-1443	#62-5912						
APTSPC =	000100	59-5906	62-5912	#62-5912					
ASWREG =	000000	20-1427	20-1427						
ATESTN =	000000	20-1427	20-1427						
AUNIT =	000000	20-1427	20-1427						
AUSWR =	000000	20-1427	20-1427						
AVECT1 =	000000	20-1427	20-1427						
AVECT2 =	000000	20-1427	20-1427						
A05	004476	25-1503	#25-1512						
A1	004350	25-1466	#25-1477	25-1493	25-1506				
A11	004350	#25-1478	25-1538	25-1551					
A12	004364	#25-1483	25-1540	25-1553					
A2	004422	#25-1493	25-1512						
A3	004426	25-1491	#25-1496						
A4	004474	#25-1510							
A5	004500	25-1494	#25-1514						
A6	004526	25-1517	#25-1521						
A7	004552	25-1524	#25-1526						
BBDATO	032350	51-5326	51-5348	51-5354	51-5378	51-5400	51-5406	51-5428	51-5449	51-5473
		51-5482	51-5488	51-5497	#51-5506					
BBDONE	032500	51-5459	51-5464	51-5469	51-5475	51-5484	51-5490	51-5499	#51-5517	
BBER0	032036	51-5318	51-5337	51-5365	51-5438	51-5458	#51-5460			
BBER1	032076	51-5332	#51-5470							
BBER10	032056	51-5388	51-5417	#51-5465						
BBER11	032112	#51-5472	51-5478	51-5502	51-5505					
BBER2	032134	51-5359	#51-5476							
BBER3	032152	51-5361	#51-5479							
BBER4	032206	51-5384	#51-5485							
BBER40	032222	#51-5487	51-5493							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
BBER5	032242	51-5411	#51-5491							
BBER6	032260	51-5413	#51-5494							
BBER7	032314	51-5434	#51-5500							
BBER8	032332	51-5455	#51-5503							
BBPAT0	032360	51-5369	51-5380	51-5485	51-5486	#51-5507				
BBPAT1	032370	51-5323	51-5345	51-5374	51-5396	51-5425	51-5446	51-5472	51-5481	51-5487
		51-5496	51-5501	#51-5508						
BBPAT2	032400	51-5321	51-5328	51-5470	51-5471	#51-5509				
BBPAT3	032410	51-5392	51-5407	51-5491	51-5494	#51-5510				
BBPAT4	032420	51-5343	51-5355	51-5476	51-5479	#51-5511				
BBPAT5	032430	51-5423	51-5500	#51-5512						
BBPAT6	032440	51-5444	51-5451	51-5503	51-5504	#51-5513				
BBP10	032460	51-5350	51-5477	51-5480	#51-5515					
BBP11	032470	51-5430	#51-5516							
BBP7	032450	51-5402	51-5492	51-5495	#51-5514					
BB1	031150	#51-5315								
BB10	031334	#51-5352	51-5362							
BB11	031354	#51-5357	51-5360							
BB12	031364	51-5358	#51-5360							
BB13	031372	51-5353	#51-5362							
BB14	031404	51-5364	#51-5367							
BB15	031440	51-5368	#51-5375							
BB16	031464	#51-5382	51-5385							
BB17	031474	51-5383	#51-5385							
BB2	031212	51-5319	#51-5324							
BB20	031506	51-5387	#51-5390							
BB21	031542	51-5391	#51-5397							
BB22	031566	#51-5404	51-5414							
BB23	031606	#51-5409	51-5412							
BB24	031616	51-5410	#51-5412							
BB25	031624	51-5405	#51-5414							
BB26	031636	51-5416	#51-5419							
BB27	031672	51-5420	#51-5426							
BB3	031216	#51-5326								
BB30	031714	#51-5432	51-5435							
BB31	031724	51-5433	#51-5435							
BB32	031736	51-5437	#51-5440							
BB33	031772	51-5441	#51-5447							
BB34	032014	#51-5453	51-5456							
BB35	032024	51-5454	#51-5456							
BB4	031234	#51-5330	51-5333							
BB5	031244	51-5331	#51-5333							
BB6	031256	51-5336	#51-5339							
BB7	031312	51-5342	#51-5346							
BDONE	004776	26-1591	#26-1610							
BERR	004732	26-1588	#26-1593							
BERR1	004762	26-1597	#26-1604							
BITSTS	014072	#33-2834	33-2914	33-2922	33-2938	33-2940				
BIT0 =	000001	#19-1415								
BIT00 =	000001	#19-1415	19-1415	56-5900	56-5900	57-5902	57-5902			
BIT01 =	000002	#19-1415	19-1415							
BIT02	000004	#19-1415	19-1415							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
BIT03	= 000010	#19-1415	19-1415							
BIT04	= 000020	#19-1415	19-1415							
BIT05	= 000040	#19-1415	19-1415							
BIT06	= 000100	#19-1415	19-1415							
BIT07	= 000200	#19-1415	19-1415							
BIT08	= 000400	#19-1415	19-1415	56-5900						
BIT09	= 001000	#19-1415	19-1415	56-5900	57-5902	57-5902				
BIT1	= 000002	#19-1415								
BIT10	= 002000	#19-1415	57-5902							
BIT11	= 004000	#19-1415	56-5900							
BIT12	= 010000	#19-1415	55-5898							
BIT13	= 020000	#19-1415	57-5902							
BIT14	= 040000	#19-1415	56-5900							
BIT15	= 100000	#19-1415								
BIT2	= 000004	#19-1415								
BIT3	= 000010	#19-1415								
BIT4	= 000020	#19-1415								
BIT5	= 000040	#19-1415								
BIT6	= 000100	#19-1415								
BIT7	= 000200	#19-1415								
BIT8	= 000400	#19-1415								
BIT9	= 001000	#19-1415								
BPTVEC	= 000014	#19-1415								
B1	004706	26-1576	#26-1579	26-1590						
B2	004710	#26-1582	26-1595							
B3	004726	#26-1590	26-1602	26-1608						
CCDATO	031004	50-5066	50-5072	50-5094	50-5100	50-5123	50-5129	50-5152	50-5158	50-5180
		50-5186	50-5208	50-5214	50-5238	50-5244	50-5253	50-5259	50-5265	50-5273
		#50-5289								
CCDONE	031144	50-5226	50-5230	50-5234	50-5240	50-5246	50-5255	50-5261	50-5267	50-5276
		#50-5301								
CCER0	030346	50-5083	50-5111	50-5197	50-5225	#50-5227				
CCER1	030402	50-5077	#50-5235							
CCER10	030714	50-5191	#50-5277							
CCER11	030732	50-5193	#50-5280							
CCER12	030750	50-5219	#50-5283							
CCER13	030766	50-5221	#50-5286							
CCER2	030440	50-5079	#50-524'							
CCER22	030454	#50-5243	50-5288							
CCER3	030476	50-5105	#50-5247							
CCER4	030514	50-5107	#50-5250							
CCER44	030530	#50-5252	50-5282							
CCER5	030552	50-5134	#50-5256							
CCER50	030416	#50-5237	50-5249	50-5279	50-5285					
CCER55	030566	#50-5258	50-5270							
CCER6	030606	50-5136	#50-5262							
CCER7	030642	50-5163	#50-5268							
CCER8	030660	50-5165	#50-5271							
CCER90	030364	50-5140	50-5169	#50-5231						
CCP0	031014	50-5061	50-5073	50-5089	50-5115	50-5175	50-5203	50-5237	50-5243	50-5252
		50-5258	50-5264	50-5274	#50-5290					
CCP1	031024	50-5091	50-5101	50-5247	50-5250	#50-5291				

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
CCP10	031114	50-5154	50-5269	50-5272	#50-5298				
CCP11	031124	50-5182	50-5278	50-5281	#50-5299				
CCP12	031134	#50-5300							
CCP2	031034	50-5063	50-5068	50-5235	50-5236	50-5241	50-5242	#50-5292	
CCP3	031044	50-5130	50-5144	50-5177	50-5187	50-5277	50-5280	#50-5293	
CCP4	031054	50-5205	50-5210	50-5215	50-5283	50-5284	50-5286	50-5287	#50-5294
CCP5	031064	50-5148	50-5159	50-5268	50-5271	#50-5295			
CCP6	031074	50-5119	50-5125	50-5256	50-5257	50-5262	50-5263	#50-5296	
CCP7	031104	50-5096	50-5248	50-5251	#50-5297				
CC1	027332	#50-5057							
CC10	027556	#50-5103	50-5106						
CC11	027566	50-5104	#50-5106						
CC12	027574	50-5099	#50-5108						
CC13	027606	50-5110	#50-5113						
CC14	027642	50-5114	#50-5120						
CC15	027666	#50-5127	50-5137						
CC16	027706	#50-5132	50-5135						
CC17	027716	50-5133	#50-5135						
CC18	027724	50-5128	#50-5137						
CC19	027736	50-5139	#50-5142						
CC2	027366	50-5060	#50-5064						
CC20	027772	50-5143	#50-5149						
CC21	030016	#50-5156	50-5166						
CC22	030036	#50-5161	50-5164						
CC23	030046	-5162	#50-5164						
CC24	030054	50-5157	#50-5166						
CC25	030066	50-5168	#50-5171						
CC26	030122	50-5174	#50-5178						
CC27	030144	#50-5184	50-5194						
CC28	030164	#50-5189	50-5192						
CC29	030174	50-5190	#50-5192						
CC3	027410	#50-5070	50-5080						
CC30	030202	50-5185	#50-5194						
CC31	030214	50-5196	#50-5199						
CC32	030250	50-5202	#50-5206						
CC33	030272	#50-5212	50-5222						
CC34	030312	#50-5217	50-5220						
CC35	030322	50-5218	#50-5220						
CC36	030330	50-5213	#50-5222						
CC37	030342	50-5224	#50-5226						
CC4	027430	#50-5075	50-5078						
CC5	027440	50-5076	#50-5078						
CC6	027446	50-5071	#50-5080						
CC7	027460	50-5082	#50-5085						
CC8	027514	50-5088	#50-5092						
CC9	027536	#50-5098	50-5108						
CDONE	005742	27-1736	#27-1802						
CERR1	005476	27-1636	27-1677	27-1693	27-1734	#27-1739			
CERR2	005574	27-1649	27-1664	27-1706	27-1721	#27-1761			
CERR3	005674	27-1753	27-1759	27-1777	27-1783	#27-1786			
CERR4	005716	27-1742	27-1766	#27-1793					
CFCC1	043223	#71-6151							

SYMBOL CROSS REFERENCE

```
SYMBOL   VALUE       REFERENCES
CHPNUM    013772     #33-2832  33-2908   33-2927
CKSWR   = 104407      56-5900  57-5902   57-5902  #64-5916   70-6112
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SYMBOL CROSS REFERENCE

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SYMBOL CROSS REFERENCE

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SYMBOL CROSS REFERENCE

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DF36	= 071111	21-1434	#74-6681						
DF37	= 071111	21-1434	#74-6682						
DF4	= 070610	21-1434	#74-6655						
DF40	071135	21-1434	#74-6683						
DF41	071163	21-1434	#74-6684						
DF42	071177	21-1434	#74-6685	74-6686					
DF43	= 071177	21-1434	#74-6686						
DF44	071225	21-1434	#74-6687						
DF45	071250	21-1434	#74-6688						
DF46	071275	21-1434	#74-6689						
DF47	071327	21-1434	#74-6690	74-6693	74-6696	74-6732			
DF5	070620	21-1434	#74-6656	74-6657	74-6658	74-6659	74-6660		
DF50	071344	21-1434	#74-6691	74-6733					
DF51	071370	21-1434	#74-6692	74-6734					
DF52	= 071327	21-1434	#74-6693						
DF53	071406	21-1434	#74-6694	74-6697	74-6699				
DF54	071415	21-1434	#74-6695	74-6698	74-6700	74-6701	74-6702	74-6705	74-6710	74-6715
		74-6719	74-6723						
DF55	= 071327	21-1434	#74-6696						
DF56	= 071406	21-1434	#74-6697						
DF57	= 071415	21-1434	#74-6698						
DF6	= 070620	21-1434	#74-6657	74-6663	74-6664				
DF60	= 071406	21-1434	#74-6699						
DF61	= 071415	21-1434	#74-6700						
DF62	= 071415	21-1434	#74-6701						
DF63	= 071415	21-1434	#74-6702						
DF64	071433	21-1434	#74-6703	74-6704					
DF65	= 071433	21-1434	#74-6704						
DF66	= 071415	21-1434	#74-6705						
DF67	= 070721	21-1434	#74-6706						
DF7	= 070620	21-1434	#74-6658						
DF70	071442	21-1434	#74-6707	74-6708	74-6712	74-6713	74-6716	74-6718	74-6720	74-6722
DF71	= 071442	21-1434	#74-6708						
DF72	071464	21-1434	#74-6709	74-6714	74-6717	74-6721			
DF73	= 071415	21-1434	#74-6710						
DF74	= 070721	21-1434	#74-6711						
DF75	= 071442	21-1434	#74-6712						
DF76	= 071442	21-1434	#74-6713						
DF77	= 071464	21-1434	#74-6714						
DH1	065163	21-1434	#73-6484						
DH10	= 065533	21-1434	#73-6495						
DH100	= 067035	21-1434	#73-6563						
DH101	= 065533	21-1434	#73-6564						
DH102	= 066425	21-1434	#73-6565						
DH103	= 066363	21-1434	#73-6566						
DH104	= 067035	21-1434	#73-6567						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
DH105	= 065533	21-1434	#73-6568						
DH106	= 066425	21-1434	#73-6569						
DH107	= 066363	21-1434	#73-6570						
DH11	= 065533	21-1434	#73-6496						
DH110	= 067035	21-1434	#73-6571						
DH111	= 066363	21-1434	#73-6572						
DH112	067233	21-1434	#73-6573	73-6578					
DH113	= 066363	21-1434	#73-6577						
DH114	= 067233	21-1434	#73-6578						
DH115	067452	21-1434	#73-6579	73-6583					
DH116	= 067452	21-1434	#73-6583						
DH117	= 065653	21-1434	#73-6584						
DH12	= 000000	21-1434	#73-6497						
DH120	067736	21-1434	#73-6585	73-6594					
DH121	= 065533	21-1434	#73-6587						
DH122	066763	21-1434	#73-6588						
DH123	= 066763	21-1434	#73-6589						
DH124	= 065653	21-1434	#73-6590						
DH125	= 065653	21-1434	#73-6591						
DH126	= 065533	21-1434	#73-6592						
DH127	= 067035	21-1434	#73-6593						
DH13	= 000000	21-1434	#73-6498						
DH130	= 067736	21-1434	#73-6594						
DH131	= 067035	21-1434	#73-6595						
DH132	= 067035	21-1434	#73-6596						
DH133	070026	21-1434	#73-6597	73-6599	73-6600	73-6601	73-6608	73-6609	73-6616
DH134	= 070026	21-1434	#73-6599						
DH135	= 070026	21-1434	#73-6600						
DH136	= 070026	21-1434	#73-6601						
DH137	070136	21-1434	#73-6602	73-6605	73-6606	73-6607	73-6610	73-6611	73-6615	73-6617
DH14	= 065533	21-1434	#73-6499						
DH140	= 070136	21-1434	#73-6605						
DH141	= 070136	21-1434	#73-6606						
DH142	= 070136	21-1434	#73-6607						
DH143	= 070026	21-1434	#73-6608						
DH144	= 070026	21-1434	#73-6609						
DH145	= 070136	21-1434	#73-6610						
DH146	= 070136	21-1434	#73-6611						
DH147	= 067035	21-1434	#73-6612						
DH15	= 065533	21-1434	#73-6500						
DH150	070326	21-1434	#73-6613						
DH151	= 070136	21-1434	#73-6615						
DH152	= 070026	21-1434	#73-6616						
DH153	= 070136	21-1434	#73-6617						
DH154	070417	21-1434	#73-6618	73-6619					
DH155	= 070417	21-1434	#73-6619						
DH156	= 067035	21-1434	#73-6620						
DH157	= 067035	21-1434	#73-6621						
DH16	065573	21-1434	#73-6501						
DH160	= 067035	21-1434	#73-6622						
DH161	= 067035	21-1434	#73-6623						
DH162	= 067035	21-1434	#73-6624						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
DH163	= 067035	21-1434	#73-6625						
DH164	= 065653	21-1434	#73-662'						
DH165	= 065653	21-1434	#73-662						
DH166	= 067035	21-1434	#73-6628						
DH167	= 067035	21-1434	#73-6629						
DH17	065653	21-1434	#73-6503	73-6584	73-6590	73-6591	73-6626	73-6627	73-6643
DH170	= 067035	21-1434	#73-6630						
DH171	= 067035	21-1434	#73-6631						
DH172	= 067035	21-1434	#73-6632						
DH173	= 067035	21-1434	#73-6633						
DH174	067035	21-1434	#73-6634						
DH175	= 067035	21-1434	#73-6635						
DH176	= 067035	21-1434	#73-6636						
DH177	070457	21-1434	#73-6637						
DH2	065253	21-1434	#73-6486						
DH20	065743	21-1434	#73-6505						
DH200	= 067035	21-1434	#73-6638						
DH201	= 067035	21-1434	#73-6639						
DH202	= 067035	21-1434	#73-6640						
DH203	- 067035	21-1434	#73-6641						
DH204	= 067035	21-1434	#73-6642						
DH205	= 065653	21-1434	#73-6643						
DH206	= 067035	21-1434	#73-6644						
DH207	= 067035	21-1434	#73-6645						
DH21	= 065533	21-1434	#73-6507						
DH210	- 067035	21-1434	#73-6646						
DH211	070523	21-1434	#73-6647						
DH212	= 065533	21-1434	#73-6648						
DH213	= 065533	21-1434	#73-6649						
DH214	= 067035	21-1434	#73-6650						
DH22	066031	21-1434	#73-6508						
DH23	066066	21-1434	#73-6509						
DH24	066224	21-1434	#73-6512						
DH25	066363	21-1434	#73-6514	73-6556	73-6561	73-6566	73-6570	73-6572	73-6577
DH26	066425	21-1434	#73-6515	73-6517	73-6519	73-6520	73-6540	73-6543	73-6545
		73-6562	73-6565	73-6569					
DH27	= 066425	21-1434	#73-6517						
DH3	065346	21-1434	#73-6488	75-6819	75-6849				
DH30	= 000000	21-1434	#73-6518						
DH31	= 066425	21-1434	#73-6519						
DH32	= 066425	21-1434	#73-6520						
DH33	066513	21-1434	#73-6521	73-6523	73-6524	73-6525	73-6526	73-6527	
DH34	- 066513	21-1434	#73-6523						
DH35	= 066513	21-1434	#73-6524						
DH36	= 066513	21-1434	#73-6525						
DH37	= 066513	21-1434	#73-6526						
DH4	065437	21-1434	#73-6490						
DH40	= 066513	21-1434	#73-6527						
DH41	- 000000	21-1434	#73-6528						
DH42	066616	21-1434	#73-6529	73-6531					
DH43	= 066616	21-1434	#73-6531						
DH44	= 000000	21-1434	#73-6532						

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES							
DH45		066720	21-1434	#73-6533	73-6535					
DH46		066737	21-1434	#73-6534						
DH47	=	066720	21-1434	#73-6535						
DH5		065533	21-1434	#73-6492	73-6493	73-6494	73-6495	73-6496	73-6499	73-6500	73-6507
			73-6539	73-6542	73-6554	73-6555	73-6559	73-6560	73-6564	73-6568	73-6587
			73-6592	73-6648	73-6649						
DH50		066763	21-1434	#73-6536	73-6538	73-6588	73-6589				
DH51	=	066763	21-1434	#73-6538							
DH52	=	065533	21-1434	#73-6539							
DH53	-	066425	21-1434	#73-6540							
DH54		067035	21-1434	#73-6541	73-6544	73-6546	73-6547	73-6548	73-6553	73-6558	73-6563
			73-6567	73-6571	73-6593	73-6595	73-6596	73-6612	73-6620	73-6621	73-6622
			73-6623	73-6624	73-6625	73-6628	73-6629	73-6630	73-6631	73-6632	73-6633
			73-6634	73-6635	73-6636	73-6638	73-6639	73-6640	73-6641	73-6642	73-6644
			73-6645	73-6646	73-6650						
DH55	-	065533	21-1434	#73-6542							
DH56	-	066425	21-1434	#73-6543							
DH57	=	067035	21-1434	#73-6544							
DH6	=	065533	21-1434	#73-6493							
DH60	=	066425	21-1434	#73-6545							
DH61	=	067035	21-1434	#73-6546							
DH62	=	067035	21-1434	#73-6547							
DH63	=	067035	21-1434	#73-6548							
DH64		067145	21-1434	#73-6551							
DH65		067076	21-1434	#73-6549							
DH66	=	067035	21-1434	#73-6553							
DH67	-	065533	21-1434	#73-6554							
DH7	-	065533	21-1434	#73-6494							
DH70	-	065533	21-1434	#73-6555							
DH71	=	066363	21-1434	#73-6556							
DH72	=	066425	21-1434	#73-6557							
DH73	=	067035	21-1434	#73-6558							
DH74	=	065533	21-1434	#73-6559							
DH75	-	065533	21-1434	#73-6560							
DH76	=	066363	21-1434	#73-6561							
DH77	=	066425	21-1434	#73-6562							
DISPLA		001142	#20-1427	*24-1443	*24-1443	56-5900	57-5902				
DISPRE		000174	#19-1426	24-1443							
DPAT3		017322	#37-3435								
DSWR	=	177570	#19-1415	20-1427	24-1443						
DT1		071646	21-1434	#75-6794							
DT10	-	071766	21-1434	#75-6804							
DT100	-	073302	21-1434	#75-6896							
DT101	=	073360	21-1434	#75-6897							
DT102	=	073360	21-1434	#75-6898							
DT103	-	073360	21-1434	#75-6899							
DT104	=	073302	21-1434	#75-6900							
DT105	=	073360	21-1434	#75-6901							
DT106	=	073426	21-1434	#75-6902							
DT107	=	073360	21-1434	#75-6903							
DT11	=	071766	21-1434	#75-6805							
DT110	=	073302	21-1434	#75-6904							

SYMBOL	CROSS REFERENCE VALUE	REFERENCES							
SYMBOL									
DT111	073446	21-1434	#75-6905	75-6906	75-6907	75-6908	75-6909	75-6910	75-6920	75-6921
DT112	= 073446	21-1434	#75-6906							
DT113	= 073446	21-1434	#75-6907							
DT114	= 073446	21-1434	#75-6908							
DT115	= 073446	21-1434	#75-6909							
DT116	= 073446	21-1434	#75-6910							
DT117	- 071712	21-1434	#75-6911							
DT12	072010	21-1434	#75-6806							
DT120	= 071712	21-1434	#75-6912							
DT121	= 073172	21-1434	#75-6913							
DT122	= 072576	21-1434	#75-6914							
DT123	= 073224	21-1434	#75-6915							
DT124	073460	21-1434	#75-6916	75-6919						
DT125	= 073460	21-1434	#75-6919							
DT126	= 073446	21-1434	#75-6920							
DT127	= 073446	21-1434	#75-6921							
DT13	072076	21-1434	#75-6810							
DT130	= 071712	21-1434	#75-5922							
DT131	073544	21-1434	#75-6923	75-6925						
DT132	= 073544	21-1434	#75-6925							
DT133	073606	21-1434	#75-6926	75-6929	75-6930	75-6931	75-6936	75-6937	75-6940	75-6941
		75-6943	75-6947	75-6948	75-6949	75-6950	75-6951	75-6952	75-6955	75-6956
		75-6957	75-6958	75-6959	75-6960	75-6961	75-6962	75-6963	75-6965	75-6966
		75-6967	75-6968	75-6969	75-6971	75-6972	75-6973	75-6977		
DT134	= 073606	21-1434	#75-6929							
DT135	= 073606	21-1434	#75-6930							
DT136	= 073606	21-1434	#75-6931							
DT137	073660	21-1434	#75-6932	75-6933	75-6934	75-6935	75-6938	75-6939	75-6942	75-6944
DT14	= 071766	21-1434	#75-6812							
DT140	= 073660	21-1434	#75-6933							
DT141	= 073660	21-1434	#75-6934							
DT142	- 073660	21-1434	#75-6935							
DT143	= 073606	21-1434	#75-6936							
DT144	= 073606	21-1434	#75-6937							
DT145	= 073660	21-1434	#75-6938							
DT146	= 073660	21-1434	#75-6939							
DT147	= 073606	21-1434	#75-6940							
DT15	= 071766	21-1434	#75-6813							
DT150	= 073606	21-1434	#75-6941							
DT151	- 073660	21-1434	#75-6942							
DT152	= 073606	21-1434	#75-6943							
DT153	= 073660	21-1434	#75-6944							
DT154	073700	21-1434	#75-6945	75-6946						
DT155	= 073700	21-1434	#75-6946							
DT156	= 073606	21-1434	#75-6947							
DT157	= 073606	21-1434	#75-6948							
DT16	072130	21-1434	#75-6814							
DT160	- 073606	21-1434	#75-6949							
DT161	= 073606	21-1434	#75-6950							
DT162	= 073606	21-1434	#75-6951							
DT163	= 073606	21-1434	#75-6952							
DT164	= 071712	21-1434	#75-6953							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
DT165	= 071712	21-1434	#75-6954						
DT166	= 073606	21-1434	#75-6955						
DT167	= 073606	21-1434	#75-6956						
DT17	= 071712	21-1434	#75-6815						
DT170	= 073606	21-1434	#75-6957						
DT171	= 073606	21-1434	#75-6958						
DT172	= 073606	21-1434	#75-6959						
DT173	= 073606	21-1434	#75-6960						
DT174	= 073606	21-1434	#75-6961						
DT175	= 073606	21-1434	#75-6962						
DT176	= 073606	21-1434	#75-6963						
DT177	073712	21-1434	#75-6964						
DT2	071670	21-1434	#75-6796						
DT20	072150	21-1434	#75-6816						
DT200	= 073606	21-1434	#75-6965						
DT201	= 073606	21-1434	#75-6966						
DT202	= 073606	21-1434	#75-6967						
DT203	= 073606	21-1434	#75-6968						
DT204	= 073606	21-1434	#75-6969						
DT205	= 071712	21-1434	#75-6970						
DT206	= 073606	21-1434	#75-6971						
DT207	= 073606	21-1434	#75-6972						
DT21	072172	21-1434	#75-6818	75-6886	75-6892				
DT210	= 073606	21-1434	#75-6973						
DT211	073722	21-1434	#75-6974						
DT212	073740	21-1434	#75-6975	75-6976					
DT213	= 073740	21-1434	#75-6976						
DT214	= 073606	21-1434	#75-6977						
DT22	072204	21-1434	#75-6819						
DT23	072232	21-1434	#75-6822						
DT24	072254	21-1434	#75-6824						
DT25	072300	21-1434	#75-6827						
DT26	072350	21-1434	#75-6829	75-6837					
DT27	072424	21-1434	#75-6832	75-6838					
DT3	071712	21-1434	#75-6797	75-6799	75-6815	75-6911	75-6912	75-6922	75-6953	75-6954
		75-6970							
DT30	072466	21-1434	#75-6834						
DT31	= 072350	21-1434	#75-6837						
DT32	= 072424	21-1434	#75-6838						
DT33	072520	21-1434	#75-6839	75-6848					
DT34	072576	21-1434	#75-6842	75-6845	75-6846	75-6847	75-6867	75-6914	
DT35	= 072576	21-1434	#75-6845						
DT36	= 072576	21-1434	#75-6846						
DT37	= 072576	21-1434	#75-6847						
DT4	= 071712	21-1434	#75-6799						
DT40	= 072520	21-1434	#75-6848						
DT41	072650	21-1434	#75-6849						
DT42	072702	21-1434	#75-6852	75-6855					
DT43	= 072702	21-1434	#75-6855						
DT44	072760	21-1434	#75-6856						
DT45	073030	21-1434	#75-6858						
DT46	073104	21-1434	#75-6861						

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES								
DT47		073172	21-1434	#75-6865	75-6870	75-6875	75-6913				
DT5		071734	21-1434	#75-6800							
DT50	=	072576	21-1434	#75-6867							
DT51		073224	21-1434	#75-6868	75-6915						
DT52	=	073172	21-1434	#75-6870							
DT53		073262	21-1434	#75-6871	75-6876	75-6878					
DT54		073302	21-1434	#75-6873	75-6877	75-6879	75-6880	75-6881	75-6885	75-6891	75-6896
			75-6900	75-6904							
DT55	=	073172	21-1434	#75-6875							
DT56	=	073262	21-1434	#75-6876							
DT57	=	073302	21-1434	#75-6877							
DT6		071766	21-1434	#75-6802	75-6803	75-6804	75-6805	75-6812	75-6813		
DT60	=	073262	21-1434	#75-6878							
DT61	=	073302	21-1434	#75-6879							
DT62	=	073302	21-1434	#75-6880							
DT63	=	073302	21-1434	#75-688'							
DT64		073340	21-1434	#75-6882	75-6884						
DT65	=	073340	21-1434	#75-6884							
DT66	=	073302	21-1434	#75-6885							
DT67	=	072172	21-1434	#75-6886							
DT7	=	071766	21-1434	#75-6803							
DT70		073360	21-1434	#75-6887	75-6889	75-6893	75-6894	75-6897	75-6899	75-6901	75-6903
DT71	=	073360	21-1434	#75-6889	75-6898						
DT72		073426	21-1434	#75-6890	75-6895	75-6902					
DT73	=	073302	21-1434	#75-6891							
DT74	=	072172	21-1434	#75-6892							
DT75	=	073360	21-1434	#75-6893							
DT76	=	073360	21-1434	#75-6894							
DT77	=	073426	21-1434	#75-6895							
D1		005774	28-1825	#28-1830	28-1848	28-1854					
D10		006176	28-1885	#28-1888							
D2		006020	#28-1833	28-1835	#28-1836						
D3		006022	#28-1837	28-1856							
D4		006026	#28-1839								
D5		006040	#28-1845	28-1876	28-1882	28-1892					
D6		006054	28-1846	#28-1850							
D7		006064	28-1851	#28-1853							
D8		006134	#28-1870	28-1879	28-1884						
D9		006146	28-1[illegible]75	#28-1878							
EDONE		006354	29-1922	29-1928	29-1934	#29-1947					
EEDATO		035232	53-5760	53-5766	53-5789	53-5795	53-5813	53-5814	53-5815	53-5816	#53-5817
EEDONE		035314	53-5808	53-5812	53-5813	53-5814	53-5815	53-5816	#53-5823		
EEER0		035024	53-5778	53-5807	#53-5809						
EEER1		035042	53-5771	#53-5813							
EEER2		035100	53-5773	#53-5814							
EEER3		035136	53-5800	#53-5815							
EEER4		035174	53-5802	#53-5816							
EEP0		035242	53-5762	53-5791	53-5813	53-5814	53-5815	53-5816	#53-5818		
EEP1		035254	53-5755	53-5757	53-5813	53-5813	53-5814	53-5814	#53-5819		
EEP2		035264	53-5767	#53-5820							
EEP3		035274	53-5784	53-5786	53-5815	53-5815	53-5816	53-5816	#53-5821		
EEP4		035304	53-5796	#53-5822							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES			
EERR0	006272	29-1917	#29-1924		
EERR1	006310	29-1921	#29-1930		
EERR2	006324	29-1906	#29-1936		
EE1	03453.	#53-5751			
EE10	034764	#53-5798	53-5801		
EE11	034774	53-5799	#53-5801		
EE12	035002	53-5794	#53-5803		
EE13	035020	53-5806	#53-5808		
EE2	034570	53-5754	#53-5758		
EE3	034612	#53-5764	53-5774		
EE4	034632	#53-5769	53-5772		
EE5	034642	53-5770	#53-5772		
EE6	034650	53-5765	#53-5774		
EE7	034666	53-5777	#53-5780		
EE8	034722	53-5783	#53-5787		
EE9	034744	#53-5793	53-5803		
EMTVEC =	000030	#29-1415	*24-1443	*24-1443	
EM1	044704	21-1434	#72-6205		
EM10 =	045112	21-1434	#72-6213		
EM100	054014	21-1434	#72-6338		
EM101	054054	21-1434	#72-6339		
EM102	054200	21-1434	#72-6340		
EM103	054252	21-1434	#72-6341		
EM104	054355	21-1434	#72-6342		
EM105	054416	21-1434	#72-6343		
EM106	054543	21-1434	#72-6344		
EM107	054616	21-1434	#72-6345		
EM11	045233	21-1434	#72-6214		
EM110	054722	21-1434	#72-6346		
EM111	054764	-1434	#72-6362	72-6363	72-6366
EM112 =	054764	21-1434	#72-6363		
EM113	055066	21-1434	#72-6364	72-6365	72-6367
EM114 =	055066	21-1434	#72-6365		
EM115 =	054764	21-1434	#72-6366		
EM116 =	055066	21-1434	#72-6367		
EM117	055170	21-1434	#72-6368		
EM12 =	000000	21-1434	#72-6215		
EM120	055324	21-1434	#72-6369		
EM121	055460	21-1434	#72-6370		
EM122	055577	21-1434	#72-6372		
EM123	055676	21-1434	#72-6374		
EM124	055737	21-1434	#72-6375		
EM125	056032	21-1434	#72-6376		
EM126	056122	21-1434	#72-6377		
EM127	056331	21-1434	#72-6382		
EM13 =	000000	21-1434	#72-6216		
EM130	056544	21-1434	#72-6387		
EM131	056644	21-1434	#72-6390		
EM132	056704	21-1434	#72-6391		
EM133	056744	21-1434	#72-6432	72-6436	
EM134	057003	21-1434	#72-6433	72-6437	
EM135	057042	21-1434	#72-6434	72-6438	

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES			
EM136		057101	21-1434	#72-6435	72-6439	
EM137	=	056744	21-1434	#72-6436		
EM14		045314	21-1434	#72-6217		
EM140	=	057003	21-1434	#72-6437		
EM141	=	057042	21-1434	#72-6438		
EM142	=	057101	21-1434	#72-6439		
EM143		057140	21-1434	#72-6440	72-6442	
EM144		057173	21-1434	#72-6441	72-6443	
EM145	=	057140	21-1434	#72-6442		
EM146	=	057173	21-1434	#72-6443		
EM147		057226	21-1434	#72-6444	72-6445	72-6446
EM15		045437	21-1434	#72-6220		
EM150	=	057226	21-1434	#72-6445		
EM151	=	057226	21-1434	#72-6446		
EM152		057260	21-1434	#72-6447	72-6448	
EM153	=	057260	21-1434	#72-6448		
EM154		057312	21-1434	#72-6449		
EM155		057544	21-1434	#72-6450		
EM156		057777	21-1434	#72-6451		
EM157		060214	21-1434	#72-6452		
EM16		045562	21-1434	#72-6223		
EM160		060433	21-1434	#72-6453		
EM161		060640	21-1434	#72-6454		
EM162		061045	21-1434	#72-6455		
EM163		061112	21-1434	#72-6456		
EM164		061157	21-1434	#72-6457		
EM165		061224	21-1434	#72-6458		
EM166		061271	21-1434	#72-6459		
EM167		061401	21-1434	#72-6460		
EM17		045633	21-1434	#72-6224		
EM170		061640	21-1434	#72-6461		
EM171		061750	21-1434	#72-6462		
EM172		062207	21-1434	#72-6463		
EM173		062446	21-1434	#72-6464		
EM174		062705	21-1434	#72-6465		
EM175		063144	21-1434	#72-6466		
EM176		063403	21-1434	#72-6467		
EM177		063540	21-1434	#72-6468		
EM2		044741	21-1434	#72-6207		
EM20		046066	21-1434	#72-6228		
EM200		063574	21-1434	#72-6469		
EM201		063731	21-1434	#72-6470		
EM202		064066	21-1434	#72-6471		
EM203		064223	21-1434	#72-6472		
EM204		064360	21-1434	#72-6473		
EM205		064515	21-1434	#72-6474		
EM206		064562	21-1434	#72-6475		
EM207		064627	21-1434	#72-6476		
EM21		046244	21-1434	#72-6232		
EM210		064751	21-1434	#72-6478		
EM211	=	045112	21-1434	#72-6479		
EM212	=	045146	21-1434	#72-6480		

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES			
EM213	=	045200	21-1434	#72-6481		
EM214		065026	21-1434	#72-6482		
EM22		046375	21-1434	#72-6235	72-6237	72-6238
EM23	=	046375	21-1434	#72-6237		
EM24	=	046375	21-1434	#72-6238		
EM25		046462	21-1434	#72-6239		
EM26		046575	21-1434	#72-6241	72-6243	
EM27	=	046575	21-1434	#72-6243		
EM3		045005	21-1434	#72-6208		
EM30		046643	21-1434	#72-6244		
EM31		046715	21-1434	#72-6246	72-6248	
EM32	=	046715	21-1434	#72-6248		
EM33		046763	21-1434	#72-6249		
EM34		047024	21-1434	#72-6251		
EM35		047126	21-1434	#72-6253		
EM36		047230	21-1434	#72-6255		
EM37		047331	21-1434	#72-6257		
EM4		045052	21-1434	#72-6209		
EM40		047432	21-1434	#72-6259		
EM41		047603	21-1434	#72-6261		
EM42		047640	21-1434	#72-6266		
EM43		047761	21-1434	#72-6267		
EM44		050102	21-1434	#72-6268	72-6269	
EM45	=	050102	21-1434	#72-6269		
EM46		050145	21-1434	#72-6270		
EM47		050223	21-1434	#72-6275		
EM5		045112	21-1434	#72-6210	72-6213	72-6479
EM50		050341	21-1434	#72-6276		
EM51		050437	21-1434	#72-6278		
EM52		050500	21-1434	#72-6298		
EM53		050621	21-1434	#72-6[illegible]9		
EM54		051016	21-1434	#72-6[illegible]0		
EM55		051062	21-1434	#72-6291		
EM56		051203	21-1434	#72-6292		
EM57		051400	21-1434	#72-6293		
EM6		045146	21-1434	#72-6211	72-6480	
EM60		051444	21-1434	#72-6294		
EM61		051641	21-1434	#72-6295		
EM62		051705	21-1434	#72-6296		
EM63		052077	21-1434	#72-6300		
EM64		052271	21-1434	#72-6304	72-6306	
EM65	=	052271	21-1434	#72-6306		
EM66		052425	21-1434	#72-6307		
EM67		052470	21-1434	#72-6329		
EM7		045200	21-1434	#72-6212	72-6481	
EM70		052721	21-1434	#72-6330		
EM71		053044	21-1434	#72-6331		
EM72		053146	21-1434	#72-6332		
EM73		053222	21-1434	#72-6333		
EM74		053262	21-1434	#72-6334		
EM75		053513	21-1434	#72-6335		
EM76		053636	21-1434	#72-6336		

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
EM77	053740	21-1434	#72-6337							
ERM10	037042	57-5902	57-5902	#57-5902						
ERROR	= 104000	#19-1415	25-1510	25-1534	25-1547	25-1560	25-1565	26-1601	26-1607	27-1790
		27-1797	28-1843	28-1867	28-1881	28-1[illegible]1	29-1927	29-1933	29-1945	30-2079
		30-2098	30-2102	30-2112	30-2134	30-2138	30-2146	30-2161	30-2177	30-2192
		30-2207	30-2215	30-2221	30-2240	30-2250	30-2258	30-2277	30-2287	30-2295
		31-2454	31-2461	31-2469	31-2481	32-2625	32-2632	32-2639	32-2650	33-2886
		34-3058	35-3182	35-3188	35-3194	35-3197	35-3201	35-3204	35-3216	35-3227
		36-3300	36-3307	36-3316	37-3398	37-3405	37-3414	38-3496	38-3503	38-3515
		39-3594	39-3604	39-3611	39-3622	40-3726	40-3734	40-3740	40-3752	40-3759
		41-3866	41-3874	41-3881	41-3893	41-3900	42-3999	42-4009	42-4016	42-4024
		43-4131	43-4141	43-4151	43-4158	44-4310	44-4319	44-4337	44-4352	44-4368
		45-4430	45-4438	45-4458	45-4466	45-4486	45-4494	45-4516	45-4524	46-4653
		46-4659	46-4667	46-4672	47-4748	47-4756	47-4762	48-4836	48-4842	49-4990
		49-4994	49-5002	49-5008	49-5016	49-5022	49-5028	49-5034	50-5229	50-5233
		50-5239	50-5245	50-5254	50-5260	50-5266	50-5275	51-5462	51-5467	51-5474
		51-5483	51-5489	51-5498	52-5716	52-5718	52-5719	52-5720	52-5721	52-5722
		52-5723	52-5724	52-5725	52-5726	52-5727	52-5728	52-5729	53-5811	53-5813
		53-5814	53-5815	53-5816	53-5881	54-5884	54-5886	56-5900	57-5902	67-6079
		68-6088	69-6097							
ERRVEC	= 000004	#19-1415	24-1443	*24-1443	*24-1443	*25-1473	*25-1487	*28-1827	*30-1977	*30-2016
		*31-2352	*32-2529	*35-3103	*35-3133	*36-3261	*37-3360	*39-3555	*40-3659	*41-3799
		*42-3938	*43-4059	56-5900	*56-5900	*56-5900	*56-5900	*70-6117		
ERTYPE	041342	25-1526	33-2904	57-5902	#66-5930					
ERT1	041526	#66-5978	66-6045							
ERT2	041712	66-5983	66-5991	66-6000	66-6009	66-6033	#66-6037			
ERT3	041716	66-6017	66-6024	#66-6042						
ERT4	041726	66-5975	66-6044	#66-6047						
ERT5	041740	66-5942	#66-6052							
E1	006230	29-1905	#29-1908							
E2	006244	#29-1911								
E3	006244	29-1910	#29-1912							
E4	006246	#29-1913	29-1936							
FDATI0	010174	30-1969	30-1993	30-2077	30-2078	30-2087	#30-2298			
FDATI1	010176	#30-2299								
FDATI2	010200	#30-2300								
FDATI3	010202	30-2254	#30-2301							
FDATI4	010204	30-1976	30-1985	30-2082	30-2092	30-2227	#30-2302			
FDATI5	010206	30-2243	#30-2303							
FDATI6	010210	#30-2304								
FDATI7	010212	#30-2305								
FDATOC	010216	30-2011	30-2032	30-2123	30-2143	#30-2307				
FDATOT	010220	#30-2308								
FDATOX	010222	#30-2309								
FDATO3	010224	30-2271	#30-2310							
FLATG	010226	30-2015	30-2024	30-2118	30-2128	30-2212	30-2263	#30-2311		
FDATO5	010230	30-2149	30-2164	30-2280	#30-2312					
FDATO6	010232	30-2180	30-2195	#30-2313						
FDATO7	010234	30-2144	30-2213	#30-2314						
FDONE	010260	30-2072	30-2080	30-2099	30-2103	30-2113	30-2135	30-2139	30-2147	30-2162
		30-2178	30-2193	30-2208	30-2216	30-2222	30-2241	30-2251	30-2259	30-2278
		30-2288	30-2296	#30-2326						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
FECMS	042455	#71-6132	75-6801						
FERR0	006766	30-1998	#30-2074						
FERR1	007024	30-1987	#30-2082						
FERR10	007604	30-2053	30-2065	30-2168	30-2199	#30-2210			
FERR11	007640	30-2004	30-2071	#30-2218					
FERR2	007122	30-1991	#30-2105						
FERR20	007660	30-1977	#30-2224						
FERR21	007776	30-2232	#30-2253						
FERR25	010026	30-2016	#30-2261						
FERR26	010144	30-2269	#30-2290						
FERR3	007162	30-2026	#30-2118						
FERR4	007154	30-2030	#30-2115						
FERR5	007260	30-2037	30-2041	30-2045	30-2049	#30-2141			
FERR6	007314	30-2057	#30-2149						
FERR7	007450	30-2061	#30-2180						
FER2	007126	#30-2107	30-2116						
FFDATO	035622	54-5844	54-5866	54-5884	54-5886	#54-5889			
FFDONE	035702	54-5877	54-5882	54-5884	54-5886	#54-5895			
FFER0	035512	54-5854	54-5876	#54-5879					
FFER1	035526	54-5872	#54-5884						
FFER2	035564	54-5850	#54-5886						
FFP0	035632	54-5861	54-5884	#54-5890					
FFP1	035642	54-5863	54-5884	#54-5891					
FFP2	035652	54-5839	54-5886	#54-5892					
FFP3	035662	54-5841	54-5886	#54-5893					
FFP4	035672	54-5846	54-5868	54-5884	54-5886	#54-5894			
FF1	035320	#54-5835							
FF10	035500	54-5871	#54-5873						
FF11	035510	54-5875	#54-5877						
FF2	035354	54-5838	#54-5842						
FF3	035376	#54-5848	54-5851						
FF4	035404	54-5849	#54-5851						
FF5	035414	54-5853	#54-5857						
FF6	035450	54-5860	#54-5864						
FF7	035472	#54-5870	54-5873						
FPSMS	042411	#71-6131	75-6801						
FPSPUR	042066	25-1484	28-1858	29-1938	35-3156	35-3175	44-4316	44-4358	49-4979	#67-6073
		70-6116								
FPVECT	= 000244	#19-1410	*25-1468	*25-1484	*28-1828	*29-1906	*35-3098	*35-3131	*44-4208	*44-4299
		*49-4883	*51-5318	*70-6116						
FXDAT0	010240	30-1970	30-1994	30-2033	30-2075	30-2076	30-2145	#30-2316		
FXDAT1	010242	#30-2317								
FXDAT2	010244	#30-2318								
FXDAT3	010246	#30-2319								
FXDAT4	010250	30-2214	#30-2320							
FXDAT5	010252	#30-2321								
FXDAT6	010254	#30-2322								
FXDAT7	010256	#30-2323								
F1	006360	#30-1964	30-1964							
F10	006602	30-2007	#30-2020	30-2268						
F11	006604	#30-2021	30-2115							
F12	006622	30-2025	#30-2028							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
F13	006654	30-2036	#30-2039							
F135	006634	30-2029	#30-2032							
F14	006664	30-2040	#30-2043							
F15	006674	30-2044	#30-2047							
F16	006704	30-2048	#30-2051							
F17	006714	30-2052	#30-2055							
F2	006416	#30-1973	30-1974							
F20	006724	30-2056	#30-2059							
F21	006734	30-2060	#30-2063							
F22	006744	30-2064	#30-2067							
F23	006762	30-2070	#30-2072							
F3	006436	30-1965	#30-1981							
F4	006440	#30-1982	30-2105	30-2231						
F5	006456	30-1986	#30-1989							
F6	006532	30-2003	#30-2006							
F7	006562	#30-2012	30-2013							
GADR	015030	*33-2873	33-2887	*33-2901	33-2951	#33-2979				
GAND0	015000	33-2875	33-2899	33-2909	33-2925	33-2942	#33-2967			
GAND1	015002	#33-2968								
GAND2	015004	#33-2969								
GAND3	015006	#33-2970								
GCMP	014210	33-2811	33-2812	33-2813	33-2814	33-2815	33-2816	33-2817	33-2818	33-2819
		33-2820	33-2821	33-2822	#33-2863					
GDAT00	015020	33-2811	33-2812	33-2813	33-2814	33-2815	33-2816	33-2817	33-2818	33-2819
		33-2820	33-2821	33-2822	33-2850	33-2856	33-2863	33-2885	#33-2975	
GDAT01	015022	#33-2976								
GDAT02	015024	#33-2977								
GDAT03	015026	#33-2978								
GDONE	015032	33-2824	#33-2980							
GERR1	014236	33-2868	#33-2873							
GFLAG1	014754	33-2811	*33-2811	33-2812	*33-2812	33-2813	*33-2813	33-2814	*33-2814	33-2815
		*33-2815	33-2816	*33-2816	33-2817	*33-2817	33-2818	*33-2818	33-2819	*33-2819
		33-2820	*33-2820	33-2821	*33-2821	33-2822	*33-2822	33-2836	#33-2957	
GFLAG2	014756	*33-2883	33-2891	33-2898	#33-2958					
GNS	- ******	19-1426	19-1426	24-1444	55-5898	55-5898	64-5916	64-5916	64-5916	64-5916
		64-5916	64-5916	64-5916	64-5916	64-5916	64-5916	64-5916	64-5916	64-5916
		64-5916	64-5916	64-5916	64-5916	64-5916	64-5916	64-5916	64-5917	64-5917
GOR0	015010	33-2900	33-2928	#33-2971						
GOR1	015012	#33-2972								
GOR2	015014	#33-2973								
GOR3	015016	#33-2974								
GPAT00	014760	33-2811	33-2813	33-2815	33-2817	33-2819	33-2821	33-2846	#33-2959	
GPAT01	014762	#33-2960								
GPAT02	014764	#33-2961								
GPAT03	014766	#33-2962								
GPAT10	014770	33-2812	33-2814	33-2816	33-2818	33-2820	33-2822	33-2841	#33-2963	
GPAT11	014772	#33-2964								
GPAT12	014774	#33-2965								
GPAT13	014776	#33-2966								
GRESET	014170	33-2811	33-2812	33-2813	33-2814	33-2815	33-2816	33-2817	33-2818	33-2819
		33-2820	33-2821	33-2822	#33-2856					
GSETUP	014112	33-2811	33-2812	33-2813	33-2814	33-2815	33-2816	33-2817	33-2818	33-2819

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
		33-2820	33-2821	33-2822	#33-2836					
GSUM	014322	33-2811	33-2812	33-2813	33-2814	33-2815	33-2816	33-2817	33-2818	33-2819
		33-2820	33-2821	33-2822	#33-2891					
GS1	014142	#33-2846	33-2860							
GTSWR	= 104406	24-1444	#64-5916							
G1	012020	33-2811	33-2811	#33-2811	33-2811					
G10	012326	33-2813	#33-2813							
G11	012330	33-2813	#33-2813							
G12	012422	33-2814	33-2814	#33-2814	33-2814					
G13	012454	33-2814	#33-2814							
G14	012456	33-2814	#33-2814							
G15	012550	33-2815	33-2815	#33-2815	33-2815					
G16	012602	33-2815	#33-2815							
G17	012604	33-2815	#33-2815							
G2	012052	33-2811	#33-2811							
G20	012676	33-2816	33-2816	#33-2816	33-2816					
G21	012730	33-2816	#33-2816							
G22	012732	33-2816	#33-2816							
G23	013024	33-2817	33-2817	#33-2817	33-2817					
G24	013056	33-2817	#33-2817							
G25	013060	33-2817	#33-2817							
G26	013152	33-2818	33-2818	#33-2818	33-2818					
G27	013204	33-2818	#33-2818							
G3	012054	33-2811	#33-2811							
G30	013206	33-2818	#33-2818							
G31	013300	33-2819	33-2819	#33-2819	33-2819					
G32	013332	33-2819	#33-2819							
G33	013334	33-2819	#33-2819							
G34	013426	33-2820	33-2820	#33-2820	33-2820					
G35	013460	33-2820	#33-2820							
G36	013462	33-2820	#33-2820							
G37	013554	33-2821	33-2821	#33-2821	33-2821					
G4	012146	33-2812	33-2812	#33-2812	33-2812					
G40	013606	33-2821	#33-2821							
G41	013610	33-2821	#33-2821							
G42	013702	33-2822	33-2822	#33-2822	33-2822					
G43	013734	33-2822	#33-2822							
G44	013736	33-2822	#33-2822							
G5	012200	33-2812	#33-2812							
G6	012202	33-2812	#33-2812							
G7	012274	33-2813	33-2813	#33-2813	33-2813					
HADR	015566	*34-3033	34-3041	#34-3062						
HA1R	015642	34-3025	34-3035	34-3044	#34-3071					
HA1W	015572	34-2991	34-3000	34-3010	34-3034	34-3052	#34-3065			
HA2R	015652	34-3026	#34-3072							
HA2W	015602	34-3001	34-3011	#34-3066						
HA3R	015662	34-3027	#34-3073							
HA3W	015612	34-3002	34-3012	#34-3067						
HA4R	015672	34-3028	#34-3074							
HA4W	015622	34-3003	34-3013	#34-3068						
HA5R	015702	34-3029	#34-3075							
HA5W	015632	34-3004	34-3014	#34-3069						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
HCLR	015516	34-2997	34-3024	#34-3044					
HCLR1	015526	#34-3046	34-3047						
HCMP	015460	34-3008	34-3010	34-3011	34-3012	34-3013	34-3014	#34-3033	
HCMP1	015500	#34-3037	34-3040						
HCMP2	015510	34-3038	#34-3040						
HDAT1	015712	34-2992	#34-3077						
HDAT2	015722	#34-3078							
HDAT3	015732	#34-3079							
HDAT4	015742	#34-3080							
HDAT5	015752	#34-3081							
HDONE	015762	34-3018	34-3059	#34-3082					
HERROR	015534	34-3039	#34-3051						
HFLAG	015570	*34-2990	34-3016	*34-3020	#34-3063				
HSTD	015402	34-3006	34-3010	34-3011	34-3012	34-3013	34-3014	#34-3024	
HT	- 000011	#19-1415	59-5906	59-5906					
H1	015044	34-2988	#34-2990						
H10	015306	#34-3013	34-3013						
H11	015340	#34-3014	34-3014						
H12	015372	34-3017	#34-3020						
H2	015064	#34-2994	34-2995						
H3	015074	#34-2999	34-3021						
H4	015146	#34-3006							
H5	015170	#34-3010	34-3010						
H6	015222	#34-3011	34-3011						
H7	015254	#34-3012	34-3012						
IBSAVE	036504	#57-5902	*57-5902	*57-5902	57-5902	57-5902	57-5902	57-5902	
IDATI0	011122	31-2339	31-2345	31-2363	31-2389	31-2394	31-2423	31-2459	#31-2500
IDATI1	011124	#31-2501							
IDATI2	011126	*31-2420	#31-2502						
IDATI3	011130	*31-2421	#31-2503						
IDATO0	011112	31-2359	31-2362	31-2417	31-2422	31-2460	#31-2495		
IDATO1	011114	#31-2496							
IDATO2	011116	31-2368	31-2373	31-2428	#31-2497				
IDATO3	011120	31-2431	#31-2498						
IDONE	011132	31-2437	31-2455	31-2462	31-2470	31-2482	#31-2505		
IERR0	010672	31-2352	#31-2440						
IERR1	010754	31-2377	31-2430	#31-2458					
IERR2	010774	31-2381	#31-2465						
IERR25	011016	#31-2468	31-2474						
IERR3	011046	31-2412	#31-2477						
IERR4	011022	31-2433	#31-2471						
ILLMS	043365	#71-6159	75-6824						
ILL1	043261	#71-6156							
ILL2	043324	#71-6158							
IOTVEC	= 000020	#19-1415	*24-1443	*24-1443					
IPAT10	011072	31-2340	31-2388	#31-2485					
IPAT11	011074	#31-2486							
IPAT12	011076	31-2428	#31-2487						
IPAT13	011100	31-2431	#31-2488						
IPAT20	011102	31-2348	31-2397	#31-2490					
IPAT21	011104	#31-2491							
IPAT22	011106	#31-2492							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES					
IPAT23	011110	#31-2493					
I1	010272	31-2335	#31-2337				
I10	010454	31-2371	#31-2380				
I105	010462	31-2366	#31-2383				
I106	010456	31-2379	#31-2381				
I11	010464	#31-2387					
I12	010472	31-2387	#31-2388				
I13	010506	#31-2391	31-2392				
I14	010550	31-2401	#31-2405	31-2478			
I15	010552	#31-2406	31-2444				
I16	010554	#31-2407	31-2446				
I17	010572	31-2411	#31-2414				
I2	010310	#31-2342	31-2343				
I20	010632	#31-2425	31-2435				
I21	010646	#31-2430	31-2432				
I22	010652	31-2429	#31-2431				
I23	010666	31-2426	#31-2435				
I3	010356	31-2353	#31-2355				
I4	010360	#31-2356	31-2440				
I5	010362	#31-2357	31-2442				
I6	010406	#31-2365	31-2383				
I7	010422	#31-2370	31-2380				
JBUF0	016766	36-3270	#36-3319				
JBUF1	016770	#36-3320					
JBUF2	016772	#36-3321					
JBUF3	016774	#36-3322					
JDATI0	016776	36-3259	36-3274	36-3282	36-3306	36-3314	#36-3324
JDATI1	017000	#36-3325					
JDATI2	017002	#36-3326					
JDATI3	017004	#36-3327					
JDATO0	017006	36-3267	36-3275	36-3315	#36-3329		
JDATO	017016	36-3256	#36-3334				
JDATO1	017010	#36-3330					
JDATO2	017012	#36-3331					
JDATO3	017014	#36-3332					
JDAT1	017020	#36-3335					
JDAT2	017022	#36-3336					
JDAT3	017024	#36-3337					
JDONE	017026	36-3286	36-3301	36-3308	36-3317	#36-3340	
JERR0	016646	36-3261	#36-3290				
JERR1	016714	36-3272	36-3284	#36-3303			
JERR2	016740	36-3279	#36-3312				
J1	016540	36-3251	#36-3253				
J10	016666	36-3291	36-3293	#36-3296			
J2	016564	#36-3263	36-3304	36-3313			
J3	016566	#36-3264	36-3290				
J4	016570	#36-3265	36-3292				
J5	016624	#36-3277	36-3280				
J6	016632	36-3278	#36-3280				
J7	016644	36-3283	#36-3286				
KBUF0	017274	37-3358	37-3369	37-3381	#37-3422		
KBUF1	017276	#37-3423					

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES					
KBUF2	017300	#37-3424					
KBUF3	017302	#37-3425					
KDATI0	017264	37-3373	37-3404	37-3412	#37-3417		
KDATI1	017266	#37-3418					
KDATI2	017270	#37-3419					
KDATI3	017272	#37-3420					
KDATO0	017304	37-3366	37-3374	37-3413	#37-3427		
KDATO1	017306	#37-3428					
KDATO2	017310	#37-3429					
KDATO3	017312	#37-3430					
KDONE	017324	37-3385	37-3399	37-3406	37-3415	#37-3437	
KERR0	017146	37-3360	#37-3389				
KERR1	017212	37-3371	37-3383	#37-3401			
KERR2	017236	37-3378	#37-3410				
KPAT0	017314	37-3355	#37-3432				
KPAT1	017316	#37-3433					
KPAT2	017320	#37-3434					
K1	017040	37-3350	#37-3352				
K10	017166	37-3390	37-3392	#37-3395			
K2	017064	#37-3362	37-3402	37-3411			
K3	017066	#37-3363	37-3389				
K4	017070	#37-3364	37-3391				
K5	017124	#37-3376	37-3379				
K6	017132	37-3377	#37-3379				
K7	017144	37-3382	#37-3385				
LDATI0	017630	38-3455	38-3462	38-3481	38-3501	38-3513	#38-3527
LDATI1	017632	#38-3528					
LDATI2	017634	38-3475	*38-3479	38-3495	#38-3529		
LDATI3	017636	*38-3480	#38-3530				
LDATO0	017642	38-3472	38-3482	38-3502	38-3507	#38-3531	
LDATO1	017644	38-3514	#38-3532				
LDATO2	017646	#38-3533					
LDATO3	017650	#38-3534					
LDONE	017652	38-3490	38-3497	38-3504	38-3516	#38-3536	
LD1	043121	#71-6146					
LD2	043151	#71-6147					
LERR1	017464	38-3477	#38-3492				
LERR2	017536	38-3487	#38-3506				
LERR3	017510	#38-3499	38-3510				
LF	000012	#19-1415	59-5906	59-5906			
LFIEX1	042277	#71-6129	75-6800	75-6802			
LFIEX2	042347	#71-6130	75-6800	75-6802			
LFPS1	043106	#71-6145					
LOOP	004300	#24-1445	55-5898				
LPAT10	017606	38-3452	#38-3518				
LPAT11	017610	#38-3519					
LPAT12	017612	#38-3520					
LPAT13	017614	#38-3521					
LPAT20	017616	38-3456	38-3506	#38-3523			
LPAT21	017620	#38-3524					
LPAT22	017622	#38-3525					
LPAT23	017624	#38-3526					

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
L1	017336	38-3447	#38-3449							
L2	017376	#38-3466	38-3493	38-3500	38-3512					
L3	017400	#38-3467								
L4	017402	#38-3469								
L5	017452	#38-3485	38-3488							
L6	017460	38-3486	#38-3488							
MDAT00	020172	39-3570	39-3573	39-3583	39-3593	39-3609	#39-3635			
MDAT01	020174	#39-3636								
MDAT02	020176	#39-3637								
MDAT03	020200	#39-3638								
MDONE	020202	39-3581	39-3595	39-3605	39-3612	39-3623	#39-3640			
MERR0	020026	39-3566	#39-3597							
MERR1	020064	39-3576	39-3587	#39-3607						
MERR2	020000	#39-3590								
MERR3	020112	39-3555	#39-3614							
MNUMBE	- 000214	#19-806	21-1431							
MNUM0	044067	33-2811	33-2812	#71-6176						
MNUM1	044075	33-2813	33-2814	#71-6177						
MNUM2	044102	33-2815	33-2816	#71-6178						
MNUM3	044107	33-2817	33-2818	#71-6179						
MNUM4	044116	33-2819	33-2820	#71-6180						
MNUM5	044124	33-2821	33-2822	#71-6181						
MPAT10	020152	39-3551	#39-3625							
MPAT11	020154	#39-3626								
MPAT12	020156	#39-3627								
MPAT13	020160	#39-3628								
MPAT20	020162	39-3592	39-3610	#39-3630						
MPAT21	020164	#39-3631								
MPAT22	020166	#39-3632								
MPAT23	020170	#39-3633								
MS1	043433	#71-6160	75-6827	75-6840	75-6857	75-6873				
MS10	043607	#71-6167	75-6830	75-6831	75-6833	75-6843	75-6844	75-6853	75-6854	75-6865
		75-6888	75-6888	75-6917	75-6918					
MS11	043622	#71-6168	75-6831	75-6844	75-6854	75-6888	75-6918			
MS12	043647	#71-6169	75-6833	75-6865						
MS13	043705	#71-6170	75-6833	75-6866						
MS14	043722	#71-6171	75-6834							
MS15	044010	#71-6173	75-6834							
MS16	044035	30-2255	30-2291	#71-6174						
MS17	044042	#71-6175	75-6856	75-6858						
MS2	043445	#71-6161	75-6828	75-6841	75-6857	75-6874				
MS20	044132	#71-6182	75-6856							
MS21	044173	#71-6183	75-6857	75-6857	75-6859	75-6860	75-6873	75-6874		
MS22	044232	#71-6184	75-6859							
MS23	044262	#71-6185	75-6860							
MS24	044311	#71-6186	75-6858							
MS25	044404	#71-6188	75-6861	75-6869						
MS26	044426	#71-6189	75-6862	75-6869						
MS27	044443	#71-6190	75-6869	75-6869						
MS3	043452	#71-6162	75-6827	75-6828	75-6840	75-6841				
MS30	044452	#71-6191	75-6861	75-6863						
MS31	044461	#71-6192	75-6861	75-6863						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
MS32	044470	#71-6193	75-6862	75-6864						
MS33	044477	#71-6194	75-6862	75-6864						
MS34	044506	#71-6195	75-6862	75-6864						
MS35	044515	31-2354	32-2531	#71-6196						
MS36	044522	31-2402	32-2573	#71-6197						
MS37	044531	#71-6198	75-6918	75-6923						
MS4	043501	#71-6163	75-6827	75-6828	75-6840	75-6841				
MS40	044547	#71-6199	75-6924							
MS41	044603	#71-6201	75-6926							
MS415	044563	#71-6200	75-6924							
MS42	044627	#71-6202	75-6927							
MS43	044645	#71-6203	75-6927							
MS44	044662	#71-6204	75-6928							
MS5	043513	#71-6164								
MS6	043555	#71-6165	75-6830	75-6843	75-6853	75-6887	75-6917			
MS7	043573	#71-6166	75-6830	75-6831	75-6833	75-6843	75-6844	75-6853	75-6854	75-6865
		75-6887	75-6888	75-6917	75-6918					
M*	017656	#39-3548								
M15	017676	#39-3557	39-3591	39-3603	39-3608	39-3620				
M2	017702	#39-3560	39-3597	39-3619						
M3	017704	#39-3561								
M4	017706	#39-3562								
M5	017742	39-3575	#39-3577							
M6	017746	#39-3578	39-3580							
M7	017756	39-3579	#39-3583							
M8	017766	#39-3585	39-3588							
M9	017776	39-3586	#39-3588							
NDATI0	020700	40-3701	40-3758	40-3766	#40-3775					
NDATI1	020702	#40-3776								
NDATI2	020704	#40-3777								
NDATI3	020706	#40-3778								
NDATO0	020636	40-3666	40-3683	40-3690	40-3700	40-3757	#40-3762			
NDATO1	020640	#40-3763								
NDATO2	020642	#40-3764								
NDATO3	020644	#40-3765								
NDONE	020710	40-3706	40-3727	40-3735	40-3741	40-3753	40-3760	#40-3780		
NERR0	020400	40-3659	#40-3714							
NERR1	020500	40-3674	#40-3736							
NERR10	020432	40-3715	#40-3723							
NERR11	020444	40-3720	#40-3729							
NERR2	020534	40-3678	#40-3742							
NERR20	020506	#40-3737	40-3743	40-3745	40-3747					
NERR3	020544	40-3688	#40-3744							
NERR4	020554	40-3696	#40-3746							
NERR5	020564	40-3698	#40-3749							
NERR6	020610	40-3708	#40-3755							
NOOP1	042473	#71-6134	75-6806	75-6810						
NOOP10	042751	#71-6142	75-6808	75-6810						
NOOP11	043042	#71-6144	75-6810							
NOOP15	042522	#71-6135	75-6806							
NOOP2	042617	#71-6136	75-6806	75-6807						
NOOP3	042634	#71-6137	75-6807	75-6807						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
NOOP4	042646	#71-6138	75-6807						
NOOP5	042663	#71-6139	75-6807						
NOOP6	042711	#71-6140	75-6808						
NOOP7	042731	#71-6141	75-6808						
NPAT10	020670	40-3654	#40-3770						
NPAT11	020672	#40-3771							
NPAT12	020674	#40-3772							
NPAT13	020676	#40-3773							
NPAT20	020656	40-3657	40-3669	40-3672	40-3676	40-3680	40-3691	40-3719	40-3750	#40-3766
NPAT21	020660	#40-3767							
NPAT22	020662	#40-3768							
NPAT23	020664	#40-3769							
NULL	042271	30-2224	30-2261	#71-6126					
N1	020206	#40-3651							
N10	020340	#40-3693	40-3695						
N11	020350	40-3681	40-3694	#40-3698					
N12	020352	40-3670	#40-3700						
N13	020366	#40-3703	40-3705						
N14	020376	40-3704	#40-3708						
N2	020232	#40-3662	40-3739	40-3751	40-3756				
N3	020234	#40-3663	40-3716						
N4	020236	#40-3664	40-3714						
N5	020254	#40-3672							
N6	020264	40-3673	#40-3676						
N7	020274	40-3677	#40-3680						
N8	020312	#40-3685	40-3687						
N9	020324	40-3686	#40-3690						
ODATI0	021404	41-3841	41-3899	41-3907	#41-3917				
ODATI1	021406	#41-3918							
ODATI2	021410	#41-3919							
ODATI3	021412	#41-3920							
ODATO0	021342	41-3807	41-3830	41-3840	41-3898	#41-3903			
ODATO1	021344	41-3823	#41-3904						
ODATO2	021346	#41-3905							
ODATO3	021350	#41-3906							
ODONE	021414	41-3846	41-3867	41-3875	41-3882	41-3894	41-3901	#41-3922	
OERR0	021104	41-3799	#41-3854						
OERR1	021204	41-3815	41-3860	#41-3877					
OERR10	021136	41-3855	#41-3863						
OERR11	021150	#41-3869							
OERR2	021240	41-3819	#41-3883						
OERR20	021212	#41-3878	41-3884	41-3886	41-3888				
OERR3	021250	41-3828	#41-3885						
OERR4	021260	41-3836	#41-3887						
OERR5	021270	41-3838	#41-3890						
OERR6	021314	41-3848	#41-3896						
OPAT10	021374	41-3794	#41-3912						
OPAT11	021376	#41-3913							
OPAT12	021400	#41-3914							
OPAT13	021402	#41-3915							
OPAT20	021360	41-3810	41-3891	#41-3907					
OPAT21	021362	41-3797	41-3813	41-3817	41-3821	41-3831	41-3859	#41-3908	

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
OPAT22	021364	#41-3909							
OPAT23	021366	#41-3910							
OPAT24	021370	#41-3911							
01	020714	#41-3791							
010	021044	#41-3833	41-3835						
011	021054	41-3834	#41-3838						
012	021056	41-3811	#41-3840						
013	021072	#41-3843	41-3845						
014	021102	41-3844	#41-3848						
02	020740	#41-3803	41-3880	41-3897					
C3	020742	#41-3804	41-3856						
04	020744	#41-3805	41-3854	41-3892					
C5	020762	#41-3813							
06	020772	41-3814	#41-3817						
07	021002	41-3818	#41-3821						
08	021016	#41-3825	41-3827						
09	021030	41-3826	#41-3830						
PDATI0	022050	42-3940	42-3948	42-3953	42-3974	42-3978	42-3982	42-3986	42-3990	42-4008
		42-4014	#42-4032						
PDATI1	022052	#42-4033							
PDATI2	022054	#42-4034							
PDATI3	022056	#42-4035							
PDATO0	022060	42-3945	42-3949	42-3958	42-4015	#42-4037			
PDATO1	022062	#42-4038							
PDATO2	022064	#42-4039							
PDATO3	022066	#42-4040							
PDONE	022070	42-3956	42-4000	42-4010	42-4017	42-4025	#42-4042		
PERR0	021536	42-3938	#42-3966						
PERR1	021756	42-3962	#42-4012						
PERR10	021556	42-3969	#42-3972						
PERR11	021566	42-3967	#42-3974						
PERR12	021604	42-3975	#42-3978						
PERR13	021622	42-3979	#42-3982						
PERR14	021640	42-3983	#42-3986						
PERR15	021656	42-3987	#42-3990						
PERR16	021666	42-3991	#42-3993						
PERR17	021674	42-3973	42-3977	42-3981	42-3985	42-3989	#42-3995		
PERR2	022004	42-3964	#42-4019						
PERR20	021722	42-3992	#42-4002						
PERR21	021732	42-3955	#42-4005						
PERR22	021740	42-4004	#42-4006						
PFECAD	042040	66-6056	#66-6060						
PFECDH	042010	66-6056	#66-6058						
PFECEM	041754	66-6056	#66-6057						
PFECFT	042050	66-6056	#66-6061						
PFECWS	041744	#66-6056							
PIRQ	= 177772	#19-1415							
PIRQVE	= 000240	#19-1415							
POWERM	042224	65-5920	#71-6125						
PPAT10	022040	42-3935	#42-4027						
PPAT11	022042	#42-4028							
PPAT12	022044	#42-4029							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
PPAT13	022046	#42-4030								
PROGNU	= 000001	#19-807	24-1444							
PR0	= 000000	#19-1415								
PR1	= 000040	#19-1415								
PR2	= 000100	#19-1415								
PR3	= 000140	#19-1415								
PR4	= 000200	#19-1415								
PR5	= 000240	#19-1415								
PR6	= 000300	#19-1415								
PR7	= 000340	#19-1415								
PS	= 177776	#19-1415	19-1415							
PSW	= 177776	#19-1415	26-1585							
PWRVEC	= 000024	#19-1415	*24-1443	*24-1443	*65-5920	*65-5920	*65-5920	*65-5920	*65-5920	*65-5920
P1	021420	#42-3932								
P2	021442	#42-3942	42-3943	42-4005	42-4013	42-4020				
P3	- 021444	#42-3943	42-3966	43-4101						
P4	021446	#42-3945	42-3968							
P5	021470	#42-3950	42-3952							
P6	021512	42-3951	#42-3958							
P7	021522	#42-3960	42-3963							
P8	021532	42-3961	#42-3963							
QDATI0	022560	43-4073	43-4156	43-4166	#43-4176					
QDATI1	022562	#43-4177								
QDATI2	022564	#43-4178								
QDATI3	022566	#43-4179								
QDATO0	022550	43-4068	43-4072	43-4083	43-4091	43-4157	#43-4171			
QDATO1	022552	#43-4172								
QDATO2	022554	#43-4173								
QDATO3	022556	#43-4174								
QDONE	022570	43-4081	43-4132	43-4142	43-4152	43-4159	#43-4181			
QERR0	022236	43-4059	#43-4101							
QERR1	022502	43-4095	#43-4154							
QERR11	022246	#43-4104								
QERR12	022264	43-4105	#43-4108							
QERR13	022302	43-4109	#43-4112							
QERR14	022320	43-4113	#43-4116							
QERR15	022336	43-4117	#43-4121							
QERR16	022346	43-4122	#43-4125							
QERR17	022354	43-4107	43-4111	43-4115	43-4119	#43-4127				
QERR2	022436	43-4088	#43-4144							
QERR20	022402	43-4123	#43-4134							
QERR21	022412	43-4080	#43-4137							
QERR22	022420	43-4136	#43-4138							
QERR3	022446	43-4097	#43-4146							
QERR4	022454	43-4145	#43-4148							
QPAT10	022530	43-4056	#43-4161							
QPAT11	022532	#43-4162								
QPAT12	022534	#43-4163								
QPAT13	022536	#43-4164								
QPAT20	022540	43-4063	43-4078	43-4090	43-4104	43-4108	43-4112	43-4116	43-4121	43-4140
		#43-4166								
QPAT21	022542	#43-4167								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
QPAT22	022544	#43-4168							
QPAT23	022546	#43-4169							
Q1	022074	#43-4053							
Q10	022232	43-4094	#43-4096						
Q2	022116	#43-4065	43-4066	43-4137	43-4150	43-4155			
Q3	= 022120	#43-4066							
Q4	022122	#43-4068							
Q5	022144	#43-4074	43-4076						
Q6	022166	43-4075	#43-4083						
Q7	022176	#43-4085	43-4087						
Q8	022210	43-4086	#43-4090						
Q9	022224	#43-4093	43-4096						
RDCHR	= 104410	#64-5916							
RESREG	= 104412	#64-5916							
RESVEC	= 000010	#19-1415	*24-1443	24-1443	*24-1443				
RSETUP	= 104413	25-1567	26-1610	27-1802	28-1894	29-1947	30-2326	31-2505	32-2673	33-2980
		34-3082	35-3242	36-3340	37-3437	38-3536	39-3640	40-3780	41-3922	42-4042
		43-4181	45-4544	46-4694	47-4790	48-4869	49-5044	50-5301	51-5463	51-5468
		51-5517	52-5741	53-5823	#64-5917	67-6080	68-6089	69-6098		
R6	=%000006	#19-1415	*24-1443	*24-1443	24-1443					
R7	=%000007	#19-1415								
SADR	016502	*35-3158	35-3171	*35-3176	35-3183	35-3189	#35-3230			
SAVREG	= 104411	#64-5916								
SCOPE	= 000004	#19-1415	25-1464	26-1575	27-1620	28-1824	29-1904	30-1962	31-2334	32-2513
		33-2809	34-2987	35-3092	36-3250	37-3349	38-3446	39-3546	40-3649	41-3789
		42-3930	43-4051	44-4199	45-4411	46-4553	47-4703	48-4799	49-4879	50-5055
		51-5313	52-5525	53-5749	54-5833	55-5898				
SDAT00	016516	35-3111	35-3114	35-3141	35-3144	#35-3237				
SDAT01	016520	#35-3238								
SDAT02	016522	#35-3239								
SDAT03	016524	#35-3240								
SDONE	016526	35-3176	35-3195	35-3198	35-3202	35-3205	35-3217	35-3228	#35-3242	
SERR0	016206	35-3098	#35-3154							
SERR1	016416	35-3103	#35-3208							
SERR10	016226	#35-3160	35-3177							
SERR15	016306	35-3165	#35-3180							
SERR2	016346	35-3119	#35-3193							
SERR20	016326	35-3170	#35-3186							
SERR3	016372	35-3122	#35-3200							
SERR4	016264	35-3131	#35-3173							
SERR5	016450	35-3133	#35-3219							
SERR6	016360	35-3149	#35-3196							
SERR7	016404	35-3151	#35-3203							
SETD1	043237	27-1653	27-1751	#71-6153						
SETF1	043231	27-1624	27-1775	#71-6152						
SETI1	043245	27-1681	27-1781	#71-6154						
SETL1	043253	27-1710	27-1757	#71-6155						
SPACE	042274	66-6065	#71-6128							
SPAT10	016506	35-3095	35-3115	35-3128	35-3145	#35-3232				
SPAT11	016510	#35-3233								
SPAT12	016512	#35-3234								
SPAT13	016514	#35-3235								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
STACK	= 001100	#19-1415	24-1443	70-6120						
START	003616	19-1426	#24-1443	65-5920						
STFS1	043162	#71-6148								
STKLMT	= 177774	#19-1415								
STST1	043312	#71-6157								
ST1	043175	#71-6149								
ST2	043212	#71-6150								
SWR	001140	#20-1427	24-1443	*24-1443	24-1443	*24-1443	*24-1443	24-1444	25-1516	25-1518
		33-2893	33-2895	55-5898	56-5900	56-5900	56-5900	56-5900	56-5900	57-5902
		57-5902	57-5902	57-5902	57-5902	63-5914	63-5914	65-5920	65-5920	70-6109
SWREG	000176	#19-1426	24-1443	24-1444	63-5914	63-5914				
SW0	= 000001	#19-1415								
SW00	= 000001	#19-1415	19-1415							
SW01	= 000002	#19-1415	19-1415							
SW02	= 000004	#19-1415	19-1415							
SW03	= 000010	#19-1415	19-1415							
SW04	= 000020	#19-1415	19-1415							
SW05	= 000040	#19-1415	19-1415							
SW06	= 000100	#19-1415	19-1415							
SW07	= 000200	#19-1415	19-1415							
SW08	= 000400	#19-1415	19-1415							
SW09	= 001000	#19-1415	19-1415							
SW1	= 000002	#19-1415								
SW10	= 002000	#19-1415								
SW11	= 004000	#19-1415								
SW12	= 010000	#19-1415								
SW13	= 020000	#19-1415	25-1516	33-2893						
SW14	= 040000	#19-1415								
SW15	= 100000	#19-1415								
SW2	= 000004	#19-1415								
SW3	= 000010	#19-1415								
SW4	= 000020	#19-1415								
SW5	= 000040	#19-1415								
SW6	= 000100	#19-1415								
SW7	= 000200	#19-1415	25-1518	33-2895						
SW8	= 000400	#19-1415								
SW9	= 001000	#19-1415								
S1	015766	#35-3093								
S10	016144	#35-3139								
S11	016170	#35-3147	35-3150							
S12	016200	35-3148	#35-3150							
S2	016026	#35-3106	35-3193	35-3200						
S3	016030	#35-3107	35-3154	35-3208						
S4	016034	#35-3109	35-3210							
S5	016060	#35-3117	35-3120							
S6	016070	35-3118	#35-3120							
S7	016076	#35-3125	35-3158							
S8	016136	#35-3136	35-3196	35-3203	35-3219					
S9	016140	#35-3137	35-3173	35-3221						
TAB	= 000011	#19-1413	71-6127	71-6129	71-6130	71-6134	71-6140	71-6141	71-6142	71-6142
		71-6142	71-6145	71-6145	71-6146	71-6146	71-6146	71-6147	71-6147	71-6148
		71-6148	71-6149	71-6149	71-6150	71-6150	71-6151	71-6152	71-6153	71-6154

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		71-6155	71-6156	71-6157	71-6157	71-6158	71-6159	71-6159	71-6159	71-6171
		71-6171	71-6171	71-6172	71-6182	71-6182	71-6186	71-6186	71-6186	73-6484
		73-6484	73-6485	73-6485	73-6485	73-6486	73-6486	73-6487	73-6488	73-6488
		73-6489	73-6489	73-6490	73-6490	73-6491	73-6491	73-6492	73-6492	73-6501
		73-6501	73-6502	73-6503	73-6503	73-6504	73-6504	73-6505	73-6505	73-6506
		73-6506	73-6510	73-6510	73-6511	73-6511	73-6514	73-6514	73-6514	73-6515
		73-6515	73-6516	73-6516	73-6521	73-6521	73-6522	73-6529	73-6529	73-6530
		73-6534	73-6536	73-6536	73-6537	73-6541	73-6541	73-6551	73-6551	73-6552
		73-6552	73-6576	73-6576	73-6582	73-6582	73-6585	73-6585	73-6586	73-6586
		73-6598	73-6598	73-6603	73-6603	73-6604	73-6604	73-6614	73-6614	73-6618
		73-6618	73-6647	73-6647	73-6647					
TBITVE	= 000014	#19-1415	*24-1443	*24-1443						
TDATI0	011740	32-2517	32-2522	32-2540	32-2560	32-2565	32-2594	32-2630	#32-2668	
TDATI1	011742	#32-2669								
TDATI2	011744	*32-2591	#32-2670							
TDATI3	011746	*32-2592	#32-2671							
TDATO0	011730	32-2536	32-2539	32-2588	32-2593	32-2631	#32-2663			
TDATO1	011732	#32-2664								
TDATO2	011734	32-2545	32-2599	#32-2665						
TDATO3	011736	32-2602	#32-2666							
TDONE	011750	32-2607	32-2626	32-2633	32-2640	32-2651	#32-2673			
TERR0	011516	32-2529	#32-2611							
TERR1	011600	32-2549	32-2601	#32-2629						
TERR2	011620	32-2551	#32-2636							
TERR25	011634	#32-2638	32-2643							
TERR3	011664	32-2583	#32-2646							
TERR4	011646	32-2604	#32-2641							
TKVEC	= 000060	#19-1415								
TOCTNM	042054	66-5989	66-5990	66-5998	66-6031	#66-6063				
TPAT10	011710	32-2516	32-2559	#32-2653						
TPAT11	011712	#32-2654								
TPAT12	011714	32-2599	#32-2655							
TPAT13	011716	32-2602	#32-2656							
TPAT20	011720	32-2525	32-2568	#32-2658						
TPAT21	011722	#32-2659								
TPAT22	011724	#32-2660								
TPAT23	011726	#32-2661								
TPVEC	= 000064	#19-1415								
TRAPVE	= 000034	#19-1415	*24-1443	*24-1443						
TRTVEC	- 000014	#19-1415								
TST1	004300	#25-1464								
TST10	011134	#32-2513								
TST11	011752	#33-2809								
TST12	015034	#34-2987								
TST13	015764	#35-3092								
TST14	016530	#36-3250								
TST15	017030	#37-3349								
TST16	017326	#38-3446								
TST17	017654	#39-3546								
TST2	004672	#26-1575								
TST20	020204	#40-3649								
TST21	020712	#41-3789								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
TST22	021416	#42-3930								
TST23	022072	#43-4051								
TST24	022572	#44-4199								
TST25	023732	#45-4411								
TST26	024530	#46-4553								
TST27	025344	#47-4703								
TST3	005000	#27-1620								
TST30	025754	#48-4799								
TST31	026262	#49-4879								
TST32	027330	#50-5055								
TST33	031146	#51-5313								
TST34	032502	#52-5525								
TST35	034532	#53-5749								
TST36	035316	#54-5833								
TST37	035702	#54-5896								
TST4	005744	#28-1824								
TST5	006212	#29-1904								
TST6	006356	#30-1962								
TST7	010262	#31-2334								
TYPDS	= 104405	55-5898	55-5898	#64-5916						
TYPE	= 104401	24-1444	33-2913	33-2920	33-2936	33-2946	33-2947	55-5898	55-5898	55-5898
		57-5902	57-5902	59-5906	60-5908	61-5910	63-5914	63-5914	63-5914	63-5914
		63-5914	63-5914	#64-5916	65-5920	66-5930	66-5958	66-5960	66-5965	66-5967
		66-6015	66-6022	66-6037	66-6047	66-6065				
TYPOC	= 104402	63-5914	#64-5916	66-5941	66-5982	66-6064				
TYPON	= 104404	#64-5916								
TYPOS	= 104403	#64-5916	66-6006							
T1	011136	#32-2514								
T10	011304	32-2548	#32-2550							
T105	011312	32-2543	#32-2553							
T11	011314	#32-2557								
T12	011322	32-2557	#32-2559							
T13	011336	#32-2562	32-2563							
T14	011400	32-2572	#32-2575							
T15	011402	#32-2576	32-2615	32-2647						
T16	011404	#32-2577	32-2617							
T17	011422	32-2582	#32-2585							
T2	011162	#32-2519	32-2520							
T20	011462	#32-2596	32-2606							
T21	011476	#32-2601	32-2603							
T22	011500	32-2600	#32-2602							
T23	011512	32-2597	#32-2606							
T3	011230	32-2530	#32-2532							
T4	011232	#32-2533	32-2611							
T5	011234	#32-2534	32-2613							
T6	011260	#32-2542	32-2553							
T7	011274	#32-2547	32-2550							
UDONE	023732	44-4311	44-4320	44-4338	44-4353	44-4364	44-4369	#44-4401		
UERR0	023376	44-4208	#44-4314							
UERR1	023422	44-4228	44-4285	#44-4324						
UERR10	023430	#44-4326	44-4340							
UERR11	023472	#44-4335								

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES							
UERR2	023506	44-4249	44-4267	#44-4339					
UERR20	023514	44-4325	#44-4341						
UERR21	023550	#44-4350							
UERR3	023572	44-4299	#44-4356						
UERR4	023622	44-4363	#44-4365						
UFLAG	023716	*44-4200	44-4286	*44-4293	#44-4395				
UPAT00	023646	44-4201	44-4212	44-4234	44-4253	44-4271	44-4289	44-4302	#44-4370
UPAT01	023650	#44-4371							
UPAT02	023652	#44-4372							
UPAT03	023654	#44-4373							
UPAT10	023656	44-4218	#44-4375						
UPAT11	023660	#44-4376							
UPAT12	023662	#44-4377							
UPAT13	023664	#44-4378							
UPAT20	023666	44-4240	#44-4380						
UPAT21	023670	#44-4381							
UPAT22	023672	#44-4382							
UPAT23	023674	#44-4383							
UPAT30	023676	44-4258	#44-4385						
UPAT31	023700	#44-4386							
UPAT32	023702	#44-4387							
UPAT33	023704	#44-4388							
UPAT40	023706	44-4276	44-4304	#44-4390					
UPAT41	023710	#44-4391							
UPAT42	023712	#44-4392							
UPAT43	023714	#44-4393							
UROM1	023724	*44-4214	*44-4236	*44-4255	*44-4273	44-4341	#44-4398		
UROM2	023726	*44-4215	*44-4237	*44-4256	*44-4274	44-4342	#44-4399		
UROM3	023730	*44-4216	*44-4238	*44-4257	*44-4275	44-4327	#44-4400		
UTMP1	023720	*44-4206	44-4214	44-4273	*44-4294	#44-4396			
UTMP2	023722	*44-4207	44-4236	44-4255	*44-4295	#44-4397			
U0	022610	#44-4203	44-4204						
U1	022640	#44-4209	44-4296						
U10	023216	#44-4277	44-4280						
U11	023220	#44-4278	44-4314						
U12	023252	44-4284	#44-4286						
U13	023270	#44-4291	44-4292						
U14	023322	44-4287	#44-4297						
U15	023356	#44-4305	44-4308	44-4365					
U16	023360	#44-4306	44-4356						
U2	022710	#44-4219	44-4221						
U3	022742	44-4227	#44-4230						
U4	023012	#44-4242	44-4244						
U5	023044	44-4248	#44-4250						
U6	023114	#44-4260	44-4262						
U7	023146	44-4266	#44-4268						
WDAP00	024516	#45-4539							
WDAT01	024520	#45-4540							
WDAT02	024522	#45-4541							
WDAT03	024524	#45-4542							
WDONE	024526	45-4431	45-4439	45-4459	45-4467	45-4487	45-4495	45-4517	45-4520	45-4525
		#45-4544							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
WPAT00	024506	45-4415	45-4418	45-4422	45-4424	45-4443	45-4448	45-4452	45-4454	45-4471
		45-4474	45-4478	45-4480	45-4499	45-4504	45-4508	45-4510	45-4529	45-4530
		45-4531	45-4532	#45-4534						
WPAT01	024510	#45-4535								
WPAT02	024512	#45-4536								
WPAT03	024514	#45-4537								
WSETUP	024454	45-4429	45-4485	45-4515	#45-4529					
W1	023734	#45-4412								
W10	024156	45-4457	#45-4460							
W11	024204	45-4462	#45-4468							
W12	024240	45-4473	#45-4475							
W13	024264	#45-4482	45-4488							
W14	024300	45-4483	#45-4488							
W15	024326	45-4490	#45-4496							
W16	024366	45-4501	#45-4505							
W17	024412	#45-4512	45-4518							
W2	023770	45-4417	#45-4419							
W20	024426	45-4513	#45-4518							
W3	024014	#45-4426	45-4432							
W4	024032	45-4427	#45-4432							
W5	024062	45-4434	#45-4440							
W6	024122	45-4445	#45-4449							
W7	024146	#45-4456	45-4460							
XAPT11	025324	#46-4686								
XDAT00	025302	46-4565	46-4588	46-4611	46-4634	46-4652	46-4657	#46-4675		
XDAT01	025304	#46-4676								
XDAT02	025306	#46-4677								
XDAT03	025310	#46-4678								
XDONE	025342	46-4646	46-4654	46-4660	46-4668	46-4673	#46-4694			
XERR1	025166	46-4571	46-4594	#46-4650						
XERR2	025250	46-4576	46-4599	#46-4664						
XERR3	025214	46-4617	46-4640	#46-4655						
XERR4	025264	46-4622	46-4645	#46-4669						
XPAT00	025312	46-4557	46-4567	46-4603	46-4613	#46-4680				
XPAT01	025314	#46-4681								
XPAT02	025316	#46-4682								
XPAT03	025320	#46-4683								
XPAT10	025322	46-4561	46-4584	46-4607	46-4630	46-4650	46-4655	#46-4685		
XPAT12	025326	#46-4687								
XPAT13	025330	#46-4688								
XPAT20	025332	46-4580	46-4590	46-4626	46-4636	#46-4689				
XPAT21	025334	#46-4690								
XPAT22	025336	#46-4691								
XPAT23	025340	#46-4692								
XTMP	025300	*46-4558	*46-4581	*46-4604	*46-4627	46-4651	46-4656	46-4658	#46-4674	
X1	024532	#46-4554								
X10	024734	46-4593	#46-4595							
X11	024750	46-4598	#46-4600							
X12	025010	46-4606	#46-4608							
X13	025034	#46-4615	46-4618							
X14	025042	46-4616	#46-4618							
X15	025056	46-4621	#46-4623							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES					
X16	025116	46-4629	#46-4631				
X17	025142	#46-4638	46-4641				
X2	024572	46-4560	#46-4562				
X20	025150	46-4639	#46-4641				
X21	025164	46-4644	#46-4646				
X3	024616	#46-4569	46-4572				
X4	024624	46-4570	#46-4572				
X5	024642	46-4575	#46-4577				
X6	024702	46-4583	#46-4585				
X7	024726	#46-4592	46-4595				
YDAT00	025712	47-4717	47-4737	47-4746	47-4754	#47-4770	
YDAT01	025714	#47-4771					
YDAT02	025716	#47-4772					
YDAT03	025720	#47-4773					
YDONE	025752	47-4734	47-4749	47-4757	47-4763	#47-4790	
YERR1	025552	47-4739	#47-4742				
YERR2	025614	47-4741	#47-4750				
YERR3	025656	47-4726	#47-4758				
YFLAG	025702	*47-4704	47-4727	*47-4729	#47-4765		
YPAT00	025722	47-4705	47-4731	#47-4775			
YPAT01	025724	#47-4776					
YPAT02	025726	#47-4777					
YPAT03	025730	#47-4778					
YPAT10	025732	47-4706	47-4730	#47-4780			
YPAT11	025734	#47-4781					
YPAT12	025736	#47-4782					
YPAT13	025740	#47-4783					
YPAT20	025742	47-4711	47-4745	47-4753	#47-4785		
YPAT21	025744	#47-4786					
YPAT22	025746	#47-4787					
YPAT23	025750	#47-4788					
YTMP1	025704	*47-4705	47-4713	*47-4730	47-4736	47-4744	47-4752	#47-4766
YTMP2	025706	*47-4706	47-4720	*47-4731	47-4747	47-4755	#47-4767	
YTMP3	025710	*47-4707	47-4724	*47-4732	47-4761	#47-4768		
Y1	025374	#47-4708	47-4733					
Y2	025422	#47-4714	47-4743	47-4751	47-4759			
Y3	025446	#47-4721	47-4723					
Y4	025464	47-4725	#47-4727					
Y5	025524	47-4728	#47-4734					
Y6	025526	47-4722	#47-4735					
Y7	025542	#47-4738	47-4740					
ZDAT00	026220	48-4812	48-4834	#48-4849				
ZDAT01	026222	#48-4850						
ZDAT02	026224	#48-4851						
ZDAT03	026226	#48-4852						
ZDONE	026260	48-4829	48-4837	48-4843	#48-4869			
ZERR1	026124	48-4818	#48-4830					
ZERR2	026166	48-4822	#48-4838					
ZFLAG	026212	*48-4800	48-4823	*48-4825	#48-4845			
ZPAT00	026230	48-4801	#48-4854					
ZPAT01	026232	#48-4855						
ZPAT02	026234	#48-4856						

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SYMBOL CROSS REFERENCE
SYMBOL   VALUE              REFERENCES
ZPAT03     026236           #48-4857
ZPAT10     026240            48-4826   #48-4859
ZPAT11     026242           #48-4860
ZPAT12     026244           #48-4861
ZPAT13     026246           #48-4862
ZPAT20     026250            48-4806    48-4833   #48-4864
ZPAT21     026252           #48-4865
ZPAT22     026254           #48-4866
ZPAT23     026256           #48-4867
ZTMP1      026214           *48-4801    48-4808    48-4815   *48-4826    48-4832    48-4835   #48-4846
ZTMP2      026216           *48-4802    48-4820   *48-4827    48-4841   #48-4847
Z1         025776           #48-4803    48-4828
Z2         026024           #48-4809    48-4831    48-4839
Z3         026050           #48-4816    48-4819
Z4         026056            48-4817   #48-4819
Z5         026070            48-4821   #48-4823
Z6         026122            48-4824   #48-4829
$APTHD     003602            23-1440   #23-1440
$ASTAT   = ******            62-5912    62-5912
$ATYC      040202            62-5912   #62-5912
$ATY1      040156           #62-5912
$ATY3      040164            59-5906   #62-5912
$ATY4      040174            57-5902   #62-5912
$AUTOB     001134           #20-1427   *24-1444    63-5914    63-5914    63-5914
$BASE      001372           #20-1427
$BDADR     001122           #20-1427
$BDDAT   • 001126           #20-1427
$BELL      001306           #20-1427    57-5902    57-5902    57-5902
$CDW1      001376           #20-1427
$CDW2      001400           #20-1427
$CHARC     037500           *59-5906   *59-5906    59-5906   *59-5906   #59-5906
$CKSWR     040424           #63-5914    64-5916    64-5916
$CLR.T     036100            55-5898   #55-5898
$CMTAG     001100           #20-1427    24-1443    24-1443    24-1443    24-1443    24-1443    24-1443    24-1443
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$CM4     = 000024           #20-1427    20-1427    20-1427   #20-1427    20-1427    20-1427   #20-1427    20-1427    20-1427
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SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
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$CNTLU	041036	63-5914	#63-5914							
$CPUOP	001344	#20-1427								
$CRLF	001313	#20-1427	33-2947	55-5898	57-5902	57-5902	57-5902	59-5906	59-5906	59-5906
		63-5914	66-5930	66-5961	66-5968	66-6048	75-6819	75-6827	75-6827	75-6828
		75-6828	75-6829	75-6830	75-6830	75-6831	75-6833	75-6833	75-6833	75-6834
		75-6834	75-6840	75-6840	75-6840	75-6841	75-6843	75-6843	75-6843	75-6844
		75-6849	75-6849	75-6853	75-6853	75-6854	75-6854	75-6856	75-6856	75-6857
		75-6857	75-6857	75-6857	75-6858	75-6858	75-6859	75-6859	75-6859	75-6860
		75-6861	75-6862	75-6865	75-6866	75-6869	75-6869	75-6873	75-6873	75-6874
		75-6874	75-6887	75-6887	75-6888	75-6888	75-6916	75-6917	75-6917	75-6918
		75-6918	75-6918	75-6923	75-6923	75-6924	75-6924	75-6924	75-6924	75-6926
		75-6926	75-6927	75-6927	75-6927	75-6927	75-6928	75-6928		
$DBLK	040146	61-5910	61-5910	#61-5910						
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$DDW1	001404	#20-1427								
$DDW10	001426	#20-1427								
$DDW11	001430	#20-1427								
$DDW12	001432	#20-1427								
$DDW13	001434	#20-1427								
$DDW14	001436	#20-1427								
$DDW15	001440	#20-1427								
$DDW2	001406	#20-1427								
$DDW3	001410	#20-1427								
$DDW4	001412	#20-1427								
$DDW5	001414	#20-1427								
$DDW6	001416	#20-1427								
$DDW7	001420	#20-1427								
$DDW8	001422	#20-1427								
$DDW9	001424	#20-1427								
$DEVCT	001326	#20-1427								
$DEVM	001374	#20-1427								
$DOAGN	036120	55-5898	55-5898	55-5898	#55-5898					
$DTBL	040136	61-5910	#61-5910							
$ENDAD	036110	22-1438	24-1444	#55-5898	57-5902					
$ENDCT	035736	24-1443	#55-5898							
$ENULL	036164	#55-5898								
$ENV	001336	#20-1427	24-1444	57-5902	59-5906	62-5912	62-5912			
$ENVM	001337	#20-1427	24-1443	59-5906	59-5906	62-5912				
$EOP	035702	#55-5898	67-6081	68-6090	69-6099					
$EOPCT	035730	*24-1443	#55-5898	55-5898						
$ERFLG	001103	#20-1427	56-5900	*56-5900	56-5900	56-5900	*56-5900	56-5900	56-5900	*57-5902
		57-5902	57-5902							
$ERMAX	001115	#20-1427	*24-1443	56-5900	*56-5900	56-5900	56-5900			
$ERROR	036506	24-1443	#57-5902							
$ERRPC	001116	#20-1427	*25-1524	*33-2902	*57-5902	*57-5902	57-5902	57-5902	*57-5902	57-5902
		57-5902	66-5933	66-5940	66-6060					
$ERRTB	001442	#21-1427	66-5954							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
$ERTTL	001112	#20-1427	55-5898	*55-5898	*57-5902	57-5902	57-5902		
$ESCAP	001304	#20-1427	*24-1443	*56-5900	57-5902	57-5902	57-5902	57-5902	
$ETABL	001336	#20-1427							
$ETEND	001442	#20-1427	23-1440						
$FATAL	001320	#20-1427	*62-5912	*66-5949					
$FFLG	040422	*62-5912	*62-5912	62-5912	*62-5912	#62-5912			
$FILLC	001156	#20-1427	59-5906	59-5906	59-5906				
$FILLS	001155	#20-1427	59-5906	59-5906					
$GDADR	001120	#20-1427							
$GDDAT	001124	#20-1427							
$GET42	036062	#55-5898							
$GTSWR	040474	#63-5914	64-5916	64-5916					
$HD	= 000003	19-1409	19-1409	19-1409					
$HIBTS	003602	#23-1440							
$ICNT	001104	#20-1427	*56-5900	56-5900	*56-5900	56-5900	56-5900		
$ILLUP	041334	65-5920	65-5920	#65-5920					
$INTAG	001135	#20-1427	63-5914	63-5914	63-5914				
$ITEMB	001114	#20-1427	*25-1525	*33-2903	*57-5902	57-5902	57-5902	57-5902	57-5902	66-5936
$LF	001314	#20-1427	57-5902	57-5902	59-5906	59-5906			
$LFLG	040421	*62-5912	#62-5912						
$LOOP	036156	55-5898	#55-5898						
$LPADR	001106	#20-1427	*24-1443	*56-5900	*56-5900	56-5900	56-5900	56-5900	
$LPERR	001110	#20-1427	*24-1443	*25-1466	*26-1576	*27-1621	*27-1638	*27-1651	*27-1666	*27-1679
		*27-1695	*27-1708	*27-1723	*28-1825	*29-1905	*30-1964	*30-2006	*31-2335	*31-2387
		*32-2514	*32-2557	*33-2811	*33-2812	*33-2813	*33-2814	*33-2815	*33-2816	*33-2817
		*33-2818	*33-2819	*33-2820	*33-2821	*33-2822	*34-2988	*35-3093	*35-3125	*36-3251
		*37-3350	*38-3447	*44-4209	*44-4230	*44-4250	*44-4268	*44-4297	*45-4412	*45-4440
		*45-4468	*45-4496	*46-4554	*46-4577	*46-4600	*46-4623	*47-4708	*48-4803	*49-4880
		*49-4909	*49-4943	*50-5057	*50-5085	*50-5113	*50-5142	*50-5171	*50-5199	*51-5315
		*51-5339	*51-5367	*51-5390	*51-5419	*51-5440	*52-5527	*52-5556	*52-5578	*52-5600
		*52-5628	*52-5656	*52-5685	*53-5751	*53-5780	*54-5835	*54-5857	56-5900	*56-5900
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$MADR2	001354	#20-1427							
$MADR3	001360	#20-1427							
$MADR4	001364	#20-1427							
$MAIL	001316	#20-1427	23-1440	23-1440	24-1443	24-1444	56-5900	57-5902	59-5906	
$MAMS1	001346	#20-1427							
$MAMS2	001352	#20-1427							
$MAMS3	001356	#20-1427							
$MAMS4	001362	#20-1427							
$MBADR	003604	#23-1440							
$MFLG	040420	*62-5912	62-5912	*62-5912	#62-5912				
$MNEW	041061	63-5914	#63-5914						
$MSGAD	001332	#20-1427	*62-5912	62-5912					
$MSGLG	001334	#20-1427	*62-5912						
$MSGTY	001316	#20-1427	62-5912	*62-5912	62-5912	*62-5912			
$MSWR	041050	63-5914	#63-5914						
$MTYP1	001347	#20-1427							
$MTYP2	001353	#20-1427							
$MTYP3	001357	#20-1427							
$MTYP4	001363	#20-1427							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
$MXCNT	036500	56-5900	56-5900	56-5900	#56-5900					
$NULL	001154	#20-1427	59-5906	59-5906	59-5906					
$NWTS*	= 000001	#24-1464	24-1464	#25-1464	25-1464	#25-1575	25-1575	#26-1575	26-1575	#26-1620
		26-1620	#27-1620	27-1620	#27-1824	27-1824	#28-1824	28-1824	#28-1904	28-1904
		#29-1904	29-1904	#29-1962	29-1962	#30-1962	30-1962	#30-2334	30-2334	#31-2334
		31-2334	#31-2513	31-2513	#32-2513	32-2513	#32-2809	32-2809	#33-2809	33-2809
		#33-2987	33-2987	#34-2987	34-2987	#34-3092	34-3092	#35-3092	35-3092	#35-3250
		35-3250	#36-3250	36-3250	#36-3349	36-3349	#37-3349	37-3349	#37-3446	37-3446
		#38-3446	38-3446	#38-3546	38-3546	#39-3546	39-3546	#39-3649	39-3649	#40-3649
		40-3649	#40-3789	40-3789	#41-3789	41-3789	#41-3930	41-3930	#42-3930	42-3930
		#42-4051	42-4051	#43-4051	43-4051	#43-4199	43-4199	#44-4199	44-4199	#44-4411
		44-4411	#45-4411	45-4411	#45-4553	45-4553	#46-4553	46-4553	#46-4703	46-4703
		#47-4703	47-4703	#47-4799	47-4799	#48-4799	48-4799	#48-4879	48-4879	#49-4879
		49-4879	#49-5055	49-5055	#50-5055	50-5055	#50-5313	50-5313	#51-5313	51-5313
		#51-5525	51-5525	#52-5525	52-5525	#52-5749	52-5749	#53-5749	53-5749	#53-5833
		53-5833	#54-5833	54-5833						
$OCNT	037726	*60-5908	*60-5908	#60-5908						
$OMODE	037730	*60-5908	*60-5908	60-5908	*60-5908	*60-5908	#60-5908			
$OVER	036464	56-5900	56-5900	56-5900	56-5900	#56-5900				
$PASS	001324	#20-1427	*24-1443	*55-5898	*55-5898	55-5898	55-5898	55-5898	56-5900	56-5900
		56-5900								
$PASTM	00361C	#23-1440								
$PWRAD	041316	#65-5920								
$PWRDN	041156	24-1443	#65-5920	65-5920						
$PWRMG	041312	#65-5920								
$PWRUP	041230	65-5920	#65-5920							
$QUES	001312	#20-1427	57-5902	57-5902	59-5906	59-5906	63-5914			
$RDCHR	040706	#63-5914	64-5916	64-5916						
$RDDEC	= ******	64-5916								
$RDLIN	= ******	64-5916								
$RDOCT	= ******	64-5916								
$RDSZ	= 000001	#63-5914	63-5914							
$REGAD	001160	#20-1427								
$REG0	001162	#20-1427	*57-5902	*57-5902	57-5902					
$REG1	001164	#20-1427								
$REG10	001202	#20-1427								
$REG11	001204	#20-1427								
$REG12	001206	#20-1427								
$REG13	001210	#20-1427								
$REG14	001212	#20-1427								
$REG15	001214	#20-1427								
$REG16	001216	#20-1427								
$REG17	001220	#20-1427								
$REG2	001166	#20-1427								
$REG20	001222	#20-1427								
$REG21	001224	#20-1427								
$REG22	001226	#20-1427								
$REG23	001230	#20-1427								
$REG3	001170	#20-1427								
$REG4	001172	#20-1427								
$REG5	001174	#20-1427								
$REG6	001176	#20-1427								

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
$REG7	001200	#20-1427								
$RESRE	037102	#58-5904	64-5916							
$RTNAD	036160	#55-5898								
$RTRN	036154	24-1443	*24-1443	*24-1443	55-5898	#55-5898				
$R2A	= ******	64-5916								
$SAVRE	037044	#58-5904	64-5916	64-5916						
$SAVR6	041340	*65-5920	65-5920	*65-5920	*65-5920	#65-5920				
$SCOPE	036170	24-1443	#56-5900							
$SETUP	= 000137	#19-1425	19-1425	#19-1425	19-1425	#19-1425	19-1425	#19-1425	19-1425	#19-1425
		19-1425	#19-1425	19-1425	#19-1425	24-1443	24-1443	24-1443	24-1443	24-1443
		24-1443	24-1443	24-1443	24-1443	24-1443	24-1443	24-1443	24-1444	24-1444
		24-1444	55-5898	55-5898	56-5900	57-5902	57-5902	57-5902	57-5902	63-5914
		63-5914	65-5920							
$STUP	= 177777	#19-1425	#19-1425	19-1425	#19-1425	#19-1425	19-1425	#19-1425	#19-1425	19-1425
		#19-1425	#19-1425	19-1425	#19-1425	#19-1425	19-1425	#19-1425	#19-1425	19-1425
$SVLAD	036430	56-5900	#56-5900							
$SVPC	= 003602	#22-1438	22-1438							
$SWR	= 177400	19-1409	#19-1409	#19-1411	20-1427	20-1427	20-1427	24-1443	24-1443	24-1443
		24-1443	24-1443	25-1464	26-1575	27-1620	28-1824	29-1904	30-1962	31-2334
		32-2513	33-2809	34-2987	35-3092	36-3250	37-3349	38-3446	39-3546	40-3649
		41-3789	42-3930	43-4051	44-4199	45-4411	46-4553	47-4703	48-4799	49-4879
		50-5055	51-5313	52-5525	53-5749	54-5833	55-5898	55-5898	55-5898	55-5898
		55-5898	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900
		56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900
		56-5900	56-5900	56-5900	57-5902	57-5902	57-5902	57-5902	57-5902	57-5902
		57-5902	57-5902	57-5902	57-5902	57-5902	65-5920			
$SWREG	001340	#20-1427	24-1443							
$SWRMK	= 000000	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900	56-5900
		56-5900								
$SWRMS	= 000200	#19-1412								
$TAB	042272	66-6038	#71-6127	75-6794	75-6794	75-6796	75-6796	75-6796	75-6797	75-6797
		75-6798	75-6800	75-6802	75-6808	75-6809	75-6810	75-6811	75-6814	75-6814
		75-6816	75-6816	75-6817	75-6818	75-6820	75-6820	75-6821	75-6822	75-6822
		75-6823	75-6825	75-6825	75-6826	75-6827	75-6829	75-6829	75-6832	75-6832
		75-6835	75-6835	75-6839	75-6839	75-6842	75-6842	75-6850	75-6850	75-6851
		75-6852	75-6852	75-6856	75-6858	75-6858	75-6865	75-6868	75-6868	75-6871
		75-6871	75-6873	75-6882	75-6882	75-6887	75-6890	75-6890	75-6905	75-6916
		75-6916	75-6923	75-6926	75-6932	75-6932	75-6945	75-6974	75-6974	75-6975
$TBIT	036162	*24-1443	*55-5898	55-5898	55-5898	#55-5898	*65-5920			
$TERM	= 000030	#64-5918								
$TESTN	001322	#20-1427	*56-5900	66-6060						
$THE	042466	#71-6133	75-6806	75-6810						
$TIMES	001302	#20-1427	*24-1443	*55-5898	*56-5900	56-5900	*56-5900	56-5900	56-5900	
$TKB	001146	#20-1427	59-5906	59-5906	59-5906	59-5906	63-5914	63-5914	63-5914	63-5914
		63-5914	63-5914							
$TKS	001144	#20-1427	59-5906	59-5906	59-5906	59-5906	63-5914	63-5914	63-5914	63-5914
		63-5914	63-5914	63-5914						
$TMPO	001232	#20-1427	*66-5931	*66-5932	75-6794	75-6796	75-6797	75-6800	75-6802	75-6808
		75-6810	75-6814	75-6816	75-6818	75-6820	75-6822	75-6825	75-6827	75-6829
		75-6832	75-6835	75-6839	75-6842	75-6850	75-6852	75-6856	75-6858	75-6861
		75-6865	75-6868	75-6871	75-6873	75-6882	75-6887	75-6890	75-6905	75-6916
		75-6923	75-6926	75-6932	75-6945	75-6964	75-6974	75-6975		

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
$TMP1	001234	#20-1427	*66-5933	75-6794	75-6796	75-6797	75-6800	75-6802	75-6808	75-6810
		75-6814	75-6816	75-6818	75-6820	75-6822	75-6825	75-6827	75-6829	75-6832
		75-6835	75-6839	75-6842	75-6850	75-6852	75-6856	75-6858	75-6861	75-6865
		75-6868	75-6871	75-6873	75-6882	75-6887	75-6890	75-6905	75-6916	75-6923
		75-6926	75-6932	75-6945	75-6964	75-6974	75-6975			
$TMP10	001252	#20-1427	*27-1624	*27-1653	*27-1681	*27-1710	*30-2225	*30-2257	*30-2262	*30-2293
		*44-4220	*44-4243	*44-4261	*44-4279	75-6806	75-6808	75-6810	75-6853	75-6863
		75-6918	75-6932							
$TMP11	001254	#20-1427	*27-1751	*27-1757	*27-1775	*27-1781	75-6807	75-6864	75-6932	
$TMP12	001256	#20-1427	75-6864							
$TMP13	001260	#20-1427	75-6864							
$TMP14	001262	#20-1427								
$TMP15	001264	#20-1427	*30-2224	*30-2255	*30-2261	*30-2291	75-6853			
$TMP16	001266	#20-1427								
$TMP17	001270	#20-1427								
$TMP2	001236	#20-1427	*25-1506	*25-1522	*25-1532	*25-1545	*25-1558	*25-1563	*26-1595	*27-1628
		*27-1642	*27-1657	*27-1669	*27-1685	*27-1698	*27-1713	*27-1726	*28-1835	*28-1889
		*29-1910	*29-1941	*30-1965	*30-2007	*30-2226	*30-2264	*31-2353	*31-2401	*31-2450
		*31-2478	*32-2530	*32-2572	*32-2621	*32-2647	*33-2811	*33-2812	*33-2813	*33-2814
		*33-2815	*33-2816	*33-2817	*33-2818	*33-2819	*33-2820	*33-2821	*33-2822	34-3053
		*35-3160	*35-3193	*35-3196	*35-3200	*35-3203	*35-3214	*35-3225	*36-3298	*36-3304
		*36-3313	*37-3397	*37-3402	*37-3411	*38-3493	*38-3500	*38-3512	*39-3591	*39-3603
		*39-3608	*39-3620	*40-3724	*40-3729	*40-3739	*40-3751	*40-3756	*41-3864	*41-3880
		*41-3892	*41-3897	*42-3997	*42-4002	*42-4005	*42-4013	*42-4020	*43-4129	*43-4134
		*43-4137	*43-4150	*43-4155	*44-4221	*44-4244	*44-4262	*44-4280	*44-4308	*44-4317
		*44-4365	*45-4417	*45-4445	*45-4473	*45-4501	*46-4560	*46-4583	*46-4606	*46-4629
		*47-4743	*47-4751	*47-4759	*48-4831	*48-4839	*49-4887	*49-4914	*49-4949	49-4975
		*49-4988	*49-4992	*50-5060	*50-5088	*50-5114	*50-5143	*50-5174	*50-5202	*51-5319
		*51-5342	*51-5368	*51-5391	*51-5420	*51-5441	*52-5530	*52-5559	*52-5581	*52-5603
		*52-5631	*52-5659	*52-5688	*53-5754	*53-5783	*54-5838	*54-5860	*67-6073	*68-6086
		*69-6095	75-6794	75-6796	75-6797	75-6800	75-6802	75-6808	75-6811	75-6814
		75-6816	75-6818	75-6820	75-6822	75-6825	75-6829	75-6832	75-6835	75-6839
		75-6842	75-6850	75-6852	75-6856	75-6858	75-6861	75-6865	75-6868	75-6871
		75-6873	75-6882	75-6887	75-6890	75-6905	75-6916	75-6923	75-6926	75-6932
		75-6945	75-6974	75-6975						
$TMP20	001272	#20-1427	75-6801	75-6802	75-6834	75-6849				
$TMP21	001274	#20-1427	75-6800	75-6802						
$TMP22	001276	#20-1427								
$TMP23	001300	#20-1427								
$TMP3	001240	#20-1427	*25-1507	*25-1523	*26-1599	*26-1605	*27-1787	*27-1794	*28-1842	*28-1865
		*28-1879	*29-1925	*29-1931	*29-1944	*30-2075	*30-2083	*30-2111	*30-2119	*30-2142
		*30-2157	*30-2172	*30-2188	*30-2203	*30-2211	*30-2219	*30-2227	*30-2263	*31-2354
		*31-2402	*31-2451	*31-2479	*32-2531	*32-2573	*32-2623	*32-2648	*33-2884	*33-2899
		*35-3181	*35-3187	*36-3296	*36-3305	*36-3314	*37-3395	*37-3403	*37-3412	*38-3494
		*38-3501	*38-3513	*39-3592	*39-3602	*39-3609	*39-3618	*40-3749	*40-3757	*41-3869
		*41-3890	*41-3898	*42-4007	*42-4014	*43-4139	*43-4156	*44-4335	*44-4350	*44-4367
		*45-4437	*45-4465	*45-4493	*45-4523	*45-4529	*46-4650	*46-4655	*46-4665	*46-4670
		*47-4744	*47-4752	*47-4760	*48-4832	*48-4840	*49-5000	*49-5006	*49-5014	*49-5020
		*49-5024	*49-5030	*50-5228	*50-5232	*50-5235	*50-5241	*50-5247	*50-5250	*50-5256
		*50-5262	*50-5268	*50-5271	*50-5277	*50-5280	*50-5283	*50-5286	*51-5461	*51-5466
		*51-5472	*51-5481	*51-5487	*51-5496	*52-5715	*52-5718	*52-5719	*52-5720	*52-5721
		*52-5722	*52-5723	*52-5724	*52-5725	*52-5726	*52-5727	*52-5728	*52-5729	*53-5810

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		*53-5813	*53-5814	*53-5815	*53-5816	*54-5879	*54-5884	*54-5886	*67-6076	75-6794
		75-6796	75-6797	75-6801	75-6809	75-6811	75-6814	75-6816	75-6820	75-6822
		75-6825	75-6827	75-6829	75-6832	75-6835	75-6839	75-6842	75-6850	75-6852
		75-6857	75-6859	75-6861	75-6865	75-6868	75-6871	75-6873	75-6874	75-6882
		75-6890	75-6916	75-6923	75-6926	75-6974				
$TMP4	001242	#20-1427	*25-1508	*26-1600	*26-1606	*27-1788	*27-1795	*28-1866	*28-1880	*29-1926
		*29-1932	*30-2076	*30-2082	*30-2107	*30-2118	*30-2143	*30-2212	*30-2220	*31-2452
		*31-2459	*31-2480	*32-2624	*32-2630	*32-2649	*33-2885	*33-2900	*35-3180	*35-3186
		*36-3297	*36-3306	*36-3315	*37-3396	*37-3404	*37-3413	*38-3495	*38-3502	*38-3514
		*39-3593	*39-3598	*39-3610	*39-3619	*40-3750	*40-3758	*41-3878	*41-3891	*41-3899
		*42-4008	*42-4015	*43-4140	*43-4157	*44-4336	*44-4351	*44-4366	*45-4436	*45-4464
		*45-4492	*45-4522	*45-4530	*46-4651	*46-4656	*46-4666	*46-4671	*47-4745	*47-4753
		*47-4761	*48-4833	*48-4841	*49-4999	*49-5005	*49-5013	*49-5019	*49-5025	*49-5031
		*50-5227	*50-5231	*50-5237	*50-5243	*50-5252	*50-5258	*50-5264	*50-5274	*51-5460
		*51-5465	*51-5470	*51-5476	*51-5479	*51-5485	*51-5491	*51-5494	*51-5500	*51-5503
		*52-5714	*52-5718	*52-5719	*52-5720	*52-5721	*52-5722	*52-5723	*52-5724	*52-5725
		*52-5726	*52-5727	*52-5728	*52-5729	*53-5809	*53-5813	*53-5814	*53-5815	*53-5816
		*54-5880	*54-5884	*54-5886	*67-6078	75-6795	75-6798	75-6801	75-6809	75-6811
		75-6817	75-6821	75-6823	75-6826	75-6827	75-6828	75-6829	75-6833	75-6836
		75-6840	75-6841	75-6841	75-6851	75-6857	75-6860	75-6862	75-6866	75-6869
		75-6872	75-6883	75-6890	75-6916	75-6924	75-6927			
$TMP5	001244	#20-1427	*25-1509	*27-1622	*28-1834	*30-2077	*30-2084	*30-2120	*30-2144	*30-2158
		*30-2173	*30-2189	*30-2204	*30-2213	*30-2229	*30-2265	*31-2460	*31-2465	*31-2471
		*32-2631	*32-2638	*33-2811	*33-2812	*33-2813	*33-2814	*33-2815	*33-2816	*33-2817
		*33-2818	*33-2819	*33-2820	*33-2821	*33-2822	*40-3731	*40-3737	*41-3871	*42-3995
		*42-4021	*43-4127	*43-4148	*44-4326	*44-4341	*45-4532	*46-4652	*46-4657	*47-4746
		*47-4754	*48-4834	*49-5001	*49-5007	*49-5015	*49-5021	*49-5026	*49-5032	*50-5238
		*50-5244	*50-5253	*50-5259	*50-5265	*50-5273	*51-5473	*51-5482	*51-5488	*51-5497
		*52-5718	*52-5719	*52-5720	*52-5721	*52-5722	*52-5723	*52-5724	*52-5725	*52-5726
		*52-5727	*52-5728	*52-5729	*53-5813	*53-5814	*53-5815	*53-5816	*54-5884	*54-5886
		75-6795	75-6806	75-6807	75-6814	75-6828	75-6828	75-6830	75-6831	75-6833
		75-6840	75-6841	75-6843	75-6844	75-6853	75-6854	75-6856	75-6858	75-6862
		75-6869	75-6887	75-6888	75-6917	75-6918	75-6924	75-6927		
$TMP6	001246	#20-1427	*27-1752	*27-1758	*27-1776	*27-1782	*30-2078	*30-2089	*30-2094	*30-2125
		*30-2130	*30-2145	*30-2159	*30-2174	*30-2190	*30-2205	*30-2214	*30-2238	*30-2248
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		*41-3887	*42-3972	*42-3976	*42-3980	*42-3984	*42-3988	*42-3993	*42-4023	*43-4106
		*43-4110	*43-4114	*43-4118	*43-4125	*43-4144	*43-4146	*44-4334	*44-4349	*45-4531
		*46-4658	*47-4747	*47-4755	*48-4835	*49-4998	*49-5004	*49-5010	*49-5012	*49-5018
		*49-5027	*49-5033	*50-5236	*50-5242	*50-5248	*50-5251	*50-5257	*50-5263	*50-5269
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		*53-5815	*53-5816	*54-5884	*54-5886	75-6807	75-6828	75-6830	75-6840	75-6843
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		*40-3738	*41-3872	*41-3879	*42-3996	*42-4022	*43-4128	*43-4149	*44-4328	*44-4343
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		27-1620	#27-1620	27-1824	28-1824	#28-1824	28-1904	29-1904	#29-1904	29-1962

SYMBOL CROSS REFERENCE

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		42-3930	#42-3930	42-4051	43-4051	#43-4051	43-4199	44-4199	#44-4199	44-4411
		45-4411	#45-4411	45-4553	46-4553	#46-4553	46-4703	47-4703	#47-4703	47-4799
		48-4799	#48-4799	48-4879	49-4879	#49-4879	49-5055	50-5055	#50-5055	50-5313
		51-5313	#51-5313	51-5525	52-5525	#52-5525	52-5749	53-5749	#53-5749	53-5833
		54-5833	#54-5833	54-5896						
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		57-5902	57-5902	57-5902	66-5931					
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$UNITM	003612	#23-1440								
$USWR	001342	#20-1427								
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$VECT2	001370	#20-1427								
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$$GET4	000001	#55-5898	#55-5898	55-5898						
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                 #33-2820   #33-2821   #33-2822
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ASMAC1           #19-852     52-5718    52-5719    52-5720    52-5721    52-5722    52-5723    52-5724    52-5725    52-5726
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AS10             #72-6422    72-6460    72-6462    72-6463    72-6464    72-6465    72-6466
AS11             #72-6428   #72-6467   #72-6469   #72-6470   #72-6471   #72-6472   #72-6473   #72-6482
AS2              #72-6395    72-6449    72-6450
AS3              #72-6401   #72-6451   #72-6452
AS4              #72-6407    72-6453    72-6454
AS5              #72-6412   #72-6455   #72-6456   #72-6475
AS6              #72-6415   #72-6457   #72-6458   #72-6474
AS7              #72-6418   #72-6459   #72-6461
COMMEN           #19-1415
ENDCOM           #19-1415
ERMAC            #19-834     57-5902
ESCAPE           #19-1415
GETPRI           #19-1415   #55-5898
GETSWR           #19-1415   #24-1444   #24-1444
HMAC1            #19-865    #34-3000   #34-3001   #34-3002   #34-3003   #34-3004
HMAC2            #19-875    #34-3025   #34-3026   #34-3027   #34-3028   #34-3029
HMAC3            #19-881     34-3010    34-3011    34-3012    34-3013    34-3014
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MACRO CROSS REFERENCE

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SKIP	#19-1415									
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	53-5833									
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.SETUP	#19-1404	19-1425								
.SWRHI	#19-1404									
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.$APTY	#19-1407	62-5912								
.$CATC	#19-1404	19-1426								
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.$EOP	#19-1405	#55-5898								
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