

FP11-F

FP11F FLTG PNT PRT A
CKFPADO

AH-F632D-MC
FICHE 1 OF 2

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The main body of the document is a large grid of data, likely a flight log or a technical record. It consists of approximately 15 columns and 25 rows of data points. Each cell in the grid contains small, faint text or numbers, which are difficult to read due to the low resolution and high density of the information. The data appears to be organized in a structured, tabular format, possibly representing flight parameters, sensor readings, or maintenance records over time.

FP11-F

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AH-F632D-MC
FICHE 2 OF 2

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IDENTIFICATION

PRODUCT CODE: AC-F630D-MC
PRODUCT NAME: CKFPAD0 FP11F FLTG PNT PRT A
DATE CREATED: OCTOBER, 1981
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: DAN MILLEVILLE

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HISTORY

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

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

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

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

1. TEST 76 - CHECKS THAT FP PROCESSOR DOESN'T ACCESS D-SPACE UNTIL CONDITIONS WARRANT.
2. TESTS 77 THROUGH 106 - CHECK THAT SR1 MATCHES WHAT ACTUALLY HAPPENED TO THE REGISTER OF THE INSTRUCTION, AND THAT THE VALUE OF AUTO INCREMENT /DECREMENT WAS PROPER.

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

THE FOLLOWING WAS ADDED TO PART 'D':

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

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ABSTRACT

THE THREE PROGRAMS:

CKFPADO CKFPBCO CKFPCDO

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

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

A. CKFPADO

CKFPADO TESTS:

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

B. CKFPBCO

CKFPBCO TESTS:

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

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C. CKFPCDO

CKFPCDO TESTS:

STF AND STD (ALL MODES)
STCFD AND STCDF
CLRD AND CLRF
NEGF AND NEGD
ABSF AND ABSD
TSTF AND TSTD
NEGF, ABSF AND TSTF (ALL SOURCE MODES)
NEGF, ABSF AND TSTF (ALL SOURCE MODES)
LDFPS (ALL SOURCE MODES)
LDCIF AND LDCLF
LDCID AND LDCLD
LDEXP
STFPS (ALL DESTINATION MODES)
STCFL AND STCFI
STCDL AND STCDI
STEXP
STST

2. REQUIREMENTS

2.1 EQUIPMENT

A PDP 11/44 (WITH OR WITHOUT CONSOLE), LA30 (OR EQUIVALENT) AND AN FP11-F FLOATING POINT PROCESSOR. NOTE THAT A SPECIAL INTERRUPTS TEST MODULE IS BEING DESIGNED FOR USE IN THE MANUFACTURING ENVIRONMENT. WHEN THIS DEVICE IS PRESENT THE PROGRAM CKFPBCO 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.

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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 CKFPADO.
SW<7>=1....	200	SELECT CORRECT INTERRUPT TEST IN PROGRAM CKFPBCO.

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6. ERRORS

6.1 SUMMARIES

IN PROGRAM CKFPADO TESTS 1 AND 11 HAVE A SPECIAL ERROR SUMMARY FEATURE. THESE TWO TEST RUN MANY TEST PATTERNS THROUGH THE LOGIC. AFTER AN ERROR IS ENCOUNTERED, ONLY THE FIRST FIVE ERRORS ARE REPORTED (TYPED ON THE TTY). EVERY ERROR THOUGH IS LOGGED AND AN ERROR SUMMARY IS PRINTED WHEN THE TEST IS COMPLETE. NOTE THAT IF SW<13>=1, THIS SUMMARY WILL NOT BE TYPED UNLESS SW<7>=1. IN OTHER WORDS TO GET JUST AN ERROR SUMMARY FROM EITHER OF THESE TWO TESTS 1 AND 11 IN PROGRAM CKFPADO BOTH SWITCHES 13 AND 7 MUST = 1.

6.2 ERROR RECOVERY

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

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

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIMES

LESS THAN 10 SECONDS FOR EACH PROGRAM ON ANY PASS.

8.2 STACK POINTER

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

8.3 PASS COUNT

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

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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 CKFPBCO 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 COMPATIBILITY

THESE PROGRAMS ARE FULLY COMPATIBLE WITH:
APT
ACT
XXDP MONITOR AND CHAIN PROGRAMS.

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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 DMO AND SMO ARE USED. NOTE THAT A MASK MUST BE USED BECAUSE SOME OF THE FPS BITS CANNOT BE SET.

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

NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR' OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13) OFF, THEN THE USER WILL 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.

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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),ACO

AND THE INSTRUCTION:

STD ACO,(R0)

MOST OF THE FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS. NOTE THAT THE INTEGRITY OF ACO 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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TEST 11

ACCUMULATORS DATA PATTERNS TEST

THIS IS A TEST OF THE FLOATING POINT PROCESSOR
ACCUMULATORS.

EACH ACCUMULATOR IS TESTED IN TWO WAYS:

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

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

EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.

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

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

WARNING: THIS PROCEDURE ASSUMES THAT THE FAULT IS
IN ONE OF THE AM2901 CHIPS. THIS ASSUMPTION IS NOT
NECESSARILY VALID IN ALL SITUATIONS. IT REMAINS TO
BE SEEN WHAT NUMBER OF FAILURES CAN
PROBABILISTICALLY 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. THIS
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.

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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 INTERMITTANT 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 RATHER THAN USING THE
SUMMARY).

MAP THE FOLLOWING NOTATION ONTO EACH BIT POSITION IN
THE 'AND' AND THE 'OR' PATTERNS WHICH ARE TYPED IN
THE ERROR SUMMARY.

A15,A14,...A1,A0 B15,B14,...B1,B0
 C15,C14,...C1,C0 D15,D14,...D1,D0

IN THIS NOTATION A15 THROUGH A0 IS THE FIRST OF THE
FOUR 16 BIT OCTAL NUMBERS TYPED, B15 THROUGH B0 IS
THE SECOND, ETC.

THIS TABLE SHOWS THE CORRESPONDING AM2901 CHIP ('E'
NUMBER) WHICH IS RESPONSIBLE FOR EACH BIT POSITION
USING THE ABOVE NOTATION. NOTE THAT ECO'S TO THE
HARDWARE MIGHT MAKE THIS TABLE OBSOLETE IF IT IS NOT
UP DATED. NOTE ALSO THAT THERE ARE FOUR BITS FOR
EACH AM2901 CHIP:

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

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

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

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

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

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

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- 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, DN+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).

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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.

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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 (BUT 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 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)

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TEST 33 ADDF AND ADD 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 ADD WITH NEGATIVE OPRANDS TEST

THIS IS A TEST OF THE ADDD INSTRUCTION WITH NEGATIVE OPRANDS. EVERY COMBINATION OF OPRAND 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.

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000214
000001

10. LISTING

```
&
MNUMBER=214
PROGNUM-1
.LIST ME
.NLIST MD,MC,CND
*****
*****
```

***** .SEOP *****

:.SEOP IS USED TO HANDLE THE END OF A PASS

:ARGUMENTS ARE:

- :1) ADR -- WILL RETURN TO ADR IF NON-BLANK
WILL RETURN TO 200 IF BLANK
 - :2) NUM -- SPECIFIES THE NUMBER OF PROGRAM PASSES
BEFORE INDICATING AN END OF PROGRAM
NOTE: IF BLANK IT DEFAULTS TO 1
 - :3) OPTION -- SPECIFIES HOW THE END OF PROGRAM IS TO BE INDICATED.
THE AVAILABLE ARGUMENTS AND THEIR INDICATIONS ARE:
 - 1) BELL RING TTY BELL
 - 2) END TYPE 'END PASS'
 - 3) PASCNT TYPE 'END PASS #XXXXX'
WHERE XXXXX IS A DECIMAL NUMBER
 - 4) ENDPAS IS THE NAME OF A MACRO THAT
MUST BE DEFINED IN THE USERS
PROGRAM
 - 5) REPORT TYPE 'END PASS #XXXXX TOTAL ERRORS
SINCE LAST REPORT YYYYY'
WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
- THE DEFAULT IS NO INDICATION

:4) INSTR1 -- THIS WILL BE THE FIRST INSTRUCTION IF NON-BLANK
SCOPE WILL BE THE FIRST INSTRUCTION IF BLANK

:5) INSTR2 -- THIS ARGUMENT ALLOWS CODE TO BE INSERTED BETWEEN
THE TESTING OF LOCATION '42' AND THE 'RESET'
INSTRUCTION IMMEDIATELY PRECEEDING THE 'XXDP' OR 'ACT11'
RETURN LINKAGE.
NOTE: CAN BE A MACRO

:NOTE: THIS ROUTINE IS CONDITIONALLY ASSEMBLED BY \$SWR FOR SWR<12>

:ROUTINES REQUIRED:

- :1) TYPE AN ASCIZ STRING (.STYPE) DEPENDING ON \$SWR
- :2) CHANGE BINARY TO DECIMAL AND TYPE (.STYPDEC).
ONLY REQUIRED WHEN 'OPTION' IS DEFINED AS 'PASCNT'
OR 'REPORT'

950
951
1771 000000
1772
1773
1774
1775
1776
1777

```

:*****
:ENABL ABS
:      .MCALL .HEADER, .SWRHI, .EQUAT, .SETUP, .SCATCH, .SACT11, .SCMTAG
:      .MCALL .STYPE, .SSAVE
:      .MCALL .STYPDEC, .STRAP, .SPOWER, .SAPTHDR, .SAPTBL5
:      .MCALL .SAPTYPE, .SREAD
:      .MCALL .EQUIV ;*REMOVE FOR ASSEMBLY ON PDP-10
:TITLE CKFPADO FP11F FLTG FMT PRT A
:*COPYRIGHT (C) 1981
:*DIGITAL EQUIPMENT CORP.
:*MAYNARD, MASS. 01754

```

1778
1779
1780
1781
1782
1783

000001
160000
000244
177400
000200
000011
000015

```

:*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
:*PACKAGE (MAINDEC-11-DZQAC-C5), JAN, 1981.
:*
$TN=1
$SWR=160000 ;:HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYP0UT
FPVECT=244
$SWR=177400
$SWRMSK=200
TAB=11
CRLF=15

```

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.SBTTL BASIC DEFINITIONS
:*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
STACK= 1100

```

001100
104000
000004

```

ERROR=EMT
SCOPE=IOT
:*MISCELLANEOUS DEFINITIONS
HT= 11 ;:CODE FOR HORIZONTAL TAB
LF= 12 ;:CODE FOR LINE FEED
CR= 15 ;:CODE FOR CARRIAGE RETURN
CRLF= 200 ;:CODE FOR CARRIAGE RETURN-LINE FEED
PS= 177776 ;:PROCESSOR STATUS WORD
PSW=PS
STKLMT= 177774 ;:STACK LIMIT REGISTER
PIRQ= 177772 ;:PROGRAM INTERRUPT REQUEST REGISTER
DSWR= 177570 ;:HARDWARE SWITCH REGISTER
DDISP= 177570 ;:HARDWARE DISPLAY REGISTER

```

000000
000001
000002
000003
000004
000005
000006
000007
000006
000007

```

:*GENERAL PURPOSE REGISTER DEFINITIONS
R0= %0 ;:GENERAL REGISTER
R1= %1 ;:GENERAL REGISTER
R2= %2 ;:GENERAL REGISTER
R3= %3 ;:GENERAL REGISTER
R4= %4 ;:GENERAL REGISTER
R5= %5 ;:GENERAL REGISTER
R6= %6 ;:GENERAL REGISTER
R7= %7 ;:GENERAL REGISTER
SP= %6 ;:STACK POINTER
PC= %7 ;:PROGRAM COUNTER

```

000000
000040
000100
000140
000200

```

:*PRIORITY LEVEL DEFINITIONS
PR0= 0 ;:PRIORITY LEVEL 0
PR1= 40 ;:PRIORITY LEVEL 1
PR2= 100 ;:PRIORITY LEVEL 2
PR3= 140 ;:PRIORITY LEVEL 3
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
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; *BASIC "CPU" TRAP VECTOR ADDRESSES
000004 ERRVEC= 4          ;; TIME OUT AND OTHER ERRORS
000010 RESVEC= 10       ;; RESERVED AND ILLEGAL INSTRUCTIONS
000014 TBITVEC=14      ;; "T" BIT
000014 TRTVEC= 14      ;; TRACE TRAP
000014 BPTVEC= 14      ;; BREAKPOINT TRAP (BPT)
000020 IOTVEC= 20      ;; INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024 PWRVEC= 24      ;; POWER FAIL
000030 EMTVEC= 30      ;; EMULATOR TRAP (EMT) **ERROR**
000034 TRAPVEC=34     ;; "TRAP" TRAP
000060 TKVEC= 60       ;; TTY KEYBOARD VECTOR
000064 TPVEC= 64       ;; TTY PRINTER VECTOR
000240 PIRQVEC=240    ;; PROGRAM INTERRUPT REQUEST VECTOR

1784      .SBTTL FPP REGISTER DEFINITIONS
1785      AC0          =%0
1786      AC1          =%1
1787      AC2          =%2
1788      AC3          =%3
1789      AC4          =%4
1790      AC5          =%5
1791      AC6          =%6
1792      AC7          =%7
1794      .SBTTL TRAP CATCHER
          =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
          =174
000174    000000    DISPREG: .WORD 0          ;; SOFTWARE DISPLAY REGISTER
000176    000000    SWREG:   .WORD 0          ;; SOFTWARE SWITCH REGISTER
          .SBTTL STARTING ADDRESS(ES)
000200    000137    003616    JMP @#START ;; JUMP TO STARTING ADDRESS OF PROGRAM
    
```

1795

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.SBTTL COMMON TAGS
:*****
:*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
:*USED IN THE PROGRAM.
.=1100

001100 001100          $CMTAG:          ;;START OF COMMON TAGS
001100 000000          .WORD          0          ;;CONTAINS THE TEST NUMBER
001102 000          $TSTNM: .BYTE          0          ;;CONTAINS ERROR FLAG
001103 000          $ERFLG: .BYTE          0          ;;CONTAINS SUBTEST ITERATION COUNT
001104 000000          $ICNT:  .WORD          0          ;;CONTAINS SCOPE LOOP ADDRESS
001106 000000          $LPADR: .WORD          0          ;;CONTAINS SCOPE RETURN FOR ERRORS
001110 000000          $LPERR: .WORD          0          ;;CONTAINS TOTAL ERRORS DETECTED
001112 000000          $ERTTL: .WORD          0          ;;CONTAINS ITEM CONTROL BYTE
001114 000          $ITEMB: .BYTE          0          ;;CONTAINS MAX. ERRORS PER TEST
001115 001          $ERMAX: .BYTE          1          ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001116 000000          $ERRPC: .WORD          0          ;;CONTAINS ADDRESS OF 'GOOD' DATA
001120 000000          $GDADR: .WORD          0          ;;CONTAINS ADDRESS OF 'BAD' DATA
001122 000000          $BDADR: .WORD          0          ;;CONTAINS 'GOOD' DATA
001124 000000          $GDDAT: .WORD          0          ;;CONTAINS 'BAD' DATA
001126 000000          $BDDAT: .WORD          0          ;;RESERVED--NOT TO BE USED
001130 000000          .WORD          0
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          $REGAD: .WORD          0          ;;CONTAINS THE ADDRESS FROM
;;WHICH ($REGO) WAS OBTAINED

001162 000024          .REPT          $CM3
001164 000000          $REG0:  .WORD          0          ;;CONTAINS (($REGAD)+0)
001166 000000          $REG1:  .WORD          0          ;;CONTAINS (($REGAD)+2)
001170 000000          $REG2:  .WORD          0          ;;CONTAINS (($REGAD)+4)
001172 000000          $REG3:  .WORD          0          ;;CONTAINS (($REGAD)+6)
001174 000000          $REG4:  .WORD          0          ;;CONTAINS (($REGAD)+10)
001176 000000          $REG5:  .WORD          0          ;;CONTAINS (($REGAD)+12)
001200 000000          $REG6:  .WORD          0          ;;CONTAINS (($REGAD)+14)
001202 000000          $REG7:  .WORD          0          ;;CONTAINS (($REGAD)+16)
001204 000000          $REG10: .WORD          0          ;;CONTAINS (($REGAD)+20)
001206 000000          $REG11: .WORD          0          ;;CONTAINS (($REGAD)+22)
001210 000000          $REG12: .WORD          0          ;;CONTAINS (($REGAD)+24)
001212 000000          $REG13: .WORD          0          ;;CONTAINS (($REGAD)+26)
001214 000000          $REG14: .WORD          0          ;;CONTAINS (($REGAD)+30)
001216 000000          $REG15: .WORD          0          ;;CONTAINS (($REGAD)+32)
001220 000000          $REG16: .WORD          0          ;;CONTAINS (($REGAD)+34)
001222 000000          $REG17: .WORD          0          ;;CONTAINS (($REGAD)+36)
001224 000000          $REG20: .WORD          0          ;;CONTAINS (($REGAD)+40)
001226 000000          $REG21: .WORD          0          ;;CONTAINS (($REGAD)+42)
001226 000000          $REG22: .WORD          0          ;;CONTAINS (($REGAD)+44)

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```
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: .ASCII <207><377><377> ;;CODE FOR BELL
001311 000
001312 077
001313 015
001314 012 000 $LF: .ASCII <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,OPTIGNS
;*
;* 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 0J0000 $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 $DEVN: .WORD ADEVN ;;DEVICE MAP
001376 000000 $CDW1: .WORD ACDW1 ;;CONTROLLER DESCRIPTION WORD#1
001400 000000 $CDW2: .WORD ACDW2 ;;CONTROLLER DESCRIPTION WORD#2
001402 000000 $DDW0: .WORD ADDW0 ;;DEVICE DESCRIPTOR WORD#0
001404 000000 $DDW1: .WORD ADDW1 ;;DEVICE DESCRIPTOR WORD#1
001406 000000 $DDW2: .WORD ADDW2 ;;DEVICE DESCRIPTOR WORD#2
001410 000000 $DDW3: .WORD ADDW3 ;;DEVICE DESCRIPTOR WORD#3
001412 000000 $DDW4: .WORD ADDW4 ;;DEVICE DESCRIPTOR WORD#4
001414 000000 $DDW5: .WORD ADDW5 ;;DEVICE DESCRIPTOR WORD#5
001416 000000 $DDW6: .WORD ADDW6 ;;DEVICE DESCRIPTOR WORD#6
001420 000000 $DDW7: .WORD ADDW7 ;;DEVICE DESCRIPTOR WORD#7
001422 000000 $DDW8: .WORD ADDW8 ;;DEVICE DESCRIPTOR WORD#8
001424 000000 $DDW9: .WORD ADDW9 ;;DEVICE DESCRIPTOR WORD#9
001426 000000 $DDW10: .WORD ADDW10 ;;DEVICE DESCRIPTOR WORD#10
001430 000000 $DDW11: .WORD ADDW11 ;;DEVICE DESCRIPTOR WORD#11
001432 000000 $DDW12: .WORD ADDW12 ;;DEVICE DESCRIPTOR WORD#12
001434 000000 $DDW13: .WORD ADDW13 ;;DEVICE DESCRIPTOR WORD#13
001436 000000 $DDW14: .WORD ADDW14 ;;DEVICE DESCRIPTOR WORD#14
001440 000000 $DDW15: .WORD ADDW15 ;;DEVICE DESCRIPTOR WORD#15
001442 $ETEND:

```

```
.SBTTL ERROR POINTER TABLE
*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
*NOTE1: IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
*NOTE2: EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
*      EM      ;;POINTS TO THE ERROR MESSAGE
*      DH      ;;POINTS TO THE DATA HEADER
*      DT      ;;POINTS TO THE DATA
*      DF      ;;POINTS TO THE DATA FORMAT
```

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

ERROR POINTER TABLE

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

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

1806

000046 003602
000052 000046
000000 036432
000000 000052
000000 000000
000000 003602

```
.SBTTL ACT11 HOOKS  
:*****  
:HOOKS REQUIRED BY ACT11  
  $SVPC=.           ;SAVE PC  
  . =46  
  $ENDAD           ;.1)SET LOC.46 TO ADDRESS OF $ENDAD IN .SEOP  
  . =52  
  .WORD 0          ;.2)SET LOC.52 TO ZERO  
  .=$SVPC          ;: RESTORE PC
```

'808

003602
000024
J00024 000200
000044 000044
000044 003602
003602
003602 000000
003604 0013'6
003606 000010
003610 000040
003612 000000
003614 000052

```
.SBTTL APT PARAMETER BLOCK
*****
:SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
*****
      .SX=      ;;SAVE CURRENT LOCATION
      =24      ;;SET POWER FAIL TO POINT TO START OF PROGRAM
      200      ;;FOR APT START UP
      =44      ;;POINT TO APT INDIRECT ADDRESS PNTR.
      $APTHDR  ;;POINT TO APT HEADER BLOCK
      =.SX     ;;RESET LOCATION COUNTER
*****
:SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
:INTERFACE SPEC.
$APTHD:
$HIBTS: .WORD 0      ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
$MBADR: .WORD $MAIL  ;;ADDRESS OF APT MAILBOX (BITS 0-15)
$TSTM:  .WORD 10     ;;RUN TIM OF LONGEST TEST
$PASTM: .WORD 40     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
$UNITM: .WORD 0      ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
      .WORD $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

181C
1811 003616

003616	012706	001100	
003622	005026		
003624	022706	001140	
003630	001374		
003632	012706	001100	
003636	012737	036516	000020
003644	012737	000340	000022
003652	012737	037146	000030
003660	012737	000340	000032
003666	012737	041540	000034
003674	012737	000340	000036
003702	012737	041624	000024
003710	012737	000340	000026
003716	013737	036124	036112
003724	005037	001302	
003730	005037	001304	
003734	112737	000001	001115
003742	012737	036476	000014
003750	012737	000340	000016
003756	012737	000002	036476
003764	012737	004012	000010
003772	005046		
003774	012746	004002	
004000	000006		
004002	012737	000006	036476
004010	000402		
004012	062706	000010	
004016	012737	000012	000010
004024	005037	036504	
004030	012737	004030	001106
004036	012737	004036	001110
004044	013746	000004	
004050	012737	004104	000004
004056	012737	177570	001140
004064	012737	177570	001142
004072	022777	177777	175040
004100	001012		
004102	000403		
004104	012716	004112	
004110	000002		
004112	012737	000176	001140
004120	012737	000174	001142
004126	012637	000004	
004132	005037	001324	
004136	132737	000200	001337
004144	001403		
004146	012737	001340	001140

```

.SBTTL INITIALIZE THE COMMON TAGS
START:
.SBTTL INITIALIZE THE COMMON TAGS
::CLEAR THE COMMON TAGS ($CMTAG) AREA
MOV #SCMTAG,R6      ::FIRST LOCATION TO BE CLEARED
CLR (R6)+          ::CLEAR MEMORY LOCATION
CMP #SWR,R6        ::DONE?
BNE -6             ::LOOP BACK IF NO
MOV #STACK,SP      ::SETUP THE STACK POINTER
::INITIALIZE A FEW VECTORS
MOV #SCOPE,@IOTVEC ::IOT VECTOR FOR SCOPE ROUTINE
MOV #340,@IOTVEC+2 ::LEVEL 7
MOV #ERROR,@EMTVEC ::EMT VECTOR FOR ERROR ROUTINE
MOV #340,@EMTVEC+2 ::LEVEL 7
MOV #TRAP,@TRAPVEC ::TRAP VECTOR FOR TRAP CALLS
MOV #340,@TRAPVEC+2::LEVEL 7
MOV #SPWRDN,@PWRVEC ::POWER FAILURE VECTOR
MOV #340,@PWRVEC+2 ::LEVEL 7
MOV $ENDCT,$EOPCT  ::SETUP END-OF-PROGRAM COUNTER
CLR $TIMES         ::INITIALIZE NUMBER OF ITERATIONS
CLR $ESCAPE        ::CLEAR THE ESCAPE ON ERROR ADDRESS
MOVB #1,$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'.
MOV #RTRN,@TBITVEC ::SET 'T' BIT VECTOR TO $RTRN
MOV #340,@TBITVEC+2 ::LEVEL 7
MOV #RTI,$RTRN     ::SET $RTRN TO A RTI
MOV #65$,@RESVEC  ::TRY TO DO A RTT
CLR -(SP)         ::DUMMY PS
MOV #64$,-(SP)    ::AND PC
RTT               ::TRY THE RTT
64$: MOV #RTT,$RTRN ::RTT IS LEGAL--SET $RTRN TO A RTT
BR 66$
65$: ADD #10,SP    ::RTT ILLEGAL--CLEAN OFF THE STACK
66$: MOV #RESVEC+2,@RESVEC ::RESTORE TRAP CATCHER
CLR $TBIT        ::CLEAR 'T' BIT SWITCH
MOV #,$LPADR     ::INITIALIZE THE LOOP ADDRESS FOR SCOPE
MOV #,$LPERR     ::SETUP THE ERROR LOOP ADDRESS
::SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
::EQUAL TO A '-1', SETUP FOR A SOFTWARE SWITCH REGISTER.
MOV @ERRVEC,-(SP) ::SAVE ERROR VECTOR
MOV #67$,@ERRVEC ::SET UP ERROR VECTOR
MOV #DSWR,SWR    ::SETUP FOR A HARDWARE SWICH REGISTER
MOV #DDISP,DISPLAY ::AND A HARDWARE DISPLAY REGISTER
CMP #-1,@SWR    ::TRY TO REFERENCE HARDWARE SWR
BNE 69$         ::BRANCH IF NO TIMEOUT TRAP OCCURRED
::AND THE HARDWARE SWR IS NOT = -1
BR 68$         ::BRANCH IF NO TIMEOUT
67$: MOV #68$,(SP) ::SET UP FOR TRAP RETURN
RTI
68$: MOV #SWREG,SWR ::POINT TO SOFTWARE SWR
MOV #DISPREG,DISPLAY
69$: MOV (SP)+,@ERRVEC ::RESTORE ERROR VECTOR
CLR $PASS        ::CLEAR PASS COUNT
BITB #APTSIZE,$ENVM ::TEST USER SIZE UNDER APT
BEQ 70$         ::YES,USE NON-APT SWITCH
MOV #SSWREG,SWR  ::NO,USE APT SWITCH REGISTER

```

```

      004154
1812 004154 005227 177777
      004160 001047
      004162 022737 036432 000042
      004170 001443
      004172 104401 004240
      004176 035737 000042
      004202 001012
      004204 123727 001336 000001
      004212 001406
      004214 023727 001140 000176
      004222 001005
      004224 104406
      004226 000403
      004230 112737 000001 001134
      004236
      004236 000420
      004300
1813 004300 104401 004306
      004304 000431
      004370
1814 004370 104401 004376
      004374 000426
      004452
1815 004452 005037 036512
1816 004456

70$:
.SBTTL TYPE PROGRAM NAME
::TYPE THE NAME OF THE PROGRAM IF FIRST PASS
      INC #-1 ;;FIRST TIME?
      BNE 71$ ;;BRANCH IF NO
      CMP #SENDAD,@#42 ;;ACT-11?
      BEQ 71$ ;;BRANCH IF YES
      TYPE ,72$ ;;TYPE ASCIZ STRING
.SBTTL GET VALUE FOR SOFTWARE SWITCH REGISTER
      TST @#42 ;;ARE WE RUNNING UNDER XXDP/ACT?
      BNE 73$ ;;BRANCH IF YES
      CMPB $ENV,#1 ;;ARE WE RUNNING UNDER APT?
      BEQ 73$ ;;BRANCH IF YES
      CMP SWR,#SWREG ;;SOFTWARE SWITCH REG SELECTED?
      BNE 74$ ;;BRANCH IF NO
      GTSWR ;;GET SOFT-SWR SETTINGS
      BR 74$
      MOVB #1,$AUTOB ;;SET AUTO-MODE INDICATOR
73$:
74$:
      BR 71$ ;;GET OVER THE ASCIZ
::72$: .ASCIZ <CRLF>*CKFPAD0 FP11F FLTG PNT PRT A*<CRLF>
71$:
      TYPE ,76$ ;;TYPE ASCIZ STRING
      BR 75$ ;;GET OVER THE ASCIZ
::76$: .ASCIZ 'EOP MSGS WILL PRINT EVERY 4 PASSES (15 SECONDS)'<<CRLF>
75$:
      TYPE ,78$ ;;TYPE ASCIZ STRING
      BR 77$ ;;GET OVER THE ASCIZ
::78$: .ASCIZ 'HIT ANY KEY TO DISABLE/ENABLE EOP MESSAGES.'<<CRLF>
77$:
      CLR EPENDS ;;CLR THE ENABLE/DISABLE EOP FLAG ;DPM002
LOOP:

```


1835

```
.SBTTL TEST # 1 - LDFPS, STFPS AND DATA PATHS TEST
*****
*TEST 1 LDFPS, STFPS AND DATA PATHS TEST
*
*THIS IS A TEST OF THE LDFPS (LOAD FLOATING POINT STATUS) AND STFPS
*(STORE FLOATING POINT STATUS) INSTRUCTIONS. A COUNT PATTERN IS GENERATED
*AND RUN THROUGH THE FLOATING POINT STATUS REGISTER.
*THIS WILL TEST THE 16-BIT TRI STATE BUS WHICH CONNECTS THE CPU
*WITH THE FPP AND ALSO RUNS INTERNALLY WITHIN THE FPP. ONLY DMO AND
*SNO 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.
*
```

```
1836 004456 000004
1837 004460 005037 004736
1838 004464 012737 004526 001110
1839 004472 012700 177777
1840 004476 012737 004740 000244
1841 004504 012737 004752 000010
1842 004512 005002
1843 004514 005102
1844 004516 005003
1845 004520 012737 005004 000004
1846
1847
1848 004526
1849 004526 010004
1850 004530 042704 030020
1851 004534 170104
1852
1853 004536 012701 177777
1854 004542 170201
1855 004544 012737 042534 000244
1856 004552 010004
1857 004554 042704 030020
1858 004560 012737 042566 000004
1859 004566 012737 042604 000010
1860 004574 020401
1861
1862 004576 001002
```

```
*****
TST1: SCOPE
      CLR AERFLG
      MOV #A1,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #-1,R0 ;INITIALIZE THE COUNT PATTERN.
      MOV #AERR1,FPVECT ;SET UP FOR UNABLE TO DECODE
      MOV #AERR2,10 ;FPP INSTRUCTION TRAP TO 244 OR 10.
      CLR R2 ;R2 IS THE 'AND' OF BAD DATA.
      COM R2
      CLR R3 ;R3 IS THE 'OR' OF BAD DATA.
      MOV #AERR3,ERRVECT ;IF EITHER INSTRUCTION
                          ;FAILS TO GO THROUGH THE
                          ;CORRECT SRC OR DST MODE AN
                          ;ODD ADDRESS TRAP WILL OCCUR.

A1:
A11: MOV R0,R4
      BIC #30020,R4
      LDFPS R4 ;TEST INSTRUCTION.

A12: MOV #-1,R1
      STFPS R1 ;TEST INSTRUCTION.
      MOV #FPSPUR,FPVECT ;SET UP FOR UNEXPECTED TRAPS.
      MOV R0,R4 ;MASK OFF UNSETTABLE BITS.
      BIC #30020,R4
      MOV #CPSPUR,ERRVECT
      MOV #CPTWO,10
      CMP R4,R1 ;COMPARE DATA EXPECTED WITH
                ;THE DATA READ.
      BNE A3 ;IF NOT EQUAL GO REPORT ERROR.
```

```

1863
1864 004600 077026      A2:   SOB   R0,A1      ;OTHERWISE DECREMENT COUNT PATTERN
1865 004602 000425      BR     A5          ;UNTIL IT IS ZERO.
1866
1867 004604 005237 004736  A3:   INC   AERFLG    ;RECORD ERROR.
1868 004610 050003      BIS   R0,R3      ;COMPUTE 'OR' OF FAILING PATTERNS.
1869 004612 010005      MOV   R0,R5      ;COMPUTE 'AND' OF FAILING PATTERNS.
1870 004614 005105      COM   R5
1871 004616 040502      BIC   R5,R2
1872
1873 004620 022737 000005 004736  CMP   #5,AERFLG   ;SEE IF MORE THAN 5 ERRORS HAVE
1874 004626 103412      BLO   A05        ;OCCURRED. BR IF YES.
1875
1876
1877 004630 012737 004521 001236  MOV   #A1,$TMP2
1878 004636 010037 001240      MOV   R0,$TMP3
1879 004642 010137 001242      MOV   R1,$TMP4
1880 004646 010437 001244      MOV   R4,$TMP5
1881 004652 104001      A4:   ERROR  +1
1882
1883 004654 000751      A05:  BR     A2          ;CONTINUE TESTING.
1884
1885 004656 005737 004736  A5:   TST   AERFLG    ;SEE IF ANY ERRORS OCCURRED.
1886 004662 001471      BEQ   ADONE      ;IF NOT GO TO NEXT TEST.
1887 004664 032777 020000 174246  BIT   #SW13,@SWR ;OTHERWISE SEE IF A SUMMARY
1888 004672 001404      BEQ   A6          ;SHOULD BE TYPED.
1889 004674 032777 000200 174236  BIT   #SW7,@SWR
1890 004702 001461      BEQ   ADONE
1891
1892 004704      A6:
1893 004704 010237 001236      MOV   R2,$TMP2   ;TYPE ERROR SUMMARY.
1894 004710 010337 001240      MOV   R3,$TMP3
1895 004714 012737 004730 001116  MOV   #A7,$ERRPC
1896 004722 112737 000002 001114  MOVB  #2,$ITEMB
1897 004730 004737 042010  A7:   JSR   PC,ERTYPE
1898 004734 000444      BR     ADONE
1899
1900 004736 000000      AERFLG: .WORD 0
1901
1902      ;UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 244.
1903 004740 011637 001236  AERR1: MOV   (SP),$TMP2      ;SAVE PC OF TRAP.
1904 004744 022626      CMP   (SP)+,(SP)+
1905 004746 104010      1$:   ERFOR +10
1906 004750 000436      BR     ADONE
1907
1908      ;UNABLE TO DECODE INSTRUCTION. TRAPPED TO 10.
1909 004752 021627 004530  AERR2: CMP   (SP),#A11+2    ;DID TRAP OCCUR OF FPP INSTRUCTION?
1910 004756 001405      BEQ   1$
1911 004760 021627 004544      CMP   (SP),#A12+2
1912 004764 001402      BEQ   1$
1913 004766 000137 042604      JMP   CPTWO
1914
1915
1916 004772 011637 001236  1$:   MOV   (SP),$TMP2
1917 004776 022626      CMP   (SP)+,(SP)+ ;OTHERWISE REPORT IR DECIDE ERROR.
1918 005000 104011      2$:   ERROR +11
1919 005002 000421      BR     ADONE
    
```

```

1920
1921      ;TRAP TO 4 HANDLER:
1922 005004 021627 004530      AERR3:  CMP      (SP),#A11+2      ;DID THE TRAP OCCUR ON THE
1923 005010 001405              BEQ      1$                      ;LDFPS INSTRUCTION?
1924 005012 021627 004544              CMP      (SP),#A12+2      ;OR THE STFPS INSTRUCTION?
1925 005016 001407              BEQ      2$
1926 005020 000137 042536              JMP      CPSPUR           ;IF NEITHER THEN REPORT
1927                                         ;UNEXPECTED TRAP TO 4.
1928
1929 005024 011637 001236      1$:    MOV      (SP),$TMP2
1930 005030 022626              CMP      (SP)+,(SP)+
1931 005032 104014              15$:   ERROR   +14
1932 005034 000404              BR      ADONE
1933
1934 005036 011637 001236      2$:    MOV      (SP),$TMP2
1935 005042 022626              CMP      (SP)+,(SP)+
1936 005044 104015              25$:   ERROR   +15
1937
1938 005046              ADONE:   RSETUP
      005046 104413
                                         ;GO INITIALIZE THE FPS AND STACK; AND
                                         ;SEE IF THE USER HAS EXPRESSED
                                         ;THE DESIRE TO CHANGE THE SOFTWARE
                                         ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                         ;THE USER TYPED CONTROL G?).

1939
1940

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1946

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.SBTTL TEST # 2 - CFCC TEST
*****
:TEST 2          CFCC TEST
:
:THIS IS A TEST OF THE COPY CONDITION CODES INSTRUCTION, CFCC.
:
*****
  
```

```

1947 00505C 000004
1947 005052 012737 005064 001110
1948 005060 012700 000017
1949
1950 005064
1951 005064 170100
1952
1953 005066
1954 005066 170000
1955
1956 005070 013703 177776
1957 005074 042703 177760
1958 005100 020003
1959 005102 001002
1960
1961 005104 077011
1962 005106 000422
1963
1964 005110
1965 005110 170201
1966 005112 012737 005066 001236
1967 005120 020001
1968 005122 001006
1969
1970 005124 010337 001240
1971 005130 010037 001242
1972 005134 104003
1973 005136 000762
1974
1975 005140
1976 005140 010037 001240
1977 005144 010137 001242
1978 005150 104004
1979 005152 000754
1980
1981 005154
      005154 104413
  
```

```

TST2:  SCOPE
        MOV    #B1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
        MOV    #17,R0          ;R0 CONTAINS TO TEST PATTERN.

B1:    LDFPS  R0                ;LOAD THE TEST PATTERN

B2:    CFCC                    ;COPY CONDITION CODES.

        MOV    PSW,R3          ;SEE IF PATTERN TRANSFERED.
        BIC    #177760,R3
        CMP    R0,R3
        BNE    BERR

B3:    SOB    R0,B1
        BR     BDONE

BERR:  STFPS  R1                ;WAS FPS MODIFIED BY CFCC?
        MOV    #B2,$TMP2
        CMP    R0,R1
        BNE    BERR1

1$:    MOV    R3,$TMP3
        MOV    R0,$TMP4
        ERROR +3
        BR     B3

BERR1: MOV    R0,$TMP3
        MOV    R1,$TMP4

1$:    ERROR +4
        BR     B3

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

1982

1991

```

.SBTTL TEST # 3 - SETF, SETD, SETI AND SETL TEST
*****
:TEST 3      SETF, SETD, SETI AND SETL TEST
:
:THIS IS A TEST OF THE SETF, SETD, SETI AND SETL INSTRUCTIONS.
:
:
:EACH INSTRUCTION IS EXECUTED WITH THE FPS CONTAINING
:
:ALL ONES AND ALSO WITH THE FPS CLEAR. THE RESULT OF EACH
:
:SITUATION IS CHECKED.
:
:
*****

```

```

1992 005156 000004
1992 005160 012737 005174 001110
1993 005166 012737 000760 001244
1994 005174 012737 000202 001250
1995 005202 012737 043677 001252
1996 005210 005000
1997
1998 005212 170100
1999 005214 012737 005222 001236
2000
2001 005222 170001
2002
2003 005224 170201
2004 005226 005002
2005 005230 020201
2006 005232 001402
2007 005234 004737 005654
2008
2009 005240
2009 005240 012737 005246 001110
2010 005246 012700 147757
2011
2012 005252 170100
2013 005254 012737 005262 001236
2014 005262 170001
2015
2016 005264 170201
2017 005266 012702 147557
2018 005272 020102
2019 005274 001402
2020 005276 004737 005752
2021
2022 005302
2022 005302 012737 005310 001110
2023 005310 012737 000203 001250
2024 005316 012737 043705 001252
2025 005324 012700 147757
2026
2027 005330 170100
2028 005332 012737 005340 001236
2029 005340 170011
2030
2031 005342 170201
2032 005344 012702 147757
2033 005350 020102
2034 005352 001402
2035 005354 004737 005752

TST3:  SCOPE
      MOV #C1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #760,$TMP5
C1:    MOV #202,$TMP7
      MOV #SETF1,$TMP10
      CLR R0
      LDFPS R0              ;CLEAR THE FPS.
      MOV #C15,$TMP2
C15:   SETF                ;TEST INSTRUCTION.
      STFPS R1              ;GET RESULT.
      CLR R2
      CMP R2,R1             ;DID AN ERROR OCCUR?
      BEQ 1$
      JSR PC,CERR1
1$:
C2:    MOV #C2,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #147757,R0
      LDFPS R0              ;PUT 147757 IS FPS
      MOV #C25,$TMP2
C25:   SETF                ;CLEAR FD BIT.
      STFPS R1              ;GET RESULT
      MOV #147557,R2
      CMP R1,R2             ;RESULT CORRECT.
      BEQ 1$
      JSR PC,CERR2
1$:
C3:    MOV #C3,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #203,$TMP7
      MOV #SETD1,$TMP10
      MOV #147757,R0
      LDFPS R0              ;LOAD 147757 INTO FPS.
      MOV #C35,$TMP2
C35:   SETD                ;SETD FD BIT.
      STFPS R1
      MOV #147757,R2
      CMP R1,R2             ;RESULT CORRECT?
      BEQ 1$
      JSR PC,CERR2

```

```

2036
2037 005360          1$:
      005360 012737 005366 001110 MOV    #C4,$LPERR    ;SET UP THE LOOP ON ERROR ADDRESS.
2038 005366 005000          C4:    CLR    R0              ;CLEAR FPS.
2039 005370 170100          LDFPS R0
2040 005372 012737 005400 001236 MOV    #C45,$TMP2
2041
2042 005400 170011          C45:  SETD                   ;SET FD BIT.
2043
2044 005402 170201          STFPS R1              ;GET RESULT.
2045 005404 012702 000200 MOV    #200,R2
2046 005410 020102          CMF   R1,R2          ;RESULT CORRECT?
2047 005412 001402          BEQ   1$
2048 005414 004737 005654 JSR   PC,CERR1
2049
2050 005420          1$:
      005420 012737 005426 001110 MOV    #C5,$LPERR    ;SET UP THE LOOP ON ERROR ADDRESS.
2051 005426 012737 000204 001250 C5:    MOV    #204,$TMP7
2052 005434 012737 043713 001252 MOV    #SETI1,$TMP10
2053 005442 005000          CLR    R0
2054
2055 005444 170100          LDFPS RC              ;CLEAR FPS
2056 005446 012737 005454 001236 MOV    #C55,$TMP2
2057
2058 005454 170002          C55:  SETI                   ;CLEAR FL BIT.
2059
2060 005456 170201          STFPS R1              ;GET RESULT.
2061 005460 005002          CLR    R2
2062 005462 020201          CMF   R2,R1          ;RESULT CORRECT?
2063 005464 001402          BEQ   1$
2064 005466 004737 005654 JSR   PC,CERR1
2065
2066 005472          1$:
      005472 012737 005500 001110 MOV    #C6,$LPERR    ;SET UP THE LOOP ON ERROR ADDRESS.
2067 005500 012700 147757 C6:    MOV    #147757,R0    ;PUT 147757 INTO FPS
2068 005504 170100          LDFPS R0
2069 005506 012737 005514 001236 MOV    #C65,$TMP2
2070
2071 005514 170002          C65:  SETI                   ;CLEAR FL BIT.
2072
2073 005516 170201          STFPS R1              ;GET THE RESULT.
2074 005520 012702 147657 MOV    #147657,R2
2075 005524 020102          CMF   R1,R2          ;RESULT CORRECT?
2076 005526 001402          BEQ   1$
2077 005530 004737 005752 JSR   PC,CERR2
2078
2079 005534          1$:
      005534 012737 005542 001110 MOV    #C7,$LPERR    ;SET UP THE LOOP ON ERROR ADDRESS.
2080 005542 012737 000205 001250 C7:    MOV    #205,$TMP7
2081 005550 012737 043721 001252 MOV    #SETL1,$TMP10
2082 005556 012700 147757 MOV    #147757,R0
2083 005562 170100          LDFPS R0              ;SET FPS TO 147757.
2084 005564 012737 005572 001236 MOV    #C75,$TMP2
2085
2086 005572 170012          C75:  SETL                   ;SET FL BIT.
2087
2088 005574 170201          STFPS R1              ;GET THE RESULT.

```

```

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

```

2145 006006 001007          BNE      3$
2146 006010 012737 043077 001254  MOV     #SETF1,$TMP11
2147 006016 012737 000202 001246  MOV     #202,$TMP6
2148 006024 000412          BR      CERR3
2149
2150 006026 032701 000100          3$:     BIT     #100,R1
2151 006032 001354          BNE     1$           ;IS FL CLEAR.
2152 006034 012737 043713 001254  MOV     #SETI1,$TMP11
2153 006042 012737 000204 001246  MOV     #204,$TMP6
2154 006050 010400          BR      CERR3
2155
2156          ;REPORT THE ERRORS:
2157 006052          CERR3:
2158 006052 010137 001240          MOV     R1,$TMP3
2159 006056 010237 001242          MOV     R2,$TMP4
2160 006062 012637 006116          MOV     (SP)+,CPC
2161 006066 104012          1$:     ERROR  +12
2162 006070 000177 000022          JMP     @CPC
2163
2164          CERR4:
2165 006074 010137 001240          MOV     R1,$TMP3
2166 006100 010237 001242          MOV     R2,$TMP4
2167 006104 012637 006116          MOV     (SP)+,CPC
2168 006110 104013          1$:     ERROR  +13
2169 006112 000177 000000          JMP     @CPC
2170
2171 006116 000000          CPC:   .WORD  0
2172
2173 006120          CDONE: RSETUP
      006120 104413          ;GO INITIALIZE THE FPS AND STACK; AND
      ;SEE IF THE USER HAS EXPRESSED
      ;THE DESIRE TO CHANGE THE SOFTWARE
      ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
      ;THE USER TYPED CONTROL G?).
2174
2175
    
```

295

```

.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.
*
*****
    
```

```

2196 006122 000004
2196 006124 012737 006152 001110
2197 006132 012705 170003
2198 006136 012737 006342 000004
2199 006144 012737 006246 000244
2200
2201 006152 005000
2202 006154 170100
2203 006156 005002
2204 006160 010537 006176
2205 006164 010537 001244
2206 006170 012737 006176 001236
2207 006176 000000
2208 006200 170000
2209 006202 005202
2210 006204 005202
2211
2212 006206 170201
2213 006210 010137 001240
2214 006214 104016
2215
2216 006216 022705 170010
2217 006222 001003
2218 006224 012705 170013
2219 006230 000750
2220
2221 006232 022705 170077
2222 006236 001001
2223 006240 000452
2224 006242 005205
2225 006244 000742
2226
2227 006246 022716 006200
2228 006252 001402
2229 006254 000137 042534
2230
    
```

```

TST4:  SCOPE
        MOV  #D1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
        MOV  #170003,R5     ;INITIAL OP CODE.
        MOV  #DERR2,ERRVECT
        MOV  #DERR1,FPVECT

D1:     CLR  R0
        LDFPS R0
        CLR  R2
        MOV  R5,D2          ;SET UP THE ILLEGAL INSTRUCTION.
        MOV  R5,$TMP5
        MOV  #D2,$TMP2

D2:     .WORD 0
D3:     CFCC
D4:     INC  R2
        INC  R2

        STFPS R1           ;REPORT FAILURE. DID NOT TRAP.
        MOV  R1,$TMP3
1$:     ERROR +16

D5:     CMF  #170010,R5     ;COMPUTE NEXT OP CODE
        BNE  D6
        MOV  #170013,R5
        BR   D1

D6:     CMP  #170077,R5
        BNE  D7
        BR   DDONE

D7:     INC  R5
        BR   D1

DERR1:  CMP  #D3,(SP)      ;DID TRAP OCCUR ON TEST INSTRUCTION?
        BEQ  1$
        JMP  FPSPUR
    
```



```

2231 006260 022626      1$:    CMP      (SP)+,(SP)+
2232 006262 170201          STFPS   R1          ;GET THE FPS AND SEE IF IT IS
2233 006264 022701 100J00    CMP      #100000,R1      ;SET CORRECTLY.
2234 006270 001406          BEQ      3$
2235
2236 006272 012737 100000 001240    MOV      #100000,$TMP3
2237 006300 010137 001242    MOV      R1,$TMP4
2238 006304 104017      2$:    ERROR   +17
2239
2240 006306 012704 000001      3$:    MOV      #1,R4
2241 006312 170304      D8:    STST    R4          ;GET THE FEC CODE. NOTE THAT
2242                                     ;IF THE DESTINATION MODE IS
2243                                     ;IMPROPERLY DECODED AN ODD
2244                                     ;ADDRESS TRAP TO 4 SHOULD OCCUR.
2245 006314 022704 000002          CMP      #2,R4          ;WAS FEC CORRECT?
2246 006320 001001          BNE     D9
2247 006322 000735          BR      D5
2248
2249 006324          D9:    ;REPORT STST FAILURE
2250 006324 012737 006312 001240    MOV      #D8,$TMP3
2251 006332 010437 001242    MOV      R4,$TMP4
2252 006336 104020      1$:    ERROR   +20
2253 006340 000726          BR      D5
2254
2255 006342 022716 006314      DERR2: CMP      #D8+2,(SP)      ;DID THE TRAP OCCUR ON THE
2256 006346 001402          BEQ     D10          ;STST INSTRUCTION?
2257 006350 000137 042566          JMP     CPSPUR
2258
2259 006354          D10:
2260 006354 011637 001236    MOV      (SP),$TMP2
2261 006360 022626          CMP      (SP)+,(SP)+
2262 006362 104021      1$:    ERROR   +21
2263 006364 000714          BR      D5
2264
2265 006366          DDONE:
      006366 104413          RSETUP      ;GO INITIALIZE THE FPS AND STACK; AND
                                     ;SEE IF THE USER HAS EXPRESSED
                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                     ;THE USER TYPED CONTROL G?).

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.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.
*****
TST5:  SCOPE
2276 006370 010004 006406 001110  MOV    #E1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2277 006372 012737 006406 001110  MOV    #E2,$FPVECT    ;SETUP FOR THE INTERRUPT.
2278 006400 012737 006502 000244
2279 006406 012700 040000  E1:    MOV    #40000,R0
2280 006412 170100          LDFPS  R0              ;SET FID.
2281 006414 012737 006422 001236  MOV    #E3,$TMP2
2282 006422          E2:
2283 006422 170020          E3:    .WORD 170020      ;ILLEGAL FPP INSTRUCTION.
2284 006424 170000          E4:    CFCC
2285
2286 006426 170201          STFPS  R1              ;SEE IF ERROR WAS DETECTED.
2287 006430 022701 140000  CMP    #140000,R1
2288 006434 001005  BNE    EERR0
2289
2290 006436 170304          STST   R4              ;SEE IF FEC=2
2291 006440 022704 000002  CMP    #2,R4
2292 006444 001010  BNE    EERR1
2293 006446 000431  BR     EDONE
2294
2295 006450          EERR0:                ;REPORT FPS INCORRECTLY SET.
2296 006450 010137 001240  MOV    R1,$TMP3
2297 006454 012737 140000 001242  MOV    #140000,$TMP4
2298 006462 104022  1$:    ERROR +22
2299 006464 000422  BR     EDONE
2300
2301 006466          EERR1:                ;REPORT FEC NOT 2.
2302 006466 010537 001240  MOV    R5,$TMP3
2303 006472 010437 001242  MOV    R4,$TMP4
2304 006476 104023  1$:    ERROR +23
2305 006500 000414  BR     EDONE
2306
2307 006502 021627 006424  EERR2:  CMP    (SP),#E4      ;DID THE ILLEGAL INSTRUCTION TRAP?
2308 006506 001402  BEC    1$
2309 006510 000137 042534  JMP    FPSPUR
2310
2311 006514          1$:
2312 006514 011637 001236  MOV    (SP),$TMP2
2313 006520 022626  CMP    (SP)+,(SP)+
2314 006522 170201  STFPS  R1
2315 006524 010137 001240  MOV    R1,$TMP3
2316 006530 104024  2$:    ERROR +24
2317
2318 006532          EDONE:
2318 006532 104413  RSETUP ;GO INITIALIZE THE FPS AND STACK; AND
;SEE IF THE USER HAS EXPRESSED
;THE DESIRE TO CHANGE THE SOFTWARE
;VIRTUAL CONSOLE SWITCH REGISTER (HAS

```

;THE USER TYPED CONTROL G?).

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```
.SBTTL TEST # 6 - LDD AND STD, WITH SRC AND DST MODE 1, TEST
:*****
:*TEST 6      LDD AND STD, WITH SRC AND DST MODE 1, TEST
:*
:*THIS IS A TEST OF BOTH THE INSTRUCTION:
:*          LDD      (R0),ACO
:*AND THE INSTRUCTION:
:*          STD      ACO,(R0)
:*MOST OF THE FAILURES ARE ISOLATED TO THE SRC OR DST FLOWS. NOTE
:*THAT THE INTEGRITY OF ACO HAS NOT BEEN ASSURED. THIS MEANS THAT
:*IN SOME CASES IT WILL BE IMPOSSIBLE TO ISOLATE CERTAIN DATA PATTERN
:*FAILURES TO EITHER THE FLOWS OR THIS ACCUMULATOR.
:*
:*****
```

```
006534 000004
2334
2335 006536
006536 C12737 006536 001110 F1:      MOV      #F1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
2336 006544 012737 006614 001236      MOV      #F3,$TMP2
2337 006552 005000      CLR      R0
2338 006554 170100      LDFPS   R0
2339 006556 170011      SETD
2340 006560 012701 010352      MOV      #FDAT10,R1      ;SET UP THE LOAD DATA.
2341 006564 012702 010416      MOV      #FXDAT0,R2
2342 006570 012703 000010      MOV      #10,R3
2343
2344 006574 012221      F2:      MOV      (R2)+,(R1)+
2345 006576 077302      SOB      R3,F2
2346
2347 006600 012700 010362      MOV      #FDAT14,R0      ;SETUP R0 FOR THE LDD (R0),ACO.
2348 006604 012737 010036 000004      MOV      #FERR20,ERRVECT ;IF THE SRC FLOWS FAIL THEN
2349                                     ;AN ODD ADDRESS MAY OCCUR.
2350 006612 005003      CLR      R3
2351
2352 006614 172410      F3:      LDD      (R0),ACO
2353 006616 005203      F4:      INC      R3
2354 006620 005203      INC      R3
2355
2356 006622 020027 010362      CMP      R0,#FDAT14      ;WAS R0 AFFECTED?
2357 006626 001402      BEQ      F5
2358 006630 000137 007202      JMP      FERR1
2359
2360 006634 020327 000002      F5:      CMF      R3,#2          ;SEE IF THE PC WAS ADVERSELY
2361 006640 001402      BEQ      1$              ;AFFECTED DURING THE INSTRUCTION.
2362 006642 000137 007300      JMP      FERR2
2363
2364 006646 012701 010352      1$:      MOV      #FDAT10,R1      ;MAKE SURE THE SOURCE DATA WAS
2365 006652 012702 010416      MOV      #FXDAT0,R2      ;NOT AFFECTED.
2366 006656 012703 000010      MOV      #10,R3
2367 006662 022122      2$:      CMP      (R1)+,(R2)+
2368 006664 001402      BEQ      3$
2369 006666 000137 007144      JMP      FERRO
2370 006672 077305      3$:      SOB      R3,2$
2371
2372 006674 170201      STFPS   R1              ;MAKE SURE THE FPS IS CORRECT.
2373 006676 022701 000200      CMP      #200,R1
2374 006702 001402      BEQ      F6
```

2375	006704	000137	010016		JMP	FERR11	
2376							
2377	006710			F6:			
	006710	012737	006716	001110	MOV	#1\$, \$LPERR	:SET UP THE LOOP ON ERROR ADDRESS.
2378	006716	012737	006760	001236	1\$:	MOV	#F10, \$TMP2
2379							
2380	006724	012703	177777		MOV	#-1, R3	
2381	006730	012704	000010		MOV	#10, R4	
2382	006734	012705	010374		MOV	#FDAT00, R5	:SET UP THE OUTPUT DATA BUFFER.
2383	006740	010325		F7:	MOV	R3, (R5)+	
2384	006742	077402			SOB	R4, F7	
2385							
2386	006744	012700	010404		MOV	#FDAT04, R0	:SET UP R0 FOR DST MODE 1 REG 0.
2387	006750	012737	010204	000004	MOV	#FERR25, ERRVECT	:IF THE DST FLOWS FAIL AN ODD :ADDRESS COULD OCCUR.
2388							
2389	006756	005003			CLR	R3	
2390							
2391	006760	174010		F10:	STD	AC0, (R0)	:TEST INSTRUCTION.
2392	006762	005203		F11:	INC	R3	
2393	006764	005203			INC	R3	
2394							
2395	006766	020027	010404		CMP	R0, #FDAT04	:WAS R0 MODIFIED?
2396	006772	001402			BEQ	F12	
2397	006774	000137	007340		JMP	FERR3	
2398							
2399	007000	020327	000002	F12:	CMP	R3, #2	:WAS THE PC AFFECTED CORRECTLY?
2400	007004	001402			BEQ	F135	
2401	007006	000137	007332		JMP	FERR4	
2402							
2403	007012	012701	010374	F135:	MOV	#FDAT00, R1	
2404	007016	012707	010416		MOV	#FXDAT0, R2	
2405							
2406	007022	022122			CMP	(R1)+, (R2)+	:SEE IF THE DATA WAS OUTPUT
2407	007024	001402			BEQ	F13	:TO THE TARGET AREA CORRECTLY.
2408	007026	000137	007436		JMP	FERR5	
2409							
2410	007032	022122		F13:	CMP	(R1)+, (R2)+	
2411	007034	001402			BEQ	F14	
2412	007036	000137	007436		JMP	FERR5	
2413							
2414	007042	022122		F14:	CMP	(R1)+, (R2)+	
2415	007044	001402			BEQ	F15	
2416	007046	000137	007436		JMP	FERR5	
2417							
2418	007052	022122		F15:	CMP	(R1)+, (R2)+	
2419	007054	001402			BEQ	F16	
2420	007056	000137	007436		JMP	FERR5	
2421							
2422	007062	022122		F16:	CMP	(R1)+, (R2)+	
2423	007064	001402			BEQ	F17	
2424	007066	000137	007762		JMP	FERR10	
2425							
2426	007072	022122		F17:	CMP	(R1)+, (R2)+	
2427	007074	001402			BEQ	F20	
2428	007076	000137	007472		JMP	FERR6	
2429							
2430	007102	022122		F20:	CMP	(R1)+, (R2)+	

2431	007104	001402				BEQ	F21		
2432	007106	000137	007026			JMP	FERR7		
2433									
2434	007112	022122			F21:	CMP	(R1)+,(R2)+		
2435	007114	001402				BEQ	F22		
2436	007116	000137	007762			JMP	FERR10		
2437									
2438	007122	005001			F22:	CLR	R1		
2439	007124	170201				STFPS	R1		:MAKE SURE FPS IS CORRECT.
2440	007126	022701	000200			CMP	#200,R1		
2441	007132	001402				BEQ	F23		
2442	007134	000137	010016			JMP	FERR11		
2443	007140	000137	010436		F23:	JMP	FDONE		
2444									
2445	007144				FERR0:				:SOURCE DATA AFFECTED BY
2446	007144	012737	010416	001240		MOV	#FXDAT0,\$TMP3		:THE LDD INSTRUCTION.
2447	007152	012737	010430	001242		MOV	#FXDAT0+12,\$TMP4		
2448	007160	012737	010352	001244		MOV	#FDAT10,\$TMP5		
2449	007166	012737	010364	001246		MOV	#FDAT10+12,\$TMP6		
2450	007174	104025			1\$:	ERROR	+25		
2451	007176	000137	010436			JMP	FDONE		
2452									
2453	007202	012737	010362	001242	FERR1:	MOV	#FDAT14,\$TMP4		:FSRC FLOWS FAILURE.
2454	007210	010037	001240			MOV	R0,\$TMP3		
2455	007214	012737	000762	001244		MOV	#762,\$TMP5		
2456	007222	012737	000321	001250		MOV	#321,\$TMP7		
2457									
2458	007230	022700	010352			CMP	#FDAT10,R0		:FSRC MODE 4?
2459	007234	001004				BNE	1\$		
2460	007236	012737	000324	001246		MOV	#324,\$TMP6		
2461	007244	000412				BR	4\$		
2462									
2463	007246	022700	010372		1\$:	CMP	#FDAT14+10,R0		:FSRC MODE 2?
2464	007252	001004				BNE	2\$		
2465	007254	012737	000322	001246		MOV	#322,\$TMP6		
2466	007262	000403				BR	4\$		
2467									
2468	007264				2\$:				
2469	007264	104027			3\$:	ERROR	+27		
2470	007266	000137	010436			JMP	FDONE		
2471									
2472	007272				4\$:				
2473	007272	104026			5\$:	ERFOR	+26		
2474	007274	000137	010436			JMP	FDONE		
2475									
2476	007300	012701	006616		FERR2:	MOV	#F4,R1		:THE PC WAS INCORRECTLY AFFECTED
2477									:DURING THE INSTRUCTION.
2478	007304	010137	001242		FER2:	MOV	R1,\$TMP4		
2479	007310	162701	000004			SUB	#4,R1		
2480	007314	006303				ASL	R3		
2481	007316	060301				ADD	R3,R1		
2482	007320	010137	001240			MOV	R1,\$TMP3		
2483	007324	104030			1\$:	ERROR	+30		
2484	007326	000137	010436			JMP	FDONE		
2485									
2486	007332	012701	006762		FERR4:	MOV	#F11,R1		
2487	007336	000762				BR	FER2		


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2488
2489 007340 012737 010404 001242 FERR3: MOV #FDAT04,$TMP4 ;FAILURE IN THE FDST FLOWS.
2490 007346 010037 001240 MOV R0,$TMP3
2491 007352 012737 000527 001244 MOV #527,$TMP5
2492 007360 012737 000641 001250 MOV #641,$TMP7
2493
2494 007366 022700 010374 CMP #FDAT00,R0 ;DST MODE 4?
2495 007372 001004 BNE 1$
2496 007374 012737 000644 001246 MOV #644,$TMP6
2497 007402 000412 BR 4$
2498
2499 007404 022700 010414 1$: CMP #FDAT04+10,R0 ;DST MODE 2?
2500 007410 001004 BNE 2$
2501 007412 012737 000642 001246 MOV #642,$TMP6
2502 007420 000403 BR 4$
2503
2504 007422 2$:
2505 007422 104032 3$: ERROR +32
2506 007424 000137 010436 JMP FDONE
2507
2508 007430 4$:
2509 007430 104031 5$: ERROR +31
2510 007432 000137 010436 JMP FDONE
2511
2512 007436 FERR5: ;FAILURE OF STD.
2513 007436 010037 001240 MOV R0,$TMP3
2514 007442 012737 010374 001242 MOV #FDAT00,$TMP4
2515 007450 012737 010412 001244 MOV #FDAT07,$TMP5
2516 007456 012737 010416 001246 MOV #FXDAT0,$TMP6
2517 007464 104033 1$: ERROR +33
2518 007466 000137 010436 JMP FDONE
2519
2520 007472 012701 010406 FERR6: MOV #FDAT05,R1 ;DID (BUT GR7) FAIL IN THE FDST
2521 007476 012702 177777 MOV #-1,R2 ;FLOWS?
2522 007502 012703 000003 MOV #3,R3
2523 007506 020221 1$: CMP R2,(R1)+
2524 007510 001017 BNE 5$
2525 007512 077303 SOB R3,1$
2526
2527 ;REPORT FAILURE OF (BUT GR7) IN
2528 007514 010037 001240 MOV R0,$TMP3 ;THE FDST FLOWS.
2529 007520 012737 000412 001244 MOV #412,$TMP5
2530 007526 012737 000147 001246 MOV #147,$TMP6
2531 007534 012737 000145 001250 MOV #145,$TMP7
2532 007542 104034 2$: ERROR +34
2533 007544 000137 010436 JMP FDONE
2534
2535 007550 012701 010406 5$: MOV #FDAT05,R1 ;DID (BUT GR7) FAIL IN THE SRC FLOWS?
2536 007554 012703 000003 MOV #3,R3
2537 007560 005721 6$: TST (R1)+
2538 007562 001402 BEQ 7$
2539 007564 000137 007762 JMP FERR10
2540 007570 077305 7$: SOB R3,6$
2541
2542 ;REPORT FAILURE OF (BUT GR7) IN
2543 007572 010037 001240 MOV R0,$TMP3 ;THE FSRC FLOWS.
2544 007576 012737 000207 001244 MOV #207,$TMP5
    
```


2602	010076	021627	006620		CMP	(SP),#F4+2				
2603	010102	001424			BEQ	FERR21				:SEE IF FSRC MODE 6 OR 7 WAS :EXECUTED.
2604										
2605	010104	020027	010360		CMP	R0,#FDAT13				:FSRC MODE 5?
2606	010110	001006			BNE	2\$				
2607										
2608										:REPORT FSRC FLOW FAILURE TO :MODE 5.
2609	010112	012737	000325	001246	MOV	#325,\$TMP6				
2610	010120	022626			CMP	(SP)+,(SP)+				
2611	010122	104042			1\$:	ERROR	+42			
2612	010124	000544			BR	FDONE				
2613										
2614	010126	020027	010364		2\$:	CMP	R0,#FDAT15			:FSRC MODE 3?
2615	010132	001402			BEQ	3\$				
2616	010134	000137	042566		JMP	CPSPUR				
2617										
2618	010140				3\$:					:REPORT FSRC FLOW FAILURE TO :MODE 3.
2619	010140	012737	000323	001246	MOV	#323,\$TMP6				
2620	010146	022626			CMP	(SP)+,(SP)+				
2621	010150	104042			4\$:	ERROR	+42			
2622	010152	000531			BR	FDONE				
2623										
2624	010154	022626			FERR21:	CMP	(SP)+,(SP)+			:REPORT FSRC FLOW FAILURE TO :MODE 6 OR MODE 7.
2625										
2626	010156	012737	044503	001264	MOV	#MS16,\$TMP15				
2627	010164	012737	000326	001246	MOV	#326,\$TMP6				
2628	010172	012737	000327	001252	MOV	#327,\$TMP10				
2629	010200	104042			1\$:	ERROR	+42			
2630	010202	000515			BR	FDONE				
2631										
2632	010204	012737	042737	001264	FERR25:	MOV	#NULL,\$TMP15			:THE EXECUTION OF THE STD INSTRUCTION :TRAPPED TO 4, BECAUSE A FAILURE :IN THE FDST FLOWS RESULTED :IN AN ODD ADDRESS.
2633	010212	005037	001252		CLR	\$TMP10				
2634	010216	012737	010404	001240	MOV	#FDAT04,\$TMP3				
2635	010224	011637	001236		MOV	(SP),\$TMP2				
2636	010230	012737	000527	001244	MOV	#527,\$TMP5				
2637	010236	012737	000641	001250	MOV	#641,\$TMP7				
2638										
2639	010244	021627	006762		CMP	(SP),#F10+2				:FLOW FAILURE TO FDST MODE 6 OR 7?
2640	010250	001424			BEQ	FERR26				
2641										
2642	010252	020027	010402		CMP	R0,#FDAT03				:DID FDST FLOW FAIL TO MODE 5?
2643	010256	001006			BNE	2\$				
2644										
2645										:REPORT FLOW FAILURE TO FDST :MODE 5.
2646	010260	012737	000645	001246	MOV	#645,\$TMP6				
2647	010266	022626			CMP	(SP)+,(SP)+				
2648	010270	104043			1\$:	ERROR	+43			
2649	010272	000461			BR	FDONE				
2650										
2651	010274	020027	010406		2\$:	CMP	R0,#FDAT05			:DID FDST FLOW FAIL TO MODE 3?
2652	010300	001402			BEQ	3\$				
2653	010302	000137	042566		JMP	CPSPUR				
2654										
2655	010306				3\$:					:REPORT FDST FLOW FAILED TO MODE 3.
2656	010306	012737	000643	001246	MOV	#643,\$TMP6				
2657	010314	022626			CMP	(SP)+,(SP)+				
2658	010316	104043			4\$:	ERROR	+43			

```
2659 010320 000446 BR FDONE
2660
2661 010322 FERR26: ;REPORT FDST FLOW FAILURE TO MODE
2662 010322 012737 044503 001264 MOV #MS16,$TMP15 ;6 OR MODE 7.
2663 010330 012737 000646 001246 MOV #646,$TMP6
2664 010336 012737 000647 001252 MOV #647,$TMP10
2665 010344 022626 CMP (SP)+,(SP)+
2666 010346 104043 1$: ERROR +43
2667 010350 000432 BR FDONE
2668
2669 010352 177777 FDATA0: -1
2670 010354 177777 FDATA1: -1
2671 010356 177777 FDATA2: -1
2672 010360 177777 FDATA3: -1
2673 010362 177777 FDATA4: -1
2674 010364 177777 FDATA5: -1
2675 010366 177777 FDATA6: -1
2676 010370 177777 FDATA7: -1
2677 010372 177777 -1
2678 010374 177777 FDATA0: -1
2679 010376 177777 FDATA1: -1
2680 010400 177777 FDATA2: -1
2681 010402 177777 FDATA3: -1
2682 010404 177777 FDATA4: -1
2683 010406 177777 FDATA5: -1
2684 010410 177777 FDATA6: -1
2685 010412 177777 FDATA7: -1
2686 010414 177777 -1
2687 010416 177777 FXDATA0: -1
2688 010420 177777 FXDATA1: -1
2689 010422 177777 FXDATA2: -1
2690 010424 177777 FXDATA3: -1
2691 010426 052525 FXDATA4: 052525
2692 010430 031463 FXDATA5: 031463
2693 010432 007417 FXDATA6: 007417
2694 010434 000477 FXDATA7: 000477
2695
2696
2697 010436 FDONE: ;GO INITIALIZE THE FPS AND STACK; AND
010436 104413 RSETUP ;SEE IF THE USER HAS EXPRESSED
;THE DESIRE TO CHANGE THE SOFTWARE
;VIRTUAL CONSOLE SWITCH REGISTER (HAS
;THE USER TYPED CONTROL G?).
2698
2699
```

2705

```

2706 010440 000004
2707 010442 012737 010450 001110
2708 010450
2709 010450 170011
2710 010452 012700 011300
2711 010456 012701 011250
2712 010462 012702 000004
2713 010466 012120
2714 010470 077202
2715
2716 010472 012700 011300
2717 010476 172510
2718
2719 010500 012700 011260
2720 010504 172410
2721
2722 010506 012701 000001
2723 010512 012737 011050 000004
2724 010520 012737 010534 001236
2725 010526 012737 045163 001240
2726 010534 172401
2727 010536 000240
2728 010540 000240
2729
2730 010542 012700 011270
2731 010546 174010
2732
2733 010550 012700 011270
2734 010554 012701 011300
2735 010560 012702 000004
2736 010564 022021
2737 010566 001424
2738
2739 010570 012700 011274
2740 010574 012702 000002
2741 010600 005720
2742 010602 001413
2743
2744 010604 012700 011274
2745 010610 012702 000002
2746 010614 022720 177777
2747 010620 001402
2748 010622 000137 011132
2749 010626 077206
2750 010630 000401
2751 010632 077216
2752 010634 000137 011152
2753
2754 010640 077227
  
```

```

.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.
*
*****
TST7: SCOPE
MOV #I1,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.

I1: SETD ;SET FD.
MOV #IDATIO,R0
MOV #IPATIO,R1
MOV #4,R2
I2: MOV (R1)+,(R0)+ ;SET UP THE INPUT DATA BUFFER.
SOB R2,I2

MOV #IDATIO,R0 ;LOAD AC1
LDD (R0),AC1

MOV #IPATIO,R0 ;LOAD ACO
LDD (R0),ACO

MOV #1,R1 ;IN CASE THE FSRC FLOWS FAIL
MOV #IERR0,ERRVECT ;AN ODD ADDRESS TRAP TO 4 MAY OCCUR.
MOV #I3,$TMP2
MOV #MS35,$TMP3

I3: LDD AC1,ACO ;TEST INSTRUCTION.
I4: NOP
I5: NOP

MOV #IDATIO,R0
STD ACO,(R0) ;GET ACO, THE RESULTS.

MOV #IDATIO,R0 ;SEE IF DATA IS CORRECT.
MOV #IDATIO,R1
MOV #4,R2
I6: CMP (R0)+,(R1)+
BEQ I105

MOV #IDATIO,R0 ;SEE IF (BUT FD) FAILED.
MOV #2,R2
I7: TST (R0)+
BEQ I10

MOV #IDATIO,R0
MOV #2,R2
I8: CMP #-1,(R0)+
BEQ 2$
JMP IERR1
I9: SOB R2,I9
BR I106

I10: SOB R2,I7
I106: JMP IERR2

I105: SOB R2,I6
  
```

```

2755
2756 ;NOW TEST THE LOAD INSTRUCTION WITH FSRC MODE ZERO AND FD CLEAR.
2757
2758 010642 012737 010650 001110 I11: MOV #I12,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
      010642 012700 011250 I12: MOV #IPAT10,R0
2759 010650 012700 011250 I12: MOV #IDATIO,R1
2760 010654 012701 011300 I12: MOV #4,R2
2761 010660 012702 000004 I12: MOV (R0)+,(R1)+
2762 010664 012021 I13: SOB R2,I13
2763 010666 077202
2764
2765 010670 012700 011300 MOV #IDATIO,R0 ;SET UP AC1
2766 010674 172510 LDD (R0),AC1
2767
2768 010676 012700 011260 MOV #IPAT20,R0 ;SET UP AC0
2769 010702 172410 LDD (R0),AC0
2770
2771 010704 012701 000001 MOV #1,R1
2772 010710 012737 010726 001236 MOV #I14,$TMP2
2773 010716 012737 045170 001240 MOV #MS36,$TMP3
2774 010724 170001 SETF ;CLEAR FD.
2775
2776 010726 172401 I14: LDF AC1,AC0 ;TEST INSTRUCTION.
2777 010730 000240 I15: NOP
2778 010732 000240 I16: NOP
2779
2780 010734 170200 STFPS R0 ;SEE IF FPS IS STILL CLEAR.
2781 010736 022700 000004 CMP #4,R0
2782 010742 001402 BEQ I17
2783 010744 000137 011224 JMP IERR3
2784
2785 010750 I17: ;RESET TO DOUBLE MODE.
2786 010750 170011 SETD
2787
2788 010752 012700 011270 MOV #IDATIO,R0
2789 010756 174010 STD AC0,(R0) ;GET AC0
2790
2791 010760 012737 177777 011304 MOV #-1,IDAT12
2792 010766 012737 177777 011306 MOV #-1,IDAT13
2793 010774 012700 011270 MOV #IDATIO,R0
2794 011000 012701 011300 MOV #IDATIO,R1
2795 011004 012702 000004 MOV #4,R2
2796 011010 022021 I20: CMF (R0)+,(R1)+ ;SEE IF AC0 WAS CORRECT.
2797 011012 001414 BEQ I23
2798
2799 011014 023737 011274 011254 CMP IDATIO2,IPAT12 ;DID (BUT FD) FAIL?
2800 011022 001402 BEQ I22
2801 011024 000137 011132 I21: JMP IERR1
2802 011030 023737 011276 011256 I22: CMP IDATIO3,IPAT13
2803 011036 001372 BNE I21
2804 011040 000137 011200 JMP IERR4
2805
2806 011044 077217 I23: SOB R2,I20
2807
2808 011046 000520 BR IDONE ;NO ERRORS.
2809
2810 ;IF AN ODD ADDRESS TRAP OCCURS COME HERE TO ANALYZE THE FSRC FAILURE.

```



```

2811 011050 022716 010536 ;ERR0: CMP #14,(SP) ;MAKE SURE THE TRAP OCCURRED
2812 011054 001413 BEQ 1$ ;ON THE INSTRUCTION BEING TESTED.
2813 011056 022716 010540 CMP #15,(SP)
2814 011062 001410 BEQ 1$
2815 011064 022716 010730 CMP #115,(SP)
2816 011070 001405 BEQ 1$
2817 011072 022716 010732 CMP #116,(SP)
2818 011076 001402 BEQ 1$
2819 011100 000137 042566 JMP CPSPUR
2820
2821 011104 011637 001236 1$: MOV (SP), $TMP2 ;REPORT FAILURE.
2822 011110 012737 000627 001240 MOV #627, $TMP3
2823 011116 012737 000320 001242 MOV #320, $TMP4
2824 011124 022626 CMP (SP)+, (SP)+
2825 011126 104047 2$: ERROR +47
2826 011130 000467 BR IDONE
2827
2828 ;REPORT DATA ERROR.
2829 011132 IERR1:
2830 011132 012737 011300 001242 MOV #IDATIO, $TMP4
2831 011140 012737 011270 001244 MOV #IDAT00, $TMP5
2832 011146 104051 1$: ERROR +51
2833 011150 000457 BR IDONE
2834
2835 ;REPORT FAILURE OF (BUT FD)
2836 011152 012737 000153 001244 IERR2: MOV #153, $TMP5
2837 011160 012737 000434 001246 MOV #434, $TMP6
2838 011166 012737 000435 001250 MOV #435, $TMP7
2839 011174
2840 011174 104050 IERR25:
2841 011176 000444 1$: ERROR +50
2842 011200 012737 000153 001244 IERR4: BR IDONE
2843 011206 012737 000435 001246 MOV #153, $TMP5
2844 011214 012737 000434 001250 MOV #435, $TMP6
2845 011222 000764 MOV #434, $TMP7
2846 BR IERR25
2847
2848 ;REPORT INCORRECT FPS AFTER LOAD INSTRUCTION.
2849 011224 IERR3:
2850 011232 010037 001240 MOV #114, $TMP2
2851 011236 012737 000004 001242 MOV R0, $TMP3
2852 011244 104041 1$: MOV #4, $TMP4
2853 011246 000420 BR IDONE
2854
2855
2856 011250 000000 IPAT10: 0
2857 011252 170360 IPAT11: 170360
2858 011254 016161 IPAT12: 016161
2859 011256 052525 IPAT13: 052525
2860
2861 011260 177777 IPAT20: -1
2862 011262 177777 IPAT21: -1
2863 011264 177777 IPAT22: -1
2864 011266 177777 IPAT23: -1
2865
2866 011270 000000 IDAT00: 0
2867 011272 000000 IDAT01: 0
    
```

2868 011274 000000
2869 011276 000000
2870
2871 011300 000000
2872 011302 000000
2873 011304 000000
2874 011306 000000
2875
2876 011310
011310 1.04413

IDAT02: 0
IDAT03: 0

IDAT10: 0
IDAT11: 0
IDAT12: 0
IDAT13: 0

IDONE: 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?).

2377
2883

2884

```
.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.
:
*****
```

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

```

2932 011510 012702 000004          MOV    #4,R2
2933 011514 012021          T13:  MOV    (R0)+,(R1)+
2934 011516 077202          SOB    R2,T13
2935
2936 011520 012700 012116          MOV    #TDAT10,R0          ;SET UP AC0
2937 011524 172410          LDD    (R0),AC0
2938
2939 011526 012700 012076          MOV    #TPAT20,R0          ;SET UP AC1
2940 011532 172510          LDD    (R0),AC1
2941
2942 011534 012701 000001          MOV    #1,R1
2943 011540 012737 011556 001236          MOV    #T14,$TMP2
2944 011546 012737 045170 001240          MOV    #MS36,$TMP3
2945 011554 170001          SETF
2946 011556 174001          T14:  STF    AC0,AC1          ;CLEAR FD
2947 011560 000240          T15:  NOP
2948 011562 000240          T16:  NOP
2949
2950 011564 005000          CLR    R0
2951 011566 170200          STFPS R0          ;SEE IF FPS IS CLEAR.
2952 011570 022700 000010          CMP    #10,R0
2953 011574 001401          BEQ   T17
2954 011576 000521          BR    TERR3
2955
2956 011600          T17:  SETD
2957 011600 170011          ;SET FD.
2958
2959 011602 012700 012106          MOV    #TDAT00,R0
2960 011606 174110          STD    AC1,(R0)          ;PICK UP AC1.
2961
2962 011610 012737 177777 012122          MOV    #-1,TDAT12
2963 011616 012737 177777 012124          MOV    #-1,TDAT13
2964 011624 012703 012106          MOV    #TDAT00,R3
2965 011630 012704 012116          MOV    #TDAT10,R4
2966 011634 012705 000004          MOV    #4,R5
2967 011640 022324          T20:  CMP    (R3)+,(R4)+          ;WAS THE DATA TRANSFERRED CORRECTLY?
2968 011642 001412          BEQ   T23
2969
2970 011644 023737 012112 012072          CMP    TDAT02,TPAT12          ;DID (BUT FD) FAIL.
2971 011652 001401          BEQ   T22
2972 011654 000440          BR    TERR1
2973 011656 023737 012114 012074          T21:  CMP    TDAT03,TPAT13
2974 011664 001373          T22:  BNE   T21
2975 011666 000456          BR    TERR4
2976
2977 011670 077515          T23:  SOB   R5,T20
2978 011672 000515          BR    TDONE
2979
2980
2981          ;TRAP HERE THROUGH VECTOR 4 IF AN ODD ADDRESS OCCURS.
2982 011674 022716 011410          TERROR: CMP    #T4,(SP)          ;MAKE SURE THE TRAP WAS ON
2983 011700 001413          BEQ   1$          ;AN INSTRUCTION BEING TESTED.
2984 011702 022716 011412          CMP    #T5,(SP)
2985 011706 001410          BEQ   1$
2986 011710 022716 011560          CMP    #T15,(SP)
2987 011714 001405          BEQ   1$
2988 011716 022716 011562          CMP    #T16,(SP)
    
```

```

2989 011722 001402          BEQ      1$
2990 011724 000137 042566    JMP      (PSPUR)
2991
2992 011730 011637 001236    1$:     MOV      (SP), $TMP2
2993 011734 022626          CMP      (SP)+, (SP)+
2994 011736 012737 000527 001240    MOV      #527, $TMP3
2995 011744 012737 000640 001242    MOV      #640, $TMP4
2996 011752 104121          2$:     ERROR   +121
2997 011754 000464          BR       TDONE
2998
2999          ;REPORT DATA FAILURE.
3000 011756          TERR1:
3001 011756 012737 012116 001242    MOV      #TDAT10, $TMP4
3002 011764 012737 012106 001244    MOV      #TDAT00, $TMP5
3003 011772 104123          1$:     ERROR   +123
3004 011774 000454          BR       TDONE
3005
3006          ;REPORT FAILURE OF (BUT FD).
3007 011776 012737 000160 001246    TERR2:  MOV      #160, $TMP6
3008 012004 012737 000161 001250    MOV      #161, $TMP7
3009 012012 012737 000640 001244    TERR25: MOV      #640, $TMP5
3010 012020 104122          1$:     ERROR   +122
3011 012022 000441          BR       TDONE
3012 012024 012737 000161 001246    TERR4:  MOV      #161, $TMP6
3013 012032 012737 000160 001250    MOV      #160, $TMP7
3014 012040 000764          BR       TERR25
3015
3016          ;REPORT INCORRECT FPS AFTER STORE INSTRUCTION.
3017 012042          TERR3:
3018 012042 012737 011560 001236    MOV      #T15, $TMP2
3019 012050 010037 001240    MOV      R0, $TMP3
3020 012054 012737 000010 001242    MOV      #10, $TMP4
3021 012062 104041          1$:     ERROR   +41
3022 012064 000420          BR       TDONE
3023
3024 012066 000000          TPAT10: 0
3025 012070 170360          TPAT11: 170360
3026 012072 016161          TPAT12: 016161
3027 012074 052525          TPAT13: 052525
3028
3029 012076 177777          TPAT20: -1
3030 012100 177777          TPAT21: -1
3031 012102 177777          TPAT22: -1
3032 012104 177777          TPAT23: -1
3033
3034 012106 000000          TDAT00: 0
3035 012110 000000          TDAT01: 0
3036 012112 000000          TDAT02: 0
3037 012114 000000          TDAT03: 0
3038
3039 012116 000000          TDAT10: 0
3040 012120 000000          TDAT11: 0
3041 012122 000000          TDAT12: 0
3042 012124 000000          TDAT13: 0
3043
3044 012126          TDONE:
      012126 104413          RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
  
```

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

3045
3046
3:79

3180

```
.SBTTL TEST # 11 - ACCUMULATORS DATA PATTERNS TEST
:*****
:TEST 11 ACCUMULATORS DATA PATTERNS TEST
:
:*THIS IS A TEST OF THE FLOATING POINT PROCESSOR ACCUMULATORS.
:*EACH ACCUMULATOR IS TESTED IN TWO WAYS:
:* 1 TEST PATTERN GENERATED BY FLOATING A ONE ACROSS
:* A FIELD OF ZEROES.
:* 2 TEST PATTERN GENERATED BY FLOATING A ZERO ACROSS
:* A FIELD OF ONES.
:*EACH OF ACCUMULATORS AC0 THROUGH AC5 IS TESTED.
:
:*NOTE THAT THIS TEST KEEPS A DYNAMIC RECORD OF THE LOGICAL 'AND' AND 'OR'
:*OF THE FAILING DATA PATTERNS. THESE CAN BE VERY USEFUL IN DETERMINING
:*STUCK BITS. IF THE USER HAS THE INHIBIT ERROR TYPE OUT SWITCH (SWR13)
:*OFF, THEN THE USER WILL RECIEVE EACH INDIVIDUAL ERROR MESSAGE PLUS
:*AN ERROR SUMMARY AT THE END OF THE TEST. INHIBITING ERROR PRINT OUT
:*WILL INHIBIT ERROR SUMMARY PRINT OUT, EXCEPT IN THE CASE DESCRIBED BELOW.
:*TO GET JUST THE ERROR SUMMARY WITH NO INDIVIDUAL ERROR REPORTS,
:*SET SWITCH REGISTER BIT13 AND SWITCH REGISTER BIT7 BOTH ON.
:
:*
:*THE FOLLOWING PROCEDURE IS PRESENTED TO AID THE TROUBLE
:*SHOOTER IN SITUATIONS WHERE AM2901 CHIP ISOLATION IS ATTEMPTED.
:
:*WARNING: THIS PROCEDURE ASSUMES THAT THE FAULT IS IN ONE OF THE
:*AM2901 CHIPS. THIS ASSUMPTION IS NOT NECESSARILY VALID IN ALL
:*SITUATIONS. IT REMAINS TO BE SEEN WHAT NUMBER OF FAILURES CAN
:*PROBABLILISTICALLY ASSOCIATED WITH THEM. NOTE ALSO THAT THIS
:*INFORMATION SHOULD NOT BE TAKEN AS ABSOLUTE, THAT IS
:*THIS INFORMATION IS THE AUTHOR'S SUGGESTION FOR ACHIEVING ISOLATION
:*WHEN CHIP LEVEL REPAIR IS NECESSARY.
:
:*WHEN THIS TEST HAS FINISHED RUNNING, IF ERRORS HAVE OCCURRED,
:*AN ERROR SUMMARY WILL BE TYPED. THUS SUMMARY WILL CONSIST OF TWO
:*IMPORTANT QUANTITIES:
:* A. FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'AND' ('*')
:* OF THE FAILING DATA PATTERNS.
:* B. FOUR SIXTEEN BIT NUMBERS LABELED THE LOGICAL 'OR' ('+')
:* OF THE FAILING DATA PATTERNS.
:
:*A BIT STUCK HIGH IN THE HARDWARE WILL SHOW UP AS A 0 IN THAT
:*BIT POSITION OF THE 'OR' OF THE FAILING DATA PATTERNS.
:
:*A BIT STUCK LOW IN THE HARDWARE WILL SHOW UP AS A 1 IN THAT BIT
:*POSITION OF THE 'AND' OF THE FAILING DATA PATTERNS.
:
:*THUS IF A FAILURE OCCURS:
:* A. STUCK HIGHS WILL SHOW AS 0'S IN THE 'OR' PATTERN.
:* B. STUCK LOWS WILL SHOW AS 1'S IN THE 'AND' PATTERN.
:*IF THE FAILURE IS INTERMITENT THEN THIS PROCEDURE WILL STILL APPLY.
:*IF THE FAILURE MOVES FROM ONE BIT TO ANOTHER, OR FROM ONE
:*GROUP OF BITS TO ANOTHER GROUP OF BITS THEN THE FAULT WILL
:*PROBABLY NOT SHOW UP IN THE 'AND' OR THE 'OR' PATTERNS; IN THIS
:*CASE THE 'AND' PATTERN WILL BE ALL 0'S AND THE 'OR' PATTERN WILL
:*BE ALL 1'S. WHEN THIS OCCURS SOME OTHER METHOD OF REPAIR MUST
:*BE FOUND (SUCH AS INSPECTION OF EACH INDIVIDUAL ERROR REPORT
```

*RATHER THAN USING THE SUMMARY).
*MAP THE FOLLOWING NOTATION ONTO EACH BIT POSITION IN THE 'AND'
*AND THE 'OR' PATTERNS WHICH ARE TYPED IN THE ERROR SUMMARY.
*A15,A14,...A1,A0 B15,B14,...B1,B0 C15,C14,...C1,C0 D15,D14,...D1,D0
*IN THIS NOTATION A15 THROUGH A0 IS THE FIRST OF THE FOUR 16 BIT
*OCTAL NUMBERS TYPED, B15 THROUGH B0 IS THE SECOND, ETC.
*THIS TABLE SHOWS THE CORRESPONDING AM2901 CHIP ('E' NUMBER)
*WHICH IS RESPONSIBLE FOR EACH BIT POSITION USING THE ABOVE
*NOTATION. NOTE THAT ECO'S TO THE HARDWARE MIGHT MAKE THIS
*TABLE OBSOLETE IF IT IS NOT UPDATED. NOTE ALSO THAT THERE ARE
*FOUR BITS FOR EACH AM2901 CHIP:

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

*NOW FIVE IMPORTANT CASES WHICH WILL ARISE WHEN A FAULTY
*AM2901 IS PRESENT CAN BE 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.

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3181 012130 000004
3182 012132 170011
012134 012737 044535 001244
012142 012737 012176 001236
012150 012700 015136
012154 012701 015176
012160 012737 012176 001110
012166 004737 014270
012172 012703 000102
012176 172410
012200 174000
012202 172400
012204 174011
012206 004737 014366
012212 005737 015132
012216 001004
012220 005137 015132
012224 000261
012226 000401
012230 000241
012232 006160 000006
012236 006160 000004
012242 006160 000002
012246 006110
012250 004737 014346

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*****
TST11: SCOPE
        SETD                                ;SET FD.
        ;TEST ACCUMULATOR 0 WITH FLOATING ONE
        MOV #MMUM0,$TMP5
        MOV #G1,$TMP2
        MOV #GPAT00,R0
        MOV #GDAT00,R1
        MOV #G1,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
        JSR PC,GSETUP ;LOAD TEST PATTERN.
        MOV #102,R3
G1:     LDD (R0),ACO
        STD ACO,ACO
        LDD ACO,ACO ;STORE THE TEST PATTERN.
        STC ACO,(R1)
        JSR PC,GCMP ;COMPARE THE DATA READ WITH
                   ;THAT WHICH WAS WRITTEN.
        TST GFLAG1
        BNE G2
        COM GFLAG1
        SEC
        BR G3
G2:     CLC
G3:     ROL 6(R0) ;GENERATE THE NEXT TEST PATTERN.
        ROL 4(R0)
        ROL 2(R0)
        ROL (R0)
        JSR PC,GRESET ;RESET DEFAULT PATTERN IN OUTPUT
                   ;BUFFER.

```

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012254 077330 SOB R3,G1
012256 004737 014500 JSR PC,GSUM ;TYPE ERROR SUMMARY.
3183 ;TEST ACCUMULATOR 0 WITH FLOATING ZERO
012262 012737 044535 001244 MOV #MMUM0,$TMP5
012270 012737 012324 001236 MOV #G4,$TMP2
012276 012700 015146 MOV #GPAT00,R0
012302 012701 015176 MOV #GDAT00,R1
012306 012737 012324 001110 MOV #G4,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
012314 004737 014270 JSR PC,GSETUP ;LOAD TEST PATTERN.
012320 012703 000102 MOV #102,R3
012324 172410 G4: LDD (R0),AC0
012326 174000 STD AC0,AC0
012330 172400 LDD AC0,AC0 ;STORE THE TEST PATTERN.
012332 174011 STD AC0,(R1)
012334 004737 014366 JSR PC,GCMP ;COMPARE THE DATA READ WITH
;THAT WHICH WAS WRITTEN.

012340 005737 015132 TST GFLAG1
012344 001004 BNE G5
012346 005137 015132 COM GFLAG1
012352 000241 CLC
012354 000401 BR G5
012356 000261 G5: SEC
012360 006160 000006 G6: ROL 6(R0) ;GENERATE THE NEXT TEST PATTERN.
012364 006160 000004 ROL 4(R0)
012370 006160 000002 ROL 2(R0)
012374 006110 ROL (R0)
012376 004737 014346 JSR PC,GRESET ;RESET DEFAULT PATTERN IN OUTPUT
;BUFFER.

012402 077330 SOB R3,G4
012404 004737 014500 JSR PC,GSUM ;TYPE ERROR SUMMARY.
3184 ;TEST ACCUMULATOR 1 WITH FLOATING ONE
012410 012737 044543 001244 MOV #MMUM1,$TMP5
012416 012737 012452 001236 MOV #G7,$TMP2
012424 012700 015136 MOV #GPAT00,R0
012430 012701 015176 MOV #GDAT00,R1
012434 012737 012452 001110 MOV #G7,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
012442 004737 014270 JSR PC,GSETUP ;LOAD TEST PATTERN.
012446 012703 000102 MOV #102,R3
012452 172410 G7: LDD (R0),AC0
012454 174001 STD AC0,AC1
012456 172401 LDD AC1,AC0 ;STORE THE TEST PATTERN.
012460 174011 STD AC0,(R1)
012462 004737 014366 JSR PC,GCMP ;COMPARE THE DATA READ WITH
;THAT WHICH WAS WRITTEN.

012466 005737 015132 TST GFLAG1
012472 001004 BNE G10
012474 005137 015132 COM GFLAG1
012500 000261 SEC
012502 000401 BR G10
012504 000241 G10: CLC
012506 006160 000006 G11: ROL 6(R0) ;GENERATE THE NEXT TEST PATTERN.
012512 006160 000004 ROL 4(R0)
012516 006160 000002 ROL 2(R0)
012522 006110 ROL (R0)
012524 004737 014346 JSR PC,GRESET ;RESET DEFAULT PATTERN IN OUTPUT
;BUFFER.

012530 077330 SOB R3,G7

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3185 012532 004737 014500      JSR      PC,GSUM      ;TYPE ERROR SUMMARY.
      ;TEST ACCUMULATOR 1 WITH FLOATING ZERO
012536 012737 044543 001244  MOV      #MNUM1,$TMP5
012544 012737 012600 001236  MOV      #G12,$TMP2
012552 012700 015146          MOV      #GPAT10,R0
012556 012701 015176          MOV      #GDAT00,R1
012562 012737 012600 001110  MOV      #G12,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012570 004737 014270          JSR      PC,GSETUP      ;LOAD TEST PATTERN.
012574 012703 000102          MOV      #102,R3
012600 172410          G12: LDD      (R0),AC0
012602 174001          STD      AC0,AC1
012604 172401          LDD      AC1,AC0      ;STORE THE TEST PATTERN.
012606 174011          STD      AC0,(R1)
012610 004737 014366          JSR      PC,GCMP      ;COMPARE THE DATA READ WITH
      ;THAT WHICH WAS WRITTEN.

012614 005737 015132          TST      GFLAG1
012620 001004          BNE      G13
012622 005137 015132          COM      GFLAG1
012626 000241          CLC
012630 000401          BR       G14
012632 000261          G13: SEC
012634 006160 000006          G14: ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
012640 006160 000004          ROL      4(R0)
012644 006160 000002          ROL      2(R0)
012650 006110          ROL      (R0)
012652 004737 014346          JSR      PC,GRESET      ;RESET DEFAULT PATTERN IN OUTPUT
      ;BUFFER.

012656 077330          SOB      R3,G12
3186 012660 004737 014500      JSR      PC,GSUM      ;TYPE ERROR SUMMARY.
      ;TEST ACCUMULATOR 2 WITH FLOATING ONE
012664 012737 044550 001244  MOV      #MNUM2,$TMP5
012672 012737 012726 001236  MOV      #G15,$TMP2
012700 012700 015136          MOV      #GPAT00,R0
012704 012701 015176          MOV      #GDAT00,R1
012710 012737 012726 001110  MOV      #G15,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
012716 004737 014270          JSR      PC,GSETUP      ;LOAD TEST PATTERN.
012722 012703 000102          MOV      #102,R3
012726 172410          G15: LDD      (R0),AC0
012730 174002          STD      AC0,AC2
012732 172402          LDD      AC2,AC0      ;STORE THE TEST PATTERN.
012734 174011          STD      AC0,(R1)
012736 004737 014366          JSR      PC,GCMP      ;COMPARE THE DATA READ WITH
      ;THAT WHICH WAS WRITTEN.

012742 005737 015132          TST      GFLAG1
012746 001004          BNE      G16
012750 005137 015132          COM      GFLAG1
012754 000261          SEC
012756 000401          BR       G17
012760 000241          G16: CLC
012762 006160 000006          G17: ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
012766 006160 000004          ROL      4(R0)
012772 006160 000002          ROL      2(R0)
012776 006110          ROL      (R0)
013000 004737 014346          JSR      PC,GRESET      ;RESET DEFAULT PATTERN IN OUTPUT
      ;BUFFER.

013004 077330          SOB      R3,G15
013006 004737 014500      JSR      PC,GSUM      ;TYPE ERROR SUMMARY.
    
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3187

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;TEST ACCUMULATOR 2 WITH FLOATING ZERO
013012 012737 044550 001244 MOV #MNUM2,$TMP5
013020 012737 013054 001236 MOV #G20,$TMP2
013026 012700 015146 MOV #GPAT10,R0
013032 012701 015176 MOV #GDAT00,R1
013036 012737 013054 001110 MOV #G20,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
013044 004737 014270 JSR PC,GSETUP ;LOAD TEST PATTERN.
013050 012703 000102 MOV #102,R3
013054 172410 G20: LDD (R0),AC0
013056 174002 STD AC0,AC2
013060 172402 LDD AC2,AC0 ;STORE THE TEST PATTERN.
013062 174011 STD AC0,(R1)
013064 004737 014366 JSR PC,GCMP ;COMPARE THE DATA READ WITH
;THAT WHICH WAS WRITTEN.

013070 005737 015132 TST GFLAG1
013074 001004 BNE G21
013076 005137 015132 COM GFLAG1
013102 000241 CLC
013104 000401 BR G22
013106 000261 G21: SEC
013110 006160 000006 G22: ROL 6(R0) ;GENERATE THE NEXT TEST PATTERN.
013114 006160 000004 ROL 4(R0)
013120 006160 000002 ROL 2(R0)
013124 006110 ROL (R0)
013126 004737 014346 JSR PC,GRESET ;RESET DEFAULT PATTERN IN OUTPUT
;BUFFER.

013132 077330 SOB R3,G20
013134 004737 014500 JSR PC,GSUM ;TYPE ERROR SUMMARY.
    
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3188

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;TEST ACCUMULATOR 3 WITH FLOATING ONE
013140 012737 044555 001244 MOV #MNUM3,$TMP5
013146 012737 013202 001236 MOV #G23,$TMP2
013154 012700 015136 MOV #GPAT00,R0
013160 012701 015176 MOV #GDAT00,R1
013164 012737 013202 001110 MOV #G23,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
013172 004737 014270 JSR PC,GSETUP ;LOAD TEST PATTERN.
013176 012703 000102 MOV #102,R3
013202 172410 G23: LDD (R0),AC0
013204 174003 STD AC0,AC3
013206 172403 LDD AC3,AC0 ;STORE THE TEST PATTERN.
013210 174011 STD AC0,(R1)
013212 004737 014366 JSR PC,GCMP ;COMPARE THE DATA READ WITH
;THAT WHICH WAS WRITTEN.

013216 005737 015132 TST GFLAG1
013222 001004 BNE G24
013224 005137 015132 COM GFLAG1
013230 000261 SEC
013232 000401 BR G25
013234 000241 G24: CLC
013236 006160 000006 G25: ROL 6(R0) ;GENERATE THE NEXT TEST PATTERN.
013242 006160 000004 ROL 4(R0)
013246 006160 000002 ROL 2(R0)
013252 006110 ROL (R0)
013254 004737 014346 JSR PC,GRESET ;RESET DEFAULT PATTERN IN OUTPUT
;BUFFER.

013260 077330 SOB R3,G23
013262 004737 014500 JSR PC,GSUM ;TYPE ERROR SUMMARY.
    
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3189

;TEST ACCUMULATOR 3 WITH FLOATING ZERO


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013266 012737 044555 001244      MOV      #MNUM3,$TMP5
013274 012737 013330 001236      MOV      #G26,$TMP2
013302 012700 015146                MOV      #GPAT10,R0
013306 012701 015176                MOV      #GDAT00,R1
013312 012737 013330 001110      MOV      #G26,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
013320 004737 014270                JSR      PC,GSETUP        ;LOAD TEST PATTERN.
013324 012703 000102                MOV      #102,R3
013330 172410                G26:    LDD      (R0),AC0
013332 172003                STD      AC0,AC3
013334 172403                LDD      AC3,AC0          ;STORE THE TEST PATTERN.
013336 174011                STD      AC0,(R1)
013340 004737 014366                JSR      PC,GCMP          ;COMPARE THE DATA READ WITH
                                ;THAT WHICH WAS WRITTEN.

013344 005737 015132                TST      GFLAG1
013350 001004                BNE      G27
013352 005137 015132                COM      GFLAG1
013356 000241                CLC
013360 000401                BR       G30
013362 000261                G27:    SEC
013364 006160 000006                G30:    ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
013370 006160 000004                ROL      4(R0)
013374 006160 000002                ROL      2(R0)
013400 006110                ROL      (R0)
013402 004737 014346                JSR      PC,GRESET        ;RESET DEFAULT PATTERN IN OUTPUT
                                ;BUFFER.

013406 077330                SOB      R3,G26
013410 004737 014500                JSR      PC,GSUM          ;TYPE ERROR SUMMARY.
3190 ;TEST ACCUMULATOR 4 WITH FLOATING ONE
013414 012737 044564 001244      MOV      #MNUM4,$TMP5
013422 012737 013456 001236      MOV      #G31,$TMP2
013430 012700 015136                MOV      #GPAT00,R0
013434 012701 015176                MOV      #GDAT00,R1
013440 012737 013456 001110      MOV      #G31,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
013446 004737 014270                JSR      PC,GSETUP        ;LOAD TEST PATTERN.
013452 012703 000102                MOV      #102,R3
013456 172410                G31:    LDD      (R0),AC0
013460 174004                STD      AC0,AC4
013462 172404                LDD      AC4,AC0          ;STORE THE TEST PATTERN.
013464 174011                STD      AC0,(R1)
013466 004737 014366                JSR      PC,GCMP          ;COMPARE THE DATA READ WITH
                                ;THAT WHICH WAS WRITTEN.

013472 005737 015132                TST      GFLAG1
013476 001004                BNE      G32
013500 005137 015132                COM      GFLAG1
013504 000261                SEC
013506 000401                BR       G33
013510 000241                G32:    CLC
013512 006160 000006                G33:    ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
013516 006160 000004                ROL      4(R0)
013522 006160 000002                ROL      2(R0)
013526 006110                ROL      (R0)
013530 004737 014346                JSR      PC,GRESET        ;RESET DEFAULT PATTERN IN OUTPUT
                                ;BUFFER.

013534 077330                SOB      R3,G31
013536 004737 014500                JSR      PC,GSUM          ;TYPE ERROR SUMMARY.
3191 ;TEST ACCUMULATOR 4 WITH FLOATING ZERO
013542 012737 044564 001244      MOV      #MNUM4,$TMP5
    
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013550 012737 013604 001236      MOV      #G34,$TMP2
013556 012700 015146      MOV      #GPAT10,R0
013562 012701 015176      MOV      #GDAT00,R1
013566 012737 013604 001110      MOV      #G34,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
013574 004737 014270      JSR      PC,GSETUP        ;LOAD TEST PATTERN.
013600 012703 000102      MOV      #102,R3
013604 172410      G34:    LDD      (R0),AC0
013606 174004      STD      AC0,AC4
013610 172404      LDD      AC4,AC0      ;STORE THE TEST PATTERN.
013612 174011      STD      AC0,(R1)
013614 004737 014366      JSR      PC,GCMP        ;COMPARE THE DATA READ WITH
                                ;THAT WHICH WAS WRITTEN.

013620 005737 015132      TST      GFLAG1
013624 001004      BNE      G35
013626 005137 015132      COM      GFLAG1
013632 000241      CLC
013634 000401      BR       G36
013636 000261      G35:    SEC
013640 006160 000006      G36:    ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
013644 006160 000004      ROL      4(R0)
013650 006160 000002      ROL      2(R0)
013654 006110      ROL      (R0)
013656 004737 014346      JSR      PC,GRESET      ;RESET DEFAULT PATTERN IN OUTPUT
                                ;BUFFER.

013662 077330      SOB      R3,G34
013664 004737 014500      JSR      PC,GSUM        ;TYPE ERROR SUMMARY.
3192 ;TEST ACCUMULATOR 5 WITH FLOATING ONE
013670 012737 044572 001244      MOV      #MNUM5,$TMP5
013676 012737 013732 001236      MOV      #G37,$TMP2
013704 012700 015136      MOV      #GPAT00,R0
013710 012701 015176      MOV      #GDAT00,R1
013714 012737 013732 001110      MOV      #G37,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
013722 004737 014270      JSR      PC,GSETUP        ;LOAD TEST PATTERN.
013726 012703 000102      MOV      #102,R3
013732 172410      G37:    LDD      (R0),AC0
013734 174005      STD      AC0,AC5
013736 172405      LDD      AC5,AC0      ;STORE THE TEST PATTERN.
013740 174011      STD      AC0,(R1)
013742 004737 014366      JSR      PC,GCMP        ;COMPARE THE DATA READ WITH
                                ;THAT WHICH WAS WRITTEN.

013746 005737 015132      TST      GFLAG1
013752 001004      BNE      G40
013754 005137 015132      COM      GFLAG1
013760 000261      SEC
013762 000401      BR       G41
013764 000241      G40:    CLC
013766 006160 000006      G41:    ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
013772 006160 000004      ROL      4(R0)
013776 006160 000002      ROL      2(R0)
014002 006110      ROL      (R0)
014004 004737 014346      JSR      PC,GRESET      ;RESET DEFAULT PATTERN IN OUTPUT
                                ;BUFFER.

014010 077330      SOB      R3,G37
014012 004737 014500      JSR      PC,GSUM        ;TYPE ERROR SUMMARY.
3193 ;TEST ACCUMULATOR 5 WITH FLOATING ZERO
014016 012737 044572 001244      MOV      #MNUM5,$TMP5
014024 012737 014060 001236      MOV      #G42,$TMP2

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014032 012700 015146      MOV      #GPAT10,R0
014036 012701 015176      MOV      #GDAT00,R1
014042 012737 014060 001110  MOV      #G42,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
014050 004737 014270      JSR      PC,GSETUP        ;LOAD TEST PATTERN.
014054 012703 000102      MOV      #102,R3
014060 17241C      G42:    LDD      (R0),AC0
014062 174005      STD      AC0,AC5
014064 172405      LDD      AC5,AC0          ;STORE THE TEST PATTERN.
014066 174011      STD      AC0,(R1)
014070 004737 014366      JSR      PC,GCMP          ;COMPARE THE DATA READ WITH
                                ;THAT WHICH WAS WRITTEN.

014074 005737 015132      TST      GFLAG1
014100 001004      BNE      G43
014102 005137 015132      COM      GFLAG1
014106 000241      CLC
014110 000401      BR      G44
014112 000261      G43:    SEC
014114 006160 000006      G44:    ROL      6(R0)      ;GENERATE THE NEXT TEST PATTERN.
014120 006160 000004      ROL      4(R0)
014124 006160 000002      ROL      2(R0)
014130 006110      ROL      (R0)
014132 004737 014346      JSR      PC,GRESET        ;RESET DEFAULT PATTERN IN OUTPUT
                                ;BUFFER.

014136 077330      SOB      R3,G42
014140 004737 014500      JSR      PC,GSUM          ;TYPE ERROR SUMMARY.

3194
3195 014144 000137 015210      JMP      GDONE
3196
3197
3198
3199
3200
3201
3202
3203 014150      105      063      067  *****IMPORTANT*****
3204
3205 014250 170000 007400 000360  IN CASE OF AN ECO OR CHIP NUMBER CHANGE, CHANGE THE 'CHPNUM' ASCII
3206
3207 014270 012705 015132      :*****
3208 014274 012704 000026      :
3209 014300 005025      :
3210 014302 077402      :
3211
3212 014304 012705 015146      :
3213 014310 012704 000010      :
3214 014314 005125      :
3215 014316 077402      :
3216
3217 014320 020037 015136      :
3218 014324 001401      :
3219 014326 000207      :
3220
3221 014330 012705 015176      :
3222 014334 012704 000004      :
3223 014340 005125      :
3224 014342 077402      :
3225 014344 000207      :

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3226
3227 014346 012705 015176      GRESET: MOV      #GDAT00,R5
3228 014352 012704 000004      MOV      #4,R4
3229 014356 005025      1$:      CLR      (R5)+
3230 014360 077402      SOB      R4,1$
3231 014362 000137 014320      JMP      GSI
3232
3233      ;SEE IF THE DATA WRITTEN MATCHES THE DATA READ.
3234 014366 012705 015176      GCMP:    MOV      #GDAT00,R5
3235 014372 012704 000004      MOV      #4,R4
3236 014376 010002      MOV      R0,R2
3237 014400 022225      1$:      CMP      (R2)+,(R5)+
3238 014402 001402      BEQ      2$
3239 014404 000137 014414      JMP      GERR1
3240 014410 077405      2$:      SOB      R4,1$
3241 014412 000207      RTS      PC
3242
3243      ;COME HERE TO REPORT AND RECORD ERRORS.
3244 014414 012637 015206      GERR1:   MOV      (SP)+,GADR      ;SAVE THE RETURN ADDRESS.
3245 014420 010037 001240      MOV      R0,1240      ;COMPUTE 'OR' OF BAD DATA.
3246 014424 012705 015156      MOV      #GAND0,R5
3247 014430 012704 000004      MOV      #4,R4
3248 014434 051065 000010      1$:      BIS      (R0),10(R5)
3249 014440 012002      MOV      (R0)+,R2
3250 014442 005102      COM      R2
3251 014444 040225      BIC      R2,(R5)+
3252 014446 077406      SOB      R4,1$
3253 014450 013700 001240      MOV      1240,R0
3254 014454 005237 015134      INC      GFLAG2      ;INCREMENT ERROR COUNT.
3255 014460 010037 001240      MOV      R0,$TMP3
3256 014464 012737 015176 001242      MOV      #GDAT00,$TMP4
3257 014472 104044      3$:      ERROR   +44
3258 014474 000177 000506      JMP      @GADR
3259
3260      ;SEE IF ANY ERRORS HAVE OCCURRED AND WHETHER OR NOT AN ERROR SUMMARY
3261      ;SHOULD BE TYPED.
3262 014500 005737 015134      GSUM:    TST      GFLAG2      ;ANY ERRORS?
3263 014504 001410      BEQ      100$      ;BRANCH IF NOT
3264 014506 032777 020000 164424      BIT      #SW13,@SWR      ;INHIBIT ERROR PRINT OUT?
3265 014514 001405      BEQ      1$      ;BRANCH IF NOT INHIBITED
3266 014516 032777 000200 164414      BIT      #SW7,@SWR      ;PRINT SUMMARY?
3267 014524 001001      BNE      1$      ;BRANCH IF NOT
3268 014526 000207      RTS      PC      ;EXIT - NO ERRORS TO REPORT
3269 014530 013737 015134 001246      1$:      MOV      GFLAG2,$TMP6      ;YES PRINT SUMMARY.
3270 014536 012737 015156 001240      MOV      #GAND0,$TMP3
3271 014544 012737 015166 001242      MOV      #GOR0,$TMP4
3272 014552 012637 015206      MOV      (SP)+,GADR      ;SAVE RETURN ADDRESS FOR POSSIBLE LOOPING
3273 014556 012737 014572 001116      MOV      #2$,$RRPC
3274 014564 112737 000045 001114      MOV      #45,$ITEMB
3275 014572 004737 042010      2$:      JSR      PC,ERTYPE
3276 014576 010046      MOV      R0,-(SP)      ;SAVE R0
3277 014600 010146      MOV      R1,-(SP)      ;SAVE R1
3278 014602 010246      MOV      R2,-(SP)      ;SAVE R2
3279 014604 012700 014150      MOV      #CHP:JM,R0      ;MOVE ADDRESS OF CHIP NUMBER ASCII'S TO R0
3280 014610 012702 015156      MC      #GAND0,R2      ;MOVE ADDRESS OF 'AND' DATA TO R2
3281 014614 112737 000077 015124      MOV      #'?',11$      ;MOVE ASCII '?' TO NEXT 3 LOCATIONS
3282 014622 112737 000077 015125      MOV      #'?',11$+1

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3283 014630 112737 000077 015126      MOVB      #'?,11$+2
3284 014636 104401 015124      TYPE      .11$
3285 014642 012701 014250      3$:      MOV      #BITSTS,R1
3286 014646 032112      4$:      BIT      (R1)+,(R2)
3287 014650 001413      BEQ      5$
3288 014652 116037 000000 015124      MOVB      0(R0),11$+0
3289 014660 116037 000001 015125      MOVB      1(R0),11$+1
3290 014666 116037 000002 015126      MOVB      2(R0),11$+2
3291 014674 104401 015124      TYPE      .11$
3292 014700 052700 000004      5$:      ADD      #4,R0
3293 014704 022701 014260      CMP      #BITSTS+10,R1
3294 014710 001356      BNE      4$
3295 014712 062702 000002      ADD      #2,R2
3296 014716 022702 015166      CMP      #GAND0+10,R2
3297 014722 001347      BNE      3$
3298 014724 012700 014150      MOV      #CHPNUM,R0
3299 014730 012702 015166      MOV      #GORO,R2
3300 014734 011246      6$:      MOV      (R2),-(SP)
3301 014736 046116 000010      BIC      10(R1),(SP)
3302 014742 022126      CMP      (R1)+,(SP)+
3303 014744 001413      BEQ      7$
3304 014746 116037 000000 015124      MOVB      0(R0),11$
3305 014754 116037 000001 015125      MOVB      1(R0),11$+1
3306 014762 116037 000002 015126      MOVB      2(R0),11$+2
3307 014770 104401 015124      TYPE      .11$
3308 014774 062700 000004      7$:      ADD      #4,R0
3309 015000 022701 014260      CMP      #BITSTS+10,R1
3310 015004 001353      BNE      6$
3311 015006 012701 014250      MOV      #BITSTS,R1
3312 015012 062702 000002      ADD      #2,R2
3313 015016 022702 015166      CMP      #GAND0+10,R2
3314 015022 001344      BNE      6$
3315 015024 122737 000077 015124      CMPB     #'?,11$
3316 015032 001002      BNE      8$
3317 015034 104401 015124      TYPE      .11$
3318 015040 104401 001313      8$:      TYPE      .$CRLF
3319 015044 012602      MOV      (SP)+,R2
3320 015046 012601      MOV      (SP)+,R1
3321 015050 012600      MOV      (SP)+,R0
3322 015052 000177 000130      JMP      @GADR
3323 015056 000207      9$:      RTS      PC
3324
3325 015060      200      103      110      10$:      .ASCIZ <CRLF>'CHIP NUMBERS TO INITIALLY LOOK AT'<CRLF>
3326 015124      077      077      077      11$:      .ASCIZ '???'
3327
3328 015132 000000      GFLAG1: .WORD 0
3329 015134 000000      GFLAG2: .WORD 0
3330 015136 000000      GPAT00: .WORD 0
3331 015140 000000      GPAT01: .WORD 0
3332 015142 000000      GPAT02: .WORD 0
3333 015144 000000      GPAT03: .WORD 0
3334 015146 177777      GPAT10: .WORD -1
3335 015150 177777      GPAT11: .WORD -1
3336 015152 177777      GPAT12: .WORD -1
3337 015154 177777      GPAT13: .WORD -1
3338 015156 177777      GAND0:  .WORD -1
3339 015160 177777      GAND1:  .WORD -1

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3340	015162	177777	GAND2:	.WORD	-1
3341	015164	177777	GAND3:	.WORD	-1
3342	015166	000000	GOR0:	.WORD	0
3343	015170	000000	GOR1:	.WORD	0
3344	015172	000000	GOR2:	.WORD	0
3345	015174	000000	GOR3:	.WORD	0
3346	015176	000000	GDATA0:	.WORD	0
3347	015200	000000	GDATA1:	.WORD	0
3348	015202	000000	GDATA2:	.WORD	0
3349	015204	000000	GDATA3:	.WORD	0
3350	015206	000000	GADR:	.WORD	0
3351	015210		GDONE:		
	015210	104413	RSETUP		

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

3358

```
.SBTTL TEST # 12 - FPP ACCUMULATORS DUAL ADDRESS TEST
*****
:TEST 12      FPP ACCUMULATORS DUAL ADDRESS TEST
:
:THIS TEST PERFORMS A DUAL ADDRESSING TEST ON THE FLOATING ACCUMULATORS.
:NOTE THAT ACCUMULATOR ZERO IS USED TO ACCESS ALL THE OTHERS.
:
:*****
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3359 015212 002004
3360 015214 012737 015222 001110
3361 015222 005037 015746
3362 015226 012700 015750
3363 015232 012701 016070
3364 015236 012703 000024
3365 015242 012120
3366 015244 077302
3367
3368 015246 004737 015674
3369
3370 015252 170011
3371
3372 015254 012700 015750
3373 015260 172410
3374 015262 174001
3375 015264 012700 015760
3376 015270 172410
3377 015272 174002
3378 015274 012700 015770
3379 015300 172410
3380 015302 174003
3381 015304 012700 016000
3382 015310 172410
3383 015312 174004
3384 015314 012700 016010
3385 015320 172410
3386 015322 174005
3387 015324 004737 015560
3388 015330 004737 015636
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```
TST12: SCOPE
MOV #H1,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.

H1: CLR HFLAG
MOV #HA1W,R0 ;INITIALIZE THE LOAD BUFFER DATA.
MOV #HDAT1,R1
MOV #24,R3
H2: MOV (R1)+,(R0)+
SOB R3,H2

JSR PC,HCLR ;CLEAR THE OUTPUT DATA BUFFER.

H3: SETD
:LOAD ACCUMULATOR 1
MOV #HA1W,R0
LDD (R0),ACO
STD ACO,AC1
:LOAD ACCUMULATOR 2
MOV #HA2W,R0
LDD (R0),ACO
STD ACO,AC2
:LOAD ACCUMULATOR 3
MOV #HA3W,R0
LDD (R0),ACO
STD ACO,AC3
:LOAD ACCUMULATOR 4
MOV #HA4W,R0
LDD (R0),ACO
STD ACO,AC4
:LOAD ACCUMULATOR 5
MOV #HA5W,R0
LDD (R0),ACO
STD ACO,AC5

H4: JSF PC,HSTD ;GO READ ALL ACCUMULATORS BACK.
JSR PC,HCMP ;SEE IF DATA IS CORRECT.

:COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 1,
:RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK
:THE DATA.
MOV #HA1W,R0
MOV #4,R2
MOV R0,R1
H5: COM (R1)+
LDD (R0),ACO
STD ACO,AC1
JSR PC,HSTD ;READ ALL THE ACCUMULATORS BACK.
JSR PC,HCMP ;CHECK THE DATA.
```


3382	015364	077210		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.	
	015366	012700	015760	MOV #HA2W,R0	
	015372	012702	000004	MOV #4,R2	
	015376	010001		MOV R0,R1	
	015400	005121		H6: COM (R1)+	
	015402	172410		LDD (R0),AC0	
	015404	174002		STD AC0,AC2	
	015406	004737	015560	JSR PC,HSTD	:READ ALL THE ACCUMULATORS BACK.
	015412	004737	015636	JSR PC,HCMP	:CHECK THE DATA.
	015416	077210		SOB R2,H6	
3383				:COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 3,	
				:RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK	
				:THE DATA.	
	015420	012700	015770	MOV #HA3W,R0	
	015424	012702	000004	MOV #4,R2	
	015430	010001		MOV R0,R1	
	015432	005121		H7: COM (R1)+	
	015434	172410		LDD (R0),ACC	
	015436	174003		STD AC0,AC3	
	015440	004737	015560	JSR PC,HSTD	:READ ALL THE ACCUMULATORS BACK.
	015444	004737	015636	JSR PC,HCMP	:CHECK THE DATA.
	015450	077210		SOB R2,H7	
3384				:COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 4,	
				:RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK	
				:THE DATA.	
	015452	012700	016000	MOV #HA4W,R0	
	015456	012702	000004	MOV #4,R2	
	015462	010001		MOV R0,R1	
	015464	005121		H10: COM (R1)+	
	015466	172410		LDD (R0),AC0	
	015470	174004		STD AC0,AC4	
	015472	004737	015560	JSR PC,HSTD	:READ ALL THE ACCUMULATORS BACK.
	015476	004737	015636	JSR PC,HCMP	:CHECK THE DATA.
	015502	077210		SOB R2,H10	
3385				:COMPLIMENT EACH WORD OF THE DATA STORED IN ACCUMULATOR 5,	
				:RELOAD THAT ACCUMULATOR, READ ALL THE ACCUMULATORS BACK AND CHECK	
				:THE DATA.	
	015504	012700	016010	MOV #HA5W,R0	
	015510	012702	000004	MOV #4,R2	
	015514	010001		MOV R0,R1	
	015516	005121		H11: COM (R1)+	
	015520	172410		LDD (R0),AC0	
	015522	174005		STD AC0,AC5	
	015524	004737	015560	JSR PC,HSTD	:READ ALL THE ACCUMULATORS BACK.
	015530	004737	015636	JSR PC,HCMP	:CHECK THE DATA.
	015534	077210		SOB R2,H11	
3386					
3387	015536	005737	015746	TST HFLAG	
3388	015542	001402		BEQ H12	
3389	015544	000137	016140	JMP HDONE	
3390					
3391	015550	005137	015746	H12: COM HFLAG	
3392	015554	000137	015252	JMP H3	
3393					

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3394 ;STORE ALL ACCUMULATORS IN THE OUTPUT BUFFERS.
3395 015560 004737 015674 HSTD: JSR PC,HCLR ;CLEAR ALL OUTPUT BUFFERS.
3396 ;STORE ACCUMULATOR 1
      MOV #HA1R,R4
      LDD AC1,AC0
      STD AC0,(R4)
3397 ;STORE ACCUMULATOR 2
      MOV #HA2R,R4
      LDD AC2,AC0
      STD AC0,(R4)
3398 ;STORE ACCUMULATOR 3
      MOV #HA3R,R4
      LDD AC3,AC0
      STD AC0,(R4)
3399 ;STORE ACCUMULATOR 4
      MOV #HA4R,R4
      LDD AC4,AC0
      STD AC0,(R4)
3400 ;STORE ACCUMULATOR 5
      MOV #HA5R,R4
      LDD AC5,AC0
      STD AC0,(R4)
3401 015614 012704 016050 RTS PC
3402 015620 172404
3403 015622 174014
3403 ;COMPARE DATA LOADED WITH DATA READ.
3404 015636 012637 015744 HCMP: MOV (SP)+,HADR ;SAVE RETURN ADDRESS.
3405 015642 012703 015750 MOV #HA1W,R3
3406 015646 012704 016020 MOV #HA1R,R4
3407 015652 012705 000024 MOV #24,R5
3408 015656 022324 HCMP1: CMP (R3)+,(R4)+
3409 015660 001402 BEQ HCMP2
3410 015662 000137 015712 JMP HERROR
3411 015666 077505 HCMP2: SOB R5,HCMP1
3412 015670 000177 000050 JMP @HADR
3413
3414 ;CLEAR THE DATA OUTPUT BUFFER.
3415 015674 012704 016020 HCLR: MOV #HA1R,R4
3416 015700 012705 000024 MOV #24,R5
3417 015704 005024 HCLR1: CLR (R4)+
3418 015706 077502 SOB R5,HCLR1
3419 015710 000207 RTS PC
3420
3421 ;REPORT ERROR.
3422 015712 HERROR:
3423 015712 012703 015750 MOV #HA1W,R3
3424 015716 012704 001236 MOV #STMP2,R4
3425 015722 012705 000012 MOV #12,R5
3426 015726 010324 1$: MOV R3,(R4)+
3427 015730 062703 000010 ADD #10,R3
3428 015734 077504 SOB R5,1$
3429 015736 104046 2$: ERROR +46
3430 015740 000137 016140 JMP HDONE
3431
3432
3433 015744 000000 HADR: .WORD 0
3434 015746 000000 HFLAG: .WORD 0
3435

```

3436	015750	000000	000000	000000	HA1W:	.WORD	0,0,0,0
3437	015760	000000	000000	000000	HA2W:	.WORD	0,0,0,0
3438	015770	000000	000000	000000	HA3W:	.WORD	0,0,0,0
3439	016000	000000	000000	000000	HA4W:	.WORD	0,0,0,0
3440	016010	000000	000000	000000	HA5W:	.WORD	0,0,0,0
3441							
3442	016020	000000	000000	000000	HA1R:	.WORD	0,0,0,0
3443	016030	000000	000000	000000	HA2R:	.WORD	0,0,0,0
3444	016040	000000	000000	000000	HA3R:	.WORD	0,0,0,0
3445	016050	000000	000000	000000	HA4R:	.WORD	0,0,0,0
3446	016060	000000	000000	000000	HA5R:	.WORD	0,0,0,0
3447							
3448	016070	073567	073567	073567	HDATA1:	.WORD	73567,73567,73567,73567
3449	016100	063146	063146	063146	HDATA2:	.WORD	63146,63146,63146,63146
3450	016110	010421	010421	010421	HDATA3:	.WORD	10421,10421,10421,10421
3451	016120	031463	031463	031463	HDATA4:	.WORD	31463,31463,31463,31463
3452	016130	042104	042104	042104	HDATA5:	.WORD	42104,42104,42104,42104
3453	016140				HDATA:		
	016140	104413			RSETUP		

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

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3455

3463

.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).

3464 016142 000004
 3464 016144 012737 016152 001110
 3465 016152 170011
 3466 016154 012700 016664
 3467 016160 172410
 3468
 3469 016162 012737 016364 000244
 3470
 3471
 3472 016170 012700 000001
 3473
 3474 016174 012737 016574 000004
 3475 016202 005003
 3476
 3477 016204 172407
 3478 016206 170000
 3479 016210 005203
 3480 016212 005203
 3481
 3482 016214 012701 016674
 3483 016220 174011
 3484
 3485 016222 012701 016674
 3486 016226 012702 016664
 3487 016232 012703 000004
 3488 016236 022122
 3489 016240 001402
 3490 016242 000137 016524
 3491 016246 077305
 3492
 3493 016250 000137 016550
 3494
 3495
 3496 016254
 3497 016254 012737 016262 001110
 3498 016262 170011
 3499 016264 012700 016664
 3500 016270 172410
 3501
 3502 016272 012737 016442 000244
 3503 016300 012700 000001
 3504 016304 012737 016626 000004
 3505 016312 005003
 3506
 3507 016314 172406
 3508 016316 170000

TST13: SCOPE
 S1: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
 SETD ;SET FD
 MOV #SPAT10, R0 ;LOAD ACO
 LDD (R0), ACO
 MOV #SERR0, FPVECT ;USE OF THE NON-EXISTENT AC-
 ;CUMULATOR SHOULD RESULT IN
 ;A TRAP TO 244.
 MOV #1, R0 ;A FAILURE IN THE FSRC FLOWS
 ;WILL RESULT IN AN ODD ADDRESS
 ;TRAP TO 4.
 MOV #SERR1, ERRVECT
 CLR R3
 S2: LDD AC7, ACO
 S3: CFCC
 INC R3
 S4: INC R3
 MOV #SDAT00, R1 ;NO TRAP OCCURRED!!
 STD ACO, (R1) ;SEE IF ACO WAS MODIFIED.
 MOV #SDAT00, R1
 MOV #SPAT10, R2
 MOV #4, R3
 S5: CMP (R1)+, (R2)+
 BEQ S6
 JMP SERR2
 S6: SOB R3, S5
 JMP SERR3
 ;NOW TEST AC6.
 S7: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
 SETD
 MOV #SPAT10, R0 ;LOAD ACO
 LDD (R0), ACO
 MOV #SERR4, FPVECT
 MOV #1, R0
 MOV #SERR5, ERRVECT
 CLR R3
 S8: LDD AC6, ACO
 S9: CFCC

```

3509 016320 005203          INC      R3
3510 016322 005203          S10:    INC      R3
3511
3512 016324 012701 016674          MOV     #SDAT00,R1
3513 016330 174011          STD     ACO,(R1)          ;NO TRAP! GET ACC
3514
3515 016332 012701 016674          MOV     #SDAT00,R1          ;WAS ACO MODIFIED.
3516 016336 012702 016664          MOV     #SPAT'0,R2
3517 016342 012703 000004          MOV     #4,R3
3518 016346 022122          S11:    CMP     (R1)+,(R2)+
3519 016350 001402          BEQ     S12
3520 016352 000137 016536          JMP     SERR6
3521 016356 077305          S12:    SOB     R3,S11
3522 016360 000137 016562          JMP     SERR7
3523
3524          ;TRAPPED TO 244.
3525 016364 021627 016206          SERR0:  CMP     (SP),#S3          ;PC OF TRAP CORRECT?
3526 016370 001402          BEQ     1$
3527 016372 000137 042534          JMP     FPSPUR
3528
3529 016376 012737 016254 016660 1$:    MOV     #S7,SADR
3530
3531 016404 011637 001236          SERR10: MOV     (SP),$TMP2
3532 016410 022626          CMP     (SP)+,(SP)+
3533 016412 005004          CLR     R4
3534 016414 170204          STFPS  R4          ;IS FPS CORRECT?
3535 016416 022704 100200          CMP     #100200,R4
3536 016422 001020          BNE     SERR15
3537
3538 016424 005004          CLR     R4
3539 016426 170304          STST   R4          ;IS FEC CORRECT?
3540 016430 022704 000002          CMP     #2,R4
3541 016434 001023          BNE     SERR20
3542 016436 000177 000216          JMP     @SADR
3543
3544 016442 021627 016316          SERR4:  CMP     (SP),#S9
3545 016446 001402          BEQ     1$
3546 016450 000137 042534          JMP     FPSPUR
3547 016454 012737 016704 016660 1$:    MOV     #SDONE,SADR
3548 016462 000750          BR     SERR10
3549
3550          ;REPORT FPS FAILURE:
3551 016464 012737 100200 001242 SERR15: MOV     #100200,$TMP4
3552 016472 010437 001240          MOV     R4,$TMP3
3553 016476 104117          1$:    ERROR +117
3554 016500 000177 000154          JMP     @SADR
3555
3556          ;REPORT FEC BAD:
3557 016504 012737 000002 001242 SERR20: MOV     #2,$TMP4
3558 016512 010437 001240          MOV     R4,$TMP3
3559 016516 104120          1$:    ERROR +120
3560 016520 000177 000134          JMP     @SADR
3561
3562
3563          ;ACO WAS MODIFIED. (BUT FSRC) FORK FAILED.
3564 016524 012737 016204 001236 SERR2:  MOV     #S2,$TMP2
3565 016532 104112          1$:    ERROR +112
    
```

```

3566 016534 000463          BR      SDONE
3567 016536 012737 016314 001236 SERR6: MOV    #S8,$TMP2
3568 016544 104114          1$:   ERROR +114
3569 016546 000456          BR      SDONE
3570
3571 016550 012737 016204 001236 SERR3: MOV    #S2,$TMP2
3572 016556 104111          1$:   ERROR +111
3573 016560 000451          BR      SDONE
3574 016562 012737 016314 001236 SERR7: MOV    #S8,$TMP2
3575 016570 104113          1$:   ERROR +113
3576 016572 000444          BR      SDONE
3577
3578          ;FAILURE OF (BUT FSRC) CAUSED AN ODD ADDRESS TRAP TO 4.
3579 016574 021627 016206 SERR1: CMP    (SP),#S3          ;DID TRAP OCCUR ON TESTED INSTRUCTION?
3580 016600 001405          BEQ    1$
3581 016602 021627 016212          CMP    (SP),#S4
3582 016606 001402          BEQ    1$
3583 016610 000137 042566          JMP    CPSPUR
3584
3585 016614 011637 001236          1$:   MOV    (SP),$TMP2
3586 016620 022626          CMP    (SP)+,(SP)+
3587 016622 104115          2$:   ERROR +115
3588 016624 000427          BR      SDONE
3589
3590 016626 021627 016314 SERR5: CMP    (SP),#S8          ;DID TRAP OCCUR ON TEST INSTRUCTION?
3591 016632 001405          BEQ    1$
3592 016634 021627 016316          CMP    (SP),#S9
3593 016640 001402          BEQ    1$
3594 016642 000137 042566          JMP    CPSPUR
3595
3596 016646 011637 001236          1$:   MOV    (SP),$TMP2
3597 016652 022626          CMP    (SP)+,(SP)+
3598 016654 104116          2$:   ERROR +116
3599 016656 000412          BR      SDONE
3600
3601 016660 000000          SADR:  0
3602 016662 177777          -1
3603 016664 010421          SPAT10: .WORD 10421
3604 016666 021042          SPAT11: .WORD 21042
3605 016670 031463          SPAT12: .WORD 31463
3606 016672 042104          SPAT13: .WORD 42104
3607
3608 016674 000000          SDAT00: .WORD 0
3609 016676 000000          SDAT01: .WORD 0
3610 016700 000000          SDAT02: .WORD 0
3611 016702 000000          SDAT03: .WORD 0
3612
3613 016704          SDONE:
      016704 104413          RSETUP

```

```

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

```

3614

3621

```
.SBTTL TEST # 14 - FSRC MODE 2 TEST
:*****
:*TEST 14      FSRC MODE 2 TEST
:*
:* THIS IS A TEST OF FSRC MODE 2, AUTO
:* INCREMENT MODE.
:*
:*****
```

```
TST14: SCOPE
3622 016710 012737 016716 001110  MOV      #J1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3623
3624 016716 170011  J1:      SETD              ;SET DOUBLE MODE
3625 016716 170011
3626
3627 016720 012700 017174  MOV      #JDAT0,R0
3628 016724 172410  LDD      (R0),ACO      ;LOAD ACO
3629
3630 016726 012700 017154  MOV      #JDAT10,R0
3631 016732 005003  CLR      R3
3632 016734 012737 017024 000004  MOV      #JERR0,ERRVECT
3633
3634 016742 172420  J2:      LDD      (R0)+,ACO      ;TEST INSTRUCTION
3635 016744 005203  J3:      INC      R3
3636 016746 005203  J4:      INC      R3
3637
3638 016750 012701 017164  MOV      #JDAT00,R1
3639 016754 174011  STD      ACO,(R1)      ;PICK UP RESULTS
3640
3641 016756 020027 017144  CMP      R0,#JBUFO      ;WAS AN AUTO
3642 016762 001001  BNE      1$            ;DECREMENT EXECUTED?
3643 016764 000442  BR       JERR1
3644
3645 016766 012702 017154  1$:      MOV      #JDAT10,R2      ;IS DATA CORRECT?
3646 016772 012703 017164  MOV      #JDAT00,R3
3647 016776 012704 000004  MOV      #4,R4
3648 017002 022223  J5:      CMP      (R2)+,(R3)+
3649 017004 001401  BEQ      J6
3650 017006 000443  BR       JERR2
3651 017010 077404  J6:      SOB      R4,J5
3652
3653 017012 022700 017164  CMP      #JDAT10+10,R0  ;WAS R0 INCREM.
3654 017016 001401  BEQ      J7            ;BY 10 (OCTAL)
3655 017020 000424  BR       JERR1
3656
3657 017022 000470  J7:      BR       JDONE
3658
3659 ;IF A TRAP THROUGH 4 OCCURS COME HERE
3660
3661 017024 021627 016744  JERR0:  CMP      (SP),#J3      ;SEE IF THE TRAP
3662 017030 001405  BEQ      J10           ;OCCURRED ON THE
3663 017032 021627 016746  CMP      (SP),#J4      ;TESTED INSTRUCTION
3664 017036 001402  BEQ      J10
3665 017040 000137 042566  JMP      CPSPUR
3666
3667 017044 012737 000762 001240  J10:    MOV      #762,$TMP3      ;REPORT FSRC FLOW
3668 017052 012737 000322 001242  MOV      #322,$TMP4      ;FAILURE
3669 017060 011637 001236  MOV      (SP),$TMP2
```



```
3670 017064 022626  
3671 017066 104052  
3672 017070 000445  
3673  
3674 017072  
3675 017072 012737 016742 001236  
3676 017100 010037 001240  
3677 017104 012737 017164 001242  
3678 017112 104053  
3679 017114 010433  
3680  
3681  
3682  
3683 017116  
3684 017116 012737 016742 001236  
3685 017124 012737 017154 001240  
3686 017132 012737 017164 001242  
3687 017140 104054  
3688 017142 000420  
3689  
3690 017144 010421  
3691 017146 021042  
3692 017150 042104  
3693 017152 031463  
3694  
3695 017154 052525  
3696 017156 114631  
3697 017160 063146  
3698 017162 073567  
3699  
3700 017164 000000  
3701 017166 000000  
3702 017170 000000  
3703 017172 000000  
3704  
3705 017174 177777  
3706 017176 177777  
3707 017200 177777  
3708 017202 177777  
3709  
3710  
3711 017204  
017204 104413  
  
3712  
3719
```

```
1S:      CMP      (SP)+,(SP)+  
          ERROR?  +52  
          BR       JDONE  
  
JERR1:   MOV      #J2,$TMP2      ;REPORT, RO NOT  
          MOV      R0,$TMP3      ;CORRECTLY AFFECTED  
          MOV      #JDAT:0+10,$TMP4  
1S:      ERROR   +53  
          BR       JDONE  
  
;REPORT DATA FAILURE  
  
JERR2:   MOV      #J2,$TMP2  
          MOV      #JDAT10,$TMP3  
          MOV      #JDAT00,$TMP4  
1S:      ERROR   +54  
          BR       JDONE  
  
JBUF0:   .WORD   010421  
JBUF1:   .WORD   021042  
JBUF2:   .WORD   042104  
JBUF3:   .WORD   031463  
  
JDAT10:  .WORD   052525  
JDAT11:  .WORD   114631  
JDAT12:  .WORD   063146  
JDAT13:  .WORD   073567  
  
JDAT00:  .WORD   0  
JDAT01:  .WORD   0  
JDAT02:  .WORD   0  
JDAT03:  .WORD   0  
  
JDAT0:   .WORD   -1  
JDAT1:   .WORD   -1  
JDAT2:   .WORD   -1  
JDAT3:   .WORD   -1  
  
JDONE:   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?).
```

3720

```

.SBTTL TEST # 15 - FSRC MODE 4 TEST
.....
*TEST 15      FSRC MODE 4 TEST
*
* THIS IS A TEST OF FSRC MODE 4, AUTO
* DECREMENT MODE.
*
.....

```

```

3721 017210 000004 017216 001110  TST15: SCOPE
3722 017210 002737 017216 001110  MOV      #K1,$LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
3723 017216 170011 017216 001110  K1:
3724 017216 170011 017216 001110  SETD
3725 017216 170011 017216 001110  ;SET DOUBLE MODE
3726 017220 012700 017472 001110  MOV      #KPATO,R0
3727 017224 172410 017472 001110  LDD      (R0),ACO        ;LOAD A DEFAULT
3728 017224 172410 017472 001110  ;PATTERN INTO ACO
3729 017226 012700 017452 001110  MOV      #KBUFO,R0
3730 017232 005003 017452 001110  CLR      R3
3731 017234 012737 017324 000004  MOV      #KERR0,ERRVECT
3732 017234 012737 017324 000004  ;
3733 017242 172440 017324 000004  K2: LDD      -(R0),ACO        ;TEST INSTRUCTION
3734 017244 005203 017324 000004  K3: INC      R3
3735 017246 005203 017324 000004  K4: INC      R3
3736 017246 005203 017324 000004  ;
3737 017250 012701 017462 000004  MOV      #KDAT00,R1
3738 017254 174011 017462 000004  STD      ACO,(R1)        ;PICK UP THE RESULT
3739 017254 174011 017462 000004  ;
3740 017256 020027 017462 000004  CMP      R0,#KBUFO+10    ;WAS AN AUTO
3741 017262 001001 017462 000004  BNE      1$              ;INCREMENT EXECUTED
3742 017264 000441 017462 000004  BR       KERR1
3743 017264 000441 017462 000004  ;
3744 017266 012702 017442 000004  1$: MOV     #KDAT10,R2    ;IS DATA CORRECT?
3745 017272 012703 017462 000004  MOV     #KDAT00,R3
3746 017276 012704 000004  MOV     #4,R4
3747 017302 022223 017462 000004  K5: CMP     (R2)+,(R3)+
3748 017304 001401 017462 000004  BEQ     K6
3749 017306 000442 017462 000004  BR      KERR2
3750 017310 077404 017462 000004  K6: SOB     R4,K5
3751 017310 077404 017462 000004  ;
3752 017312 022700 017442 000004  CMP     #KBUFO-10,R0    ;WAS R0 DECREMENTED
3753 017316 001401 017442 000004  BEQ     K7              ;PROPERLY?
3754 017320 000423 017442 000004  BR      KERR1
3755 017320 000423 017442 000004  ;
3756 017322 000467 017442 000004  K7: BR     KDONE
3757 017322 000467 017442 000004  ;
3758 017322 000467 017442 000004  ;TRAP TO HERE ON AN ODD ADDRESS ERROR
3759 017322 000467 017442 000004  ;
3760 017324 021627 017244 000004  KERR0: CMP     (SP),#K3    ;SEE IF THE ERROR
3761 017330 001405 017244 000004  BEQ     K10             ;OCCURRED AT THE
3762 017332 021627 017246 000004  CMP     (SP),#K4        ;INSTRUCTION TESTED.
3763 017336 001402 017246 000004  BEQ     K10
3764 017340 000137 042566 000004  JMP     CPSPUR
3765 017340 000137 042566 000004  ;
3766 017344 012737 000762 001240  K10: MOV     #762,$TMP3   ;REPORT FAILURE IN
3767 017352 012737 000324 001242  MOV     #324,$TMP4      ;FSRC FLOWS
3768 017360 011637 001236 001242  MOV     (SP),$TMP2

```

```

3769 017364 104055          1$:      ERROR      +55
3770 017366 000445          BR        KDONE
3771
3772 017370          KERR1:          :REPORT, R0
3773 017370 012737 017242 001236      MOV        #K2,$TMP2      :INCORRECTLY AFFECTED.
3774 017376 010037 001240      MOV        R0,$TMP3
3775 017402 012737 017442 001242      MOV        #KDAT10,$TMP4
3776 017410 104056          1$:      ERROR      +56
3777 017412 000433          BR        KDONE
3778
3779          ;REPORT DATA FAILURE
3780
3781 017414          KERR2:
3782 017414 012737 017242 001236      MOV        #K2,$TMP2
3783 017422 012737 017442 001240      MOV        #KDAT10,$TMP3
3784 017430 012737 017402 001242      MOV        #KDAT00,$TMP4
3785 017436 104057          1$:      ERROR      +57
3786 017440 000420          BR        KDONE
3787
3788 017442 052525          KDAT10: .WORD 052525
3789 017444 114631          KDAT11: .WORD 114631
3790 017446 063140          KDAT12: .WORD 063140
3791 017450 073567          KDAT13: .WORD 073567
3792
3793 017452 010421          KBUF0:  .WORD 010421
3794 017454 031463          KBUF1:  .WORD 031463
3795 017456 042104          KBUF2:  .WORD 042104
3796 017460 021042          KBUF3:  .WORD 021042
3797
3798 017462 000000          KDAT00: .WORD 0
3799 017464 000000          KDAT01: .WORD 0
3800 017466 000000          KDAT02: .WORD 0
3801 017470 000000          KDAT03: .WORD 0
3802
3803 017472 177777          KPAT0:  .WORD -1
3804 017474 177777          KPAT1:  .WORD -1
3805 017476 177777          KPAT2:  .WORD -1
3806 017500 177777          DPAT3:  .WORD -1
3807
3808 017502          KDONE:
      017502 104413          RSETUP          ;GO INITIALIZE THE FPS AND STACK; AND
                                     ;SEE IF THE USER HAS EXPRESSED
                                     ;THE DESIRE TO CHANGE THE SOFTWARE
                                     ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                     ;THE USER TYPED CONTROL G?).
3809
3816

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3817

```

.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)
*****
  
```

```

3818 017504 000004 017514 001110 TST16: SCOPE
3819 017506 002737 017514 001110 MOV #L1,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
3820 017514 L1:
3821 017514 170011 SETD ;SET DOUBLE MODE
3822
3823 017516 012700 017764 MOV #LPAT10,R0
3824 017522 172410 LDD (R0),AC0 ;LOAD AC0
3825
3826 017524 012700 020006 MOV #LDAT10,R0 ;SET UP THE INPUT
3827 017530 012701 017774 MOV #LPAT20,R1 ;DATA
3828 017534 012702 000004 MOV #4,R2
3829
3830 017540 012120 1$: MOV (R1)+,(R0)+
3831 017542 077202 SOB R2,1$
3832
3833 017544 012700 020006 MOV #LDAT10,R0
3834 017550 005003 CLR R3
3835 017552 170001 SETF ;CLEAR FD.
3836
3837 017554 172420 L2: LDF (R0)+,AC0
3838 017556 005203 L3: INC R3
3839
3840 017560 L4:
3841 017560 170011 SETD ;SET FD
3842
3843 017562 012701 020020 MOV #LDAT00,R1
3844 017566 174011 STD AC0,(R1) ;PICK UP RESULTS
3845
3846 017570 020027 020012 CMP R0,#LDAT12 ;WAS R0 INCREMENTED
3847 017574 001401 BEQ 1$ ;CORRECTLY BY 4
3848 017576 000421 BR LERR1
3849
3850 017600 012737 177777 020012 1$: MOV #-1,LDAT12
3851 017606 012737 177777 020014 MOV #-1,LDAT13
3852 017614 012702 020006 MOV #LDAT10,R2 ;IS DATA CORRECT
3853 017620 012703 020020 MOV #LDAT00,R3
3854 017624 012704 000004 MOV #4,R4
3855
3856 017630 022223 L5: CMP (R2)+,(R3)+
3857 017632 001401 BEQ L6
3858 017634 000427 BR LERR2
3859 017636 077404 L6: SOB R4,L5
3860
3861 017640 000473 BR LDONE
3862
3863 017642 LERR1:
3864 017642 012737 017554 001236 MOV #L2,$TMP2 ;REPORT FAILURE
3865 017650 010037 001240 MOV R0,$TMP3 ;R0 NOT INCREMENTED
;BY 4
  
```

```

3866 017654 012737 020012 001242      MOV      #LDAT12,$TMP4
3867 017662 104060      'S:      ERROR      +60
3868 017664 000461      BR       LDONE
3869
3870 017666      LERR3:      ;REPORT DATA FAILURE.
3871 017666 012737 017554 001236      MOV      #L2,$TMP2
3872 017674 012737 020006 001240      MOV      #LDAT10,$TMP3
3873 017702 012737 020020 001242      MOV      #LDAT00,$TMP4
3874 017710 104061      'S:      ERROR      +61
3875 017712 010446      BR       LDONE
3876
3877 017714 012702 017774      LERR2:      MOV      #LPAT20,R2      ;DID (BUT FD)
3878 017720 012703 020020      MOV      #LDAT00,R3      ;FAIL.
3879 017724 012704 000004      MOV      #4,R4
3880 017730 022223      'S:      CMP      (R2)+,(R3)+
3881 017732 001355      BNE     LERR3
3882 017734 077403      SOB     R4,1$
3883 017736 012737 017554 001236      MOV      #L2,$TMP2
3884 017744 012737 020006 001240      MOV      #LDAT10,$TMP3
3885 017752 012737 020022 001242      MOV      #LDAT01,$TMP4
3886 017760 104062      2$:      ERROR      +62
3887 017762 000422      BR       LDONE
3888
3889 017764 177777      LPAT10: .WORD      -1
3890 017766 177777      LPAT11: .WORD      -1
3891 017770 177777      LPAT12: .WORD      -1
3892 017772 177777      LPAT13: .WORD      -1
3893
3894 017774 052525      LPAT20: .WORD      052525
3895 017776 114631      LPAT21: .WORD      114631
3896 020000 063142      LPAT22: .WORD      063142
3897 020002 073567 000001      LPAT23: .WORD      073567,1
3898 020006 000000      LDAT10: .WORD      0
3899 020010 000000      LDAT11: .WORD      0
3900 020012 000000      LDAT12: .WORD      0
3901 020014 000000 000001      LDAT13: .WORD      0,1
3902 020020 000000      LDAT00: .WORD      0
3903 020022 000000      LDAT01: .WORD      0
3904 020024 000000      LDAT02: .WORD      0
3905 020026 000000      LDAT03: .WORD      0
3906
3907 020030      LDONE:      RSETUP
      020030 104413      ;GO INITIALIZE THE FPS AND STACK; AND
      ;SEE IF THE USER HAS EXPRESSED
      ;THE DESIRE TO CHANGE THE SOFTWARE
      ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
      ;THE USER TYPED CONTROL G?).
3908
3916

```

3917

```
.SBTTL TEST # 17 - FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
*****
:TEST 17      FSRC MODE 2 WITH GR7, IMMEDIATE MODE, TEST
:
: THIS IS A TEST OF FSRC MODE 2
: USING GR7 (THE PC). THIS IS IMMEDIATE
: MODE.
:
:*****
TEST17: SCOPE
```

```

3918 020032 010004
3919 020034
3920 020034 170011
3921
3922 020036 012700 020330
3923 020042 172410
3924
3925 020044 005004
3926 020046 012737 020270 000004
3927
3928 020054 172427 000000
3929 020056
3930 020056 005204
3931 020060 005204
3932 020062 005204
3933 020064 005204
3934
3935 020066 020427 000003
3936 020072 001401
3937 020074 000443
3938
3939
3940
3941 020076 012700 020350
3942 020102 174010
3943
3944 020104 012700 020350
3945 020110 022720 005204
3946 020114 001401
3947 020116 000451
3948 020120 012701 000003
3949 020124 005720
3950 020126 001002
3951 020130 077103
3952 020132 000512
3953
3954 020134 012700 020350
3955 020140 012701 000004
3956 020144 022720 005204
3957 020150 001401
3958 020152 000433
3959 020154 077105
3960
3961 020156
3962 020156 012737 020054 001236
3963 020164 012737 020340 001240
3964 020172 012737 020350 001242

M1:      SETD
          MOV    #MPAT10,R0
          LDD    (R0),AC0      :LOAD BACKGROUND
                                   :PATTERN INTO AC0.
          CLR    R4
          MOV    #MERR3,ERRVECT
M15:     LDD    #0,AC0        :TEST INSTRUCTION
          .=-2
          .WORD 5204
M2:      INC    R4           :NOTE THAT
M3:      INC    R4           :005204=INC R4
M4:      INC    R4
          CMP    R4,#3       :SEE IF THE PC
          BEQ    1$          :WAS INCREMENTED
          BR     MERR0       :BY 2 DURING THE
                                   :INSTRUCTION. IF
                                   :NOT THEN A BAD
                                   :CONSTANT WAS GENERATED
1$:      MOV    #MDAT00,R0
          STD    AC0,(R0)    :GET THE DATA
          MOV    #MDAT00,R0
          CMP    #5204,(R0)+ :IS THE DATA CORRECT?
          BEQ    M5
          BR     MERR1
M5:      MOV    #3,R1
M6:      TST   (R0)+
          BNE   M7
          SOB   R1,M6
          BR    MDONE
M7:      MOV    #MDAT00,R0   :DID (BUT GRM) FAIL?
          MOV    #4,R1
M8:      CMP    #5204,(R0)+
          BEQ    M9
          BR     MERR1
M9:      SOB   R1,M8
MERR2:   MOV    #M15,$TMP2   :REPORT FAILURE
          MOV    #MPAT20,$TMP3 :OF (BUT GR7)
          MOV    #MDAT00,$TMP4
```

```

3965 020200 104063          1$:  ERROR  +63
3966 020202 000466          BR      MDONE
3967
3968 020204 012705 020060  MERR0:  MOV    #M2,R5          :REPORT FAILURE
3969 020210 010537 001242      MOV    R5,$TMP4        :PC INCREMENTED
3970 020214 162704 000003      SUB    #3,R4
3971 020220 006304          ASL    R4
3972 020222 160405          SUB    R4,R5
3973 020224 010537 001240      MOV    R5,$TMP3
3974 020230 012737 020054 001236  MOV    #M15,$TMP2
3975 020236 104064          1$:  ERROR  +64
3976 020240 000447          BR      MDONE
3977
3978 020242          MERR1:          :REPORT DATA
3979 020242 012737 020054 001236      MOV    #M15,$TMP2        :FAILURE
3980 020250 012737 020350 001240      MOV    #MDAT00,$TMP3
3981 020256 012737 020340 001242      MOV    #MPAT20,$TMP4
3982 020264 104066          1$:  ERROR  +66
3983 020266 000434          BR      MDONE
3984          ;TRAP TO HERE THROUGH 4.
3985 020270 032716 000001  MERR3:  BIT    #1,(SP)        :SEE IF THE
3986 020274 001002          BNE    1$              :TRAP TO 4 OCCURRED
3987 020276 000137 042566          JMP    CPSPUR          :BECAUSE OF AN
3988          :ODD ADDRESS
3989 020302 011637 001240  1$:  MOV    (SP),$TMP3        :IF YES REPORT
3990 020306 012737 020060 001242      MOV    #M2,$TMP4        :BAD CONSTANT
3991 020314 012737 020054 001236      MOV    #M15,$TMP2        :GENERATED
3992 020322 022626          CMP    (SP)+,(SP)+
3993 020324 104065          2$:  ERROR  +65
3994 020326 000414          BR      MDONE
3995
3996 020330 177777          MPAT10: .WORD  -1
3997 020332 177777          MPAT11: .WORD  -1
3998 020334 177777          MPAT12: .WORD  -1
3999 020336 177777          MPAT13: .WORD  -1
4000
4001 020340 005204          MPAT20: .WORD  5204
4002 020342 005204          MPAT21: .WORD  5204
4003 020344 005204          MPAT22: .WORD  5204
4004 020346 005204          MPAT23: .WORD  5204
4005
4006 020350 000000          MDAT00: .WORD  0
4007 020352 000000          MDAT01: .WORD  0
4008 020354 000000          MDAT02: .WORD  0
4009 020356 000000          MDAT03: .WORD  0
4010
4011 020360          MDONE:
      020360 104413          RSETUP          :GO INITIALIZE THE FPS AND STACK; AND
          :SEE IF THE USER HAS EXPRESSED
          :THE DESIRE TO CHANGE THE SOFTWARE
          :VIRTUAL CONSOLE SWITCH REGISTER (HAS
          :THE USER TYPED CONTROL G?).
4012
4019
    
```

4020

```
.SBTTL TEST # 20 - FSRC MODE 3 TEST  
:.....  
:TEST 20 FSRC MODE 3 TEST  
:.....  
: THIS IS A TEST OF FSRC MODE 3, AUTO INCREMENT  
: DEFERRED  
:.....  
TST20: SCOPE
```

4021 020362 000004
4022 020364
4023 020364 170011
4024
4025 020366 012700 021046
4026 020372 172410
4027
4028 020374 012700 021034
4029 020400 005003
4030 020402 012737 020556 000004
4031
4032
4033 020410 172430
4034 020412 005203
4035 020414 005203
4036
4037 020416 012701 021014
4038 020422 174011
4039
4040 020424 020027 021036
4041 020430 001437
4042
4043 020432 020027 021044
4044 020436 001001
4045 020440 000506
4046
4047 020442 020027 021024
4048 020446 001001
4049 020450 000520
4050
4051 020452 020027 021034
4052 020456 001023
4053
4054 020460 012702 021014
4055 020464 012703 000004
4056 020470 022227 177777
4057 020474 001002
4058 020476 077304
4059 020500 000510
4060
4061 020502 012702 021014
4062 020506 012703 021034
4063 020512 012704 000004
4064 020516 022223
4065 020520 001002
4066 020522 077403
4067 020524 000502
4068

```
N1: SETD ;SET FD MODE  
MOV #NPAT10,R0  
LDD (R0),ACO ;LOAD ACO WITH A DEFAULT  
;PATTERN  
MOV #NPAT20,R0  
CLR R3  
MOV #NERR0,ERRVECT ;IF A FAILURE OCCURS  
;IN THE FSRC FLOWS AN  
;ODD TRAP TO 4 COULD OCCUR  
;TEST INSTRUCTION.  
N2: LDD @ (R0)+,ACO  
N3: INC R3  
N4: INC R3  
MOV #NDAT00,R1  
STD ACO,(R1) ;GET THE DATA  
CMP R0,#NPAT20+2 ;WAS R0 INCREMENTED  
BEQ N12 ;BY 2?  
N5: CMP R0,#NPAT20+10 ;FSRC MODE 2?  
BNE N6  
BR NERR1  
N6: CMP R0,#NPAT20-10 ;FSRC MODE 4?  
BNE N7  
BR NERR2  
N7: CMP R0,#NPAT20  
BNE N11  
MOV #NDAT00,R2 ;FSRC MODE 0?  
MOV #4,R3  
N8: CMP (R2)+,#-1  
BNE N9  
SOB R3,N8  
BR NERR3  
N9: MOV #NDAT00,R2 ;FSRC MODE 1  
MOV #NPAT20,R3  
MOV #4,R4  
N10: CMP (R2)+,(R3)+  
BNE N11  
SOB R4,N10  
BR NERR4
```



```

4069 020526 000505      N11:  BR      NERR5
4070
4071 020530 012702 021014      N12:  MOV      #NDAT00,R2      ;DATA CORRECT?
4072 020534 012703 021056      MOV      #NDATIO,R3
4073 020540 012704 000004      MOV      #4,R4
4074 020544 022223      N13:  CMP      (R2)+,(R3)+
4075 020546 001002      BNE      N14
4076 020550 077403      SOB      R4,N13
4077 020552 000545      BR      NDONE
4078
4079 020554 000504      N14:  BR      NERR6
4080
4081      ;IF AN ODD ADDRESS TRAP OCCURS COME HERE
4082      ;TO SEE IF THE FAILURE WAS IN THE FSRC
4083      ;FLOWS
4084
4085 020556 022716 020414      NERR0:  CMP      #N4,(SP)      ;FSRC MODE 6 OR 7?
4086 020562 001412      BEQ      NERR10
4087 020564 022716 020412      CMP      #N3,(SP)
4088 020570 001402      BEQ      1$
4089 020572 000137 042566      JMP      CPSPUR
4090 020576 020027 021032      1$:  CMP      RC,#NPAT20-2      ;FSRC MODE 5?
4091 020602 001407      BEQ      NERR11
4092 020604 000137 042566      JMP      CPSPUR
4093
4094 020610      NERR10:  MOV      (SP),$TMP2      ;WENT TO FSRC
4095 020610 011637 001236      CMP      (SP)+,(SP)+      ;MODE 6 OR 7.
4096 020614 022626      1$:  ERROR   +67
4097 020616 104067      BR      NDONE
4098 020620 000522
4099
4100 020622 011637 001236      NERR11:  MOV      (SP),$TMP2      ;WENT TO FSRC
4101 020626 022626      CMP      (SP)+,(SP)+      ;MODE 5.
4102 020630 012737 000627 001244      MOV      #627,$TMP5
4103 020636 012737 000323 001250      MOV      #323,$TMP7
4104 020644 012737 000325 001246      MOV      #325,$TMP6
4105 020652 104070      1$:  ERROR   +70
4106 020654 000504      BR      NDONE
4107 020656 012737 000322 001246      NERR1:  MOV      #322,$TMP6      ;FSRC MODE 2.
4108 020664 012737 000627 001244      NERR20:  MOV      #627,$TMP5
4109 020672 012737 000323 001250      MOV      #323,$TMP7
4110 020700 012737 020410 001236      MOV      #N2,$TMP2
4111 020706 104071      1$:  ERFOR   +71
4112 020710 000466      BR      NDONE
4113 020712 012737 000324 001246      NERR2:  MOV      #324,$TMP6      ;FSRC MODE 4
4114 020720 000761      BR      NERR20
4115 020722 012737 000320 001246      NERR3:  MOV      #320,$TMP6      ;FSRC MODE 0
4116 020730 000755      BR      NERR20
4117 020732 012737 000321 001246      NERR4:  MOV      #321,$TMP6      ;FSRC MODE 1
4118 020740 000751      BR      NERR20
4119
4120 020742 010037 001240      NERR5:  MOV      R0,$TMP3      ;R0 NOT
4121 020746 012737 021036 001242      MOV      #NPAT20+2,$TMP4      ;INCREMENTED
4122 020754 012737 020410 001236      MOV      #N2,$TMP2      ;PROPERLY.
4123 020762 104072      1$:  ERROR   +72
4124 020764 000440      BR      NDONE
4125

```

4126 020766 NERR6: ;DATA FAILURE.
4127 020766 012737 020710 001236 MOV #N2,\$TMP2
4128 020774 012737 021014 001240 MOV #NDAT00,\$TMP3
4129 021002 012737 021056 001242 MOV #NDAT10,\$TMP4
4130 021010 104073 1\$: ERROR +73
4131 021012 000425 BR NDONE

4132
4133 021014 000000 NDAT00: .WORD 0
4134 021016 000000 NDAT01: .WORD 0
4135 021020 000000 NDAT02: .WORD 0
4136 021022 000000 052525 052525 NDAT03: .WORD 0,52525,52525,52525,52525
4137 021034 021056 NPAT20: .WORD NDAT10
4138 021036 070707 NPAT21: .WORD 070707
4139 021040 070707 NPAT22: .WORD 070707
4140 021042 070707 000001 NPAT23: .WORD 070707,1
4141 021046 177777 NPAT10: .WORD -1
4142 021050 177777 NPAT11: .WORD -1
4143 021052 177777 NPAT12: .WORD -1
4144 021054 177777 NPAT13: .WORD -1

4145
4146 021056 010421 NDAT10: .WORD 010421
4147 021060 021042 NDAT11: .WORD 021042
4148 021062 031463 NDAT12: .WORD 031463
4149 021064 042104 NDAT13: .WORD 042104

4150
4151 021066 NDONE:
021066 104413 RSETUP

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

4152
4159

4160

```
.SBTTL TEST # 21 - FSRC MODE 5 TEST  
.....  
*TEST 21 FSRC MODE 5 TEST  
*  
* THIS IS A TEST OF FSRC MODE 5, AUTO DECREMENT  
* DEFERRED.  
*  
.....
```

021070 000004
4161
4162 021072
4163 021072 170011
4164
4165 021074 012700 021552
4166 021100 172410
4167
4168 021102 012700 021540
4169 021106 005003
4170 021110 012737 021262 000004
4171
4172
4173
4174 021116 172450
4175 021120 005203
4176 021122 005203
4177
4178 021124 012701 021520
4179 021130 174011
4180
4181 021132 020027 021536
4182 021136 001436
4183
4184 021140 020027 021550
4185 021144 001001
4186 021146 000505
4187
4188 021150 020027 021530
4189 021154 001001
4190 021156 000517
4191
4192 021160 020027 021540
4193
4194 021164 012702 021522
4195 021170 012703 000004
4196 021174 022227 177777
4197 021200 001002
4198 021202 077304
4199 021204 000510
4200
4201 021206 012702 021520
4202 021212 012703 021540
4203 021216 012704 000004
4204 021222 022223
4205 021224 001002
4206 021226 077403
4207 021230 000502
4208

```
TST21: SCOPE  
01: SETD ;SET FD MODE  
MOV #OPAT10,R0  
LDD (R0),AC0 ;LOAD AC0 WITH A  
;DEFAULT PATTERN.  
MOV #OPAT21,R0  
CLR R3  
MOV #OERR0,ERRVEC ;IF A FAILURE  
;OCCURS IN THE FSRC  
;FLOWS AN ODD ADDR.  
;TRAP TO 4 MAY OCCUR.  
;TEST INSTRUCTION  
02: LDD @-(R0),AC0  
03: INC R3  
04: INC R3  
MOV #ODAT00,R1  
STD AC0,(R1) ;GET THE DATA  
CMP R0,#OPAT20 ;WAS R0 DECREMENTED  
BEQ 012 ;BY 2?  
05: CMP R0,#OPAT21+10 ;FSRC MODE 2  
BNE 06  
BR OERR1  
06: CMP R0,#OPAT21-10 ;FSRC MODE 4?  
BNE 07  
BR OERR2  
07: CMP R0,#OPAT21  
MOV #ODAT01,R2 ;FSRC MODE 0?  
MOV #4,R3  
08: CMP (R2)+,#-1  
BNE 09  
SOB R3,08  
BR OERR3  
09: MOV #ODAT00,R2 ;FSRC MODE 1?  
MOV #OPAT21,R3  
MOV #4,R4  
010: CMP (R2)+,(R3)+  
BNE 011  
SOB R4,010  
BR OERR4
```

```

4209 021232 000505      011:  BR      OERR5
4210
4211 021234 012702 021520 012:  MOV      #ODAT00,R2      ;DATA CORRECT?
4212 021240 012703 021562      MOV      #ODATIO,R3
4213 021244 012704 000004      MOV      #4,R4
4214 021250 022223 013:  CMP      (R2)+,(R3)+
4215 021252 001002      BNE      014
4216 021254 077403      SOB     R4,013
4217 021256 000545      BR      ODONE
4218
4219 021260 000504      014:  BR      OERR6
4220
4221      ;IF AN ODD ADDRESS TRAP OCCURS COME
4222      ;HERE TO SEE IF THE FAILURE WAS IN THE
4223      ;FSRC FLOWS:
4224
4225 021262 022716 021122  OERR0:  CMP      #04,(SP)      ;FSRC MODE 6 OR 7?
4226 021266 001412      BEQ     OERR10
4227 021270 022716 021120      CMP      #03,(SP)
4228 021274 001402      BEQ     1$
4229 021276 000137 042566      JMP     CPSPUR
4230 021302 020027 021542  1$:    CMP      R0,#OPAT21+2  ;FSRC MODE 3?
4231 021306 001425      BEQ     OERR1
4232 021310 000137 042566      JMP     CPSPUR
4233
4234 021314      OERR10:  MOV      (SP),$TMP2      ;WENT TO FSRC
4235 021314 011637 001236      CMP      (SP)+,(SP)+    ;MODE 6 OR 7
4236 021320 022626      1$:    ERROR  +74
4237 021322 104074      BR      ODONE
4238 021324 000522
4239
4240 021326 011637 001240  OERR11:  MOV      (SP),$TMP3      ;WENT TO FSRC MODE
4241 021332 022626      CMP      (SP)+,(SP)+    ;3
4242 021334 012737 000627 001244      MOV      #627,$TMP5
4243 021342 012737 000325 001250      MOV      #325,$TMP7
4244 021350 012737 000323 001246      MOV      #323,$TMP6
4245 021356 104075      1$:    ERROR  +75
4246 021360 000504      BR      ODONE
4247
4248 021362 012737 000322 001246  OERR1:  MOV      #322,$TMP6      ;FSRC MODE2
4249 021370 012737 000627 001242  OERR20:  MOV      #627,$TMP4
4250 021376 012737 000325 001250      MOV      #325,$TMP7
4251 021404 012737 021116 001236      MOI     #02,$TMP2
4252 021412 104076      1$:    ERROR  +76
4253 021414 000466      BR      ODONE
4254 021416 012737 000324 001246  OERR2:  MOV      #324,$TMP6      ;FSRC MODE 4
4255 021424 000761      BR      OERR20
4256 021426 012737 000320 001246  OERR3:  MOV      #320,$TMP6      ;FSRC MODE 0
4257 021434 000755      BR      OERR20
4258 021436 012737 000321 001246  OERR4:  MOV      #321,$TMP6      ;FSRC MODE 1
4259 021444 000751      BR      OERR20
4260
4261 021446 010037 001240  OERR5:  MOV      R0,$TMP3      ;R0 NOT DECREMENTED
4262 021452 012737 021536 001242      MOV      #OPAT20,$TM
4263 021460 012737 021122 001236      MOV      #04,$TMP2      ;PROPERLY
4264 021466 104077      1$:    ERROR  +77
4265 021470 000440      BR      ODONE
  
```

```
4266
4267 021472
4268 021472 012737 021116 001236
4269 021500 012737 021520 001240
4270 021506 012737 021562 001242
4271 021514 10410C
4272 021516 000425
4273
4274 021520 000000
4275 021522 000000
4276 021524 000000
4277 021526 000000 052525 052525
4278 021536 021562
4279 021540 070707
4280 021542 070707
4281 021544 070707
4282 021546 070707 000001
4283 021552 177777
4284 021554 177777
4285 021556 177777
4286 021560 177777
4287
4288 021562 073567
4289 021564 004210
4290 021566 114631
4291 021570 125252
4292
4293 021572
      021572 104413

      OERR6:
      MOV #02,$TMP2 ;DATA FAILURE
      MOV #ODAT00,$TMP3
      MOV #ODAT10,$TMP4
      1$: ERROR +100
      BR ODONE

      ODAT00: .WORD 0
      ODAT01: .WORD 0
      ODAT02: .WORD 0
      ODAT03: .WORD 0,52525,52525,52 25
      OPAT20: .WORD ODAT10
      OPAT21: .WORD 070707
      OPAT22: .WORD 070707
      OPAT23: .WORD 070707
      OPAT24: .WORD 070707,1
      OPAT10: .WORD -1
      OPAT11: .WORD -1
      OPAT12: .WORD -1
      OPAT13: .WORD -1

      ODAT10: .WORD 73567
      ODAT11: .WORD 004210
      ODAT12: .WORD 114631
      ODAT13: .WORD 125252

      ODONE:
      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?).

4294
4300
```

4301

```
.SBTTL TEST # 22 - FSRC MODE 6 TEST
*****
*TEST 22 FSRC MODE 6 TEST
*
* THIS IS A TEST OF FSRC MODE 6, INDEX MODE
*
*****
TST22: SCOPE
```

4302	021574	000004			
4303	021576				
4304	021576	170011			
4305					
4306	021600	012700	022216		
4307	021604	172410			
4308					
4309	021606	012737	021714	000004	
4310					
4311	021614	012700	021765		
4312					
4313	021620	172460	000241		
4314		021622			
4315					
4316	021624	012701	022236		
4317	021630	174011			
4318	021632	012703	000004		
4319	021636	012702	022226		
4320	021642	012701	022236		
4321	021646	022221			
4322	021650	001007			
4323	021652	077303			
4324	021654	022700	021765		
4325	021660	001401			
4326	021662	000512			
4327	021664	000137	022246		
4328					
4329	021670	012701	022236		
4330	021674	012703	000004		
4331	021700	022721	177777		
4332	021704	001401			
4333	021706	000512			
4334	021710	077305			
4335	021712	000523			
4336					
4337	021714	021627	021622		
4338	021720	001411			
4339	021722	021627	021624		
4340	021726	001402			
4341	021730	000137	042566		
4342					
4343	021734	012737	000327	001246	
4344	021742	000443			
4345	021744	022700	021765		
4346	021750	001004			
4347	021752	012737	000321	001246	
4348	021760	000434			
4349	021762	022700	021775		
4350	021766	001004			

```

P1:      SETD                ;SET FD MODE
          MOV      #PPAT10,R0
          LDD      (R0),AC0   ;LOAD A DEFAULT PATTERN
                                ;INTO AC0
          MOV      #PERRO,ERRVECT ;IF THE (BUT FSRC) FORQ
                                ;FAILS AN ODD ADDRESS TRAP
                                ;COULD OCCUR.
P2:      LDD      241(R0),AC0
P3=P2+2
P4:      MOV      #PDAT00,R1
          STD      AC0,(R1)   ;GET THE DATA
          MOV      #4,R3
          MOV      #PDAT10,R2
          MOV      #PDAT00,R1
P5:      CMP      (R2)+,(R1)+ ;CHECK THE DATA
          BNE      P6
          SOB      R3,P5
          CMP      #PDAT10-241,R0 ;RO CORRECT?
          BEQ      1$
          BR      PERR21
1$:      JMP      PDONE
P6:      MOV      #PDAT00,R1
          MOV      #4,R3
P7:      CMP      #-1,(R1)+   ;WAS IT FSRC MODE 0?
          BEQ      P8
          BR      PERR1
P8:      SOB      R3,P7
          BR      PERR2
;TRAP TO HERE ON AN ODD ADDRESS
PERR0:   CMP      (SP),#P3
          BEQ      PERR11
          CMP      (SP),#P4   ;WAS IT FSRC MODE 7?
          BEQ      PERR10
          JMP      CPSPUR
PERR10:  MOV      #327,$TMP6
          BR      PERR17
PERR11:  CMP      #PDAT10-241,R0 ;WAS IT FSRC MODE 1
          BNE      PERR12
          MOV      #321,$TMP6
          BR      PERR17
PERR12:  CMP      #PDAT10-241+10,R0 ;WAS IT FSRC MODE 2
          BNE      PERR13
```

```

4351 021770 012737 0G0322 001246      MOV      #322,$TMP6
4352 021776 000425                BR      PERR17
4353 022000 022700 021767      PERR13: CMP      #PDAT10-241+2,R0      ;WAS IT FSRC MODE 3
4354 022004 001004                BNE     PERR14
4355 022006 012737 000323 001246      MOV      #323,$TMP6
4356 022014 000416                BR      PERR17
4357 022016 022700 021755      PERR14: CMP      #PDAT10-241-10,R0     ;WAS IT FSRC MODE 4
4358 022022 001004                BNE     PERR15
4359 022024 012737 000324 001246      MOV      #324,$TMP6
4360 022032 010407                BR      PERR17
4361 022034 022700 021763      PERR15: CMP      #PDAT10-241-2,R0     ;WAS IT FSRC MODE 5
4362 022040 001401                BEQ     PERR16
4363 022042 000416                BR      PERR20
4364 022044 012737 000325 001246  PERR16: MOV      #325,$TMP6
4365
4366 022052 012737 000627 001244  PERR17: MOV      #627,$TMP5      ;REPORT FSRC
4367 022060 012737 000326 001250      MOV      #326,$TMP7      ;FLOWS FAILURE.
4368 022066 011637 001236      MOV      (SP),$TMP2
4369 022072 022626      CMP      (SP)+,(SP)+
4370 022074 104101      1$:      ERROR   +101
4371 022076 000463                BR      PDONE
4372
4373 022100 011637 001236      PERR20: MOV      (SP),$TMP2      ;REPORT R0 AFFECTED
4374 022104 022626      CMP      (SP)+,(SP)+
4375 022106 000403                BR      PERR22
4376 022110 012737 021620 001236  PERR21: MOV      #P2,$TMP2
4377 022116                PERR22:
4378 022116 010037 001240      MOV      R0,$TMP3
4379 022122 012737 021765 001242      MOV      #PDAT10-241,$TMP4
4380 022130 104102      1$:      ERROR   +102
4381 022132 000445                BR      PDONE
4382
4383 022134                PERR1:      ;DATA FAILURE.
4384 022134 012737 021620 001236      MOV      #P2,$TMP2
4385 022142 012737 022226 001240      MOV      #PDAT10,$TMP3
4386 022150 012737 022236 001242      MOV      #PDAT00,$TMP4
4387 022156 104104      1$:      ERROR   +104
4388 022160 000432                BR      PDONE
4389
4390 022162                PERR2:      ;FSRC FAILURE TO
4391 022162 012737 021620 001236      MOV      #P2,$TMP2      ;MODE 0
4392 022170 012737 000627 001244      MOV      #627,$TMP5
4393 022176 012737 000326 001250      MOV      #326,$TMP7
4394 022204 012737 000320 001246      MOV      #320,$TMP6
4395 022212 104103      1$:      ERROR   +103
4396 022214 000414                BR      PDONE
4397
4398 022216 177777      PPAT10: .WORD   -1
4399 022220 177777      PPAT11: .WORD   -1
4400 022222 177777      PPAT12: .WORD   -1
4401 022224 177777      PPAT13: .WORD   -1
4402
4403 022226 010421      PDAT10: .WORD   010421
4404 022230 031463      PDAT11: .WORD   031463
4405 022232 052525      PDAT12: .WORD   052525
4406 022234 073567      PDAT13: .WORD   073567
4407
    
```

4408 022236 000000
4409 022240 000000
4410 022242 000000
4411 022244 000000
4412
4413 022246 104413
022246

PDAT00: .WORD 0
PDAT01: .WORD 0
PDAT02: .WORD 0
PDAT03: .WORD 0

PDONE:
RSETUP

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

4414
442

4422

.SBTTL TEST # 23 - FSRC MODE 7 TEST
:.....
*TEST 23 FSRC MODE 7 TEST
*
* THIS IS A TEST OF FSRC MODE 7, INDEX
* DEFERRED MODE.
*
:.....

022250 000004
4423
4424 022252
4425 022252 170011
4426
4427 022254 012700 022706
4428 022260 172410
4429
4430 022262 012737 022414 000004
4431
4432
4433
4434 022270 012700 022455
4435
4436 022274 172470 000241
4437 022276
4438
4439 022300 012701 022726
4440 022304 174011
4441
4442 022306 012703 000004
4443 022312 012704 022726
4444 022316 012705 022736
4445 022322 022425
4446 022324 001007
4447 022326 077303
4448
4449 022330 022700 022455
4450 022334 001401
4451 022336 000514
4452 022340 000137 022746
4453
4454 022344 012701 022726
4455 022350 012703 000004
4456 022354 022721 177777
4457 022360 001002
4458 022362 077304
4459 022364 000513
4460
4461 022366 012701 022716
4462 022372 012702 022726
4463 022376 012703 000004
4464 022402 022122
4465 022404 001401
4466 022406 000524
4467 022410 077304
4468 022412 000504
4469
4470

TST23: SCOPE
Q1: SETD
MOV #QPAT10,R0
LDD (R0),AC0 ;LOAD A DEFAULT
;PATTERN INTO AC0
MOV #QERR0,ERRVECT ;IF THE (BUT FSRC)
;FORK FAILS AN
;ODD ADR TRAP COULD
;OCCUR
MOV #QPAT20-241,R0
Q2: LDD @241(R0),AC0
Q3=Q2+2
Q4: MOV #QDAT00,R1
STD AC0,(R1) ;GET THE DATA
MOV #4,R3
MOV #QDAT00,R4
MOV #QDAT10,R5
Q5: CMP (R4)+,(R5)+ ;CHECK THE DATA
BNE Q6
SOB R3,Q5
CMP #QPAT20-241,R0 ;CHECK R0.
BEQ 1\$
BR QERR21
1\$: JMP QDONE
Q6: MOV #QDAT00,R1
MOV #4,R3
Q7: CMF #-1,(R1)+ ;WAS IT FSRC MODE 0?
BNE Q8
SOB R3,Q7
BR QERR2
Q8: MOV #QPAT20,R1
MOV #QDAT00,R2
MOV #4,R3
Q9: CMP (R1)+,(R2)+ ;WAS IT FSRC 6
;OR DATA FAILURE
BEQ Q10
BR QERR1
Q10: SOB R3,Q9
BR QERR3
;TRAP TO HERE ON AN ODD ADR FAILURE

```

4471
4472 022414 021627 021622 QERR0: CMP (SF),#P3
4473 022420 000137 042566 JMP (PSPUR)
4474
4475 022424 022700 022455 QERR11: CMP #QPAT20-241,R0 ;WAS IT FSRC
4476 022430 001004 BNE QERR12 ;MODE 1?
4477 022432 012737 000321 001246 MOV #321,$TMP6
4478 022440 000434 BR QERR17
4479 022442 022700 022465 QERR12: CMP #QPAT20-241+10,R0 ;WAS IT FSRC
4480 022446 001004 BNE QERR13 ;MODE 2?
4481 022450 012737 000322 001246 MOV #322,$TMP6
4482 022456 000425 BR QERR17
4483 022460 022700 022457 QERR13: CMP #QPAT20-241+2,R0 ;WAS IT FSRC
4484 022464 001004 BNE QERR14 ;MODE 3?
4485 022466 012737 000323 001246 MOV #323,$TMP6
4486 022474 000416 BR QERR17
4487 022476 022700 022445 QERR14: CMP #QPAT20-241-10,R0 ;WAS IT FSRC
4488 022502 001004 BNE QERR15 ;MODE 4
4489 022504 012737 000324 001246 MOV #324,$TMP6
4490 022512 000407 BR QERR17
4491
4492 022514 022700 022453 QERR15: CMP #QPAT20-241-2,R0 ;WAS IT FSRC
4493 022520 001401 BEQ QERR16 ;MODE 5
4494 022522 000416 BR QERR20
4495
4496 022524 012737 000325 001246 QERR16: MOV #325,$TMP6
4497
4498 022532 012737 000627 001244 QERR17: MOV #627,$TMP5 ;REPORT FSRC FAILURE
4499 022540 012737 000327 001250 MOV #327,$TMP7
4500 022546 011637 001236 MOV (SP),$TMP2
4501 022552 022626 CMP (SP)+,(SP)+
4502 022554 104105 1$: ERROR +105
4503 022556 000473 BR QDONE
4504
4505 022560 011637 001236 QERR20: MOV (SP),$TMP2 ;REPORT R0 AFFECTED.
4506 022564 022626 CMP (SP)+,(SP)+
4507 022566 000403 BR QERR22
4508 022570 012737 022274 001236 QERR21: MOV #Q2,$TMP2
4509 022576 QERR22:
4510 022576 010037 001240 MOV R0,$TMP3
4511 022602 012737 022455 001242 MOV #QPAT20-241,$TMP4
4512 022610 104106 1$: ERROR +106
4513 022612 000455 BR QDONE
4514
4515 022614 012737 000320 001246 QERR2: MOV #320,$TMP6 ;WENT TO FSRC
4516 022622 000403 BR QERR4 ;MODE 0
4517 022624 012737 000326 001246 QERR3: MOV #326,$TMP6 ;WENT TO FSRC
4518 ;MODE 6
4519 022632 012737 000627 001244 QERR4: MOV #627,$TMP5
4520 022640 012737 000327 001250 MOV #327,$TMP7
4521 022646 012737 022274 001236 MOV #Q2,$TMP2
4522 022654 104107 1$: ERROR +107
4523 022656 000433 BR QDONE
4524
4525 022660 QERR1: ;DATA FAILURE
4526 022660 012737 022274 001236 MOV #Q2,$TMP2
4527 022666 012737 022736 001240 MOV #QDAT10,$TMP3

```

```

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

```

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

4553

4570

```

.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 CTRLG WAS PASSED
* THROUGH WITH THE FORKS PROPERLY.
*
*****
    
```

```

4571 022750 000004
4571 022752 005037 024074
4572 022756 012700 024024
4573 022762 012701 000004
4574 022766 012720 177777
4575 022772 077103
4576
4577 022774 012737 000033 024076
4578 023002 012737 000023 024100
4579 023010 012737 023554 000244
4580 023016
      023016 012737 023024 001110
4581 023024 012700 000200
4582 023030 170100
4583 023032 012700 024024
4584 023036 172410
4585 023040 013737 024076 024102
4586 023046 012737 000001 024104
4587 023054 012737 000254 024106
4588
4589 023062 012700 024034
4590 023066 172410
4591 023070 010037 001252
4592 023074 012737 023066 001236
4593
4594 023102 012704 000204
4595 023106 170205
4596
4597 023110 020405
4598 023112 001402
4599 023114 000137 023600
4600
4601 023120
      023120 012737 023126 001110
4602 023126 012700 000200
4603 023132 170100
4604
4605 023134 012700 024024
4606 023140 172410

TST24: SCOPE
        CLR      UFLAG
        MOV      #UPAT00,R0      ;SET UP AC#0 DATA.
U0:     MOV      #4,R1
        MOV      #-1,(R0)+
        SOB      R1,U0
        MOV      #033,UTMP1
        MOV      #023,UTMP2
        MOV      #UERR0,FPVECT  ;IN CASE (BUT FIUV FAILS)
U1:     MOV      #1$,SLPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
        MOV      #200,R0
        LDFPS   R0
        MOV      #UPAT00,R0      ;LOAD AC0
        LDD     (R0),AC0
        MOV      UTMP1,UROM1
        MOV      #001,UROM2
        MOV      #254,UROM3
U2:     MOV      #UPAT10,R0      ;LOAD 0 INTO AC0
        LDD     (R0),AC0
        MOV      R0,$TMP10
        MOV      #U2,$TMP2
        MOV      #204,R4
        STFPS   R5
        ;SEE IF FPS IS CORRECT
        CMP     R4,R5
        BEQ     U3
        JMP     UERR1
U3:     MOV      #1$,SLPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
        MOV      #200,R0
        LDFPS   R0
        MOV      #UPAT00,R0      ;LOAD AC0
        LDD     (R0),AC0
    
```

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

```

4662 023446 005020          U13:  CLR      (R0)+
4663 023450 077102          SOB      R1,U13
4664 023452 012737 177777 024074  MOV      #-1,UFLAG
4665 023460 012737 000233 024076  MOV      #233,UTMP1
4666 023466 012737 000223 024100  MOV      #223,UTMP2
4667 023474 000137 023016          JMP      U1
4668 023500          U14:  MOV      #1$,SLPERR          ;SET UP THE LOOP ON ERROR ADDRESS.
      023500 012737 023506 001110  ;NOW SEE IF A TRAP CAN BE FORCED BY SETTING FIUV AND LOADING -0
4669          1$:  MOV      #UERR3,FPVECT
4670 023506 012737 023750 000244  MOV      #4200,R0          ;SET FD AND FIUV
4671 023514 012700 004200          LDFPS   R0
4672 023520 170100          LDFPS   R0
4673 023522 012700 024024  MOV      #UPAT00,R0          ;SET UP ACO
4674 023526 172410          LDD     (R0),AC0
4675 023530 012700 024064  MOV      #UPAT40,R0          ;LOAD -0
4676 023534 172410  U15:  LDD     (R0),AC0          ;SHOULD TRAP TO 244
4677 023536 170000  U16:  CFCC
4678 023540 000240          NOP
4679 023542 012737 023534 001236  MOV      #U15,$TMP2          ;REPORT ERROR.
4680          ;DIDN'T TRAP
4681 023550 104127  1$:  ERROR  +127          ;(BUT FIUV) FAILED.
4682 023552 000556          BR      UDONE
4683
4684          ;TRAPPED TO 244. DID (BUT FIUV) FAIL?
4685 023554 021627 023376  UERR0:  CMP      (SP),#U11
4686 023560 001402          BEQ     1$
4687 023562 000137 042534          JMP     FPSPUR
4688 023566 011637 001236  1$:  MOV      (SP),$TMP2
4689 023572 022626          CMP     (SP)+,(SP)+
4690 023574 104126  2$:  ERROR  +126
4691 023576 000544          BR      UDONE
4692
4693          ;COME HERE TO ANALYZE FPS ERRORS
4694
4695 023600 032705 000004  UERR1:  BIT      #4,R5
4696 023604 001432          BEQ     UERR20
4697 023606 012737 000443 001244  UERR10:  MOV      #443,$TMP5
4698 023614 013703 024106          MOV     UROM3,R3
4699 023620 010337 001250          MOV     R3,$TMP7
4700 023624 032703 000200          BIT     #200,R3
4701 023630 001403          BEQ     1$
4702 023632 042703 000200          BIC     #200,R3
4703 023636 000402          BR      2$
4704 023640 052703 000200  1$:  BIS     #200,R3
4705 023644 010337 001246  2$:  MOV     R3,$TMP6
4706 023650 010537 001240  UERR11:  MOV     R5,$TMP3
4707 023654 010437 001242          MOV     R4,$TMP4
4708 023660 104124  1$:  ERROR  +124
4709 023662 000512          BR      UDONE
4710 023664 032705 000004  UERR2:  BIT      #4,R5
4711 023670 001746          BEQ     UERR10
4712 023672 013737 024102 001244  UERR20:  MOV     UROM1,$TMP5
4713 023700 013703 024104          MOV     UROM2,R3
4714 023704 010337 001250          MOV     R3,$TMP7
4715 023710 032703 000400          BIT     #400,R3
4716 023714 001403          BEQ     1$
4717 023716 042703 000400          BIC     #400,R3
    
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4718 023722 000402          BR      2$
4719 023724 052703 000400 1$:    BIS      #400,R3
4720 023730 010337 001246 2$:    MOV      R3,$TMP6
4721 023734 010537 001240 UERR21: MOV     R5,$TMP3
4722 023740 010437 001242        MOV     R4,$TMP4
4723 023744 104125        1$:    ERROR   +125
4724 023746 000460          BR      UDONE
4725
4726          ;INTERRUPT HERE WHEN FIUV SET AND ATTEMPTED TO LOAD-0
4727 023750 021627 023536 UERR3:  CMP     (SP),#U16
4728 023754 001402        BEQ     1$
4729 023756 000137 042534        JMP     FPSPUR
4730 023762 022626        1$:    CMP     (SP)+,(SP)+
4731 023764 005000        CLR     R0
4732 023766 170300        STST   R0          ;GET FEC.
4733 023770 022700 000014        CMP     #14,R0      ;CORRECT
4734 023774 001001        BNE    UERR4
4735 023776 000444        BR     UDONE
4736 024000 012737 023534 001236 UERR4:  MOV     #U15,$TMP2
4737 024006 012737 000012 001242        MOV     #12,$TMP4
4738 024014 010037 001240        MOV     R0,$TMP3
4739 024020 104130        1$:    ERROR   +130
4740 024022 000432        BR     UDONE
4741 024024 000000        UPAT00: .WORD  0
4742 024026 000000        UPAT01: .WORD  0
4743 024030 000000        UPAT02: .WORD  0
4744 024032 000000        UPAT03: .WORD  0
4745
4746 024034 000000        UPAT10: .WORD  0          ;0
4747 024036 000000        UPAT11: .WORD  0
4748 024040 000000        UPAT12: .WORD  0
4749 024042 000000        UPAT13: .WORD  0
4750
4751 024044 010421        UPAT20: .WORD  010421      ;POS NUM
4752 024046 114631        UPAT21: .WORD  114631
4753 024050 125252        UPAT22: .WORD  125252
4754 024052 177777        UPAT23: .WORD  177777
4755
4756 024054 114631        UPAT30: .WORD  114631      ;NEG NUM
4757 024056 135673        UPAT31: .WORD  135673
4758 024060 146314        UPAT32: .WORD  146314
4759 024062 167356        UPAT33: .WORD  167356
4760
4761 024064 100000        UPAT40: .WORD  100000     ;NEG ZERO
4762 024066 000000        UPAT41: .WORD  0
4763 024070 000000        UPAT42: .WORD  0
4764 024072 000000        UPAT43: .WORD  0
4765
4766 024074 000000        UFLAG:  .WORD  0
4767 024076 000000        UTMP1:  .WORD  0
4768 024100 000000        UTMP2:  .WORD  0
4769 024102 000000        UROM1:  .WORD  0
4770 024104 000000        UROM2:  .WORD  0
4771 024106 000000        UROM3:  .WORD  0
4772 024110          UDONE:
4773
4774
    
```

4782

.SBTTL TEST # 25 - ADDF, ADD, SUBF AND SUBD WITH FSRC=AC=0 TEST
 :*****
 :*TEST 25 ADDF, ADD, SUBF AND SUBD WITH FSRC=AC=0 TEST

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

:*****

4783	024110	030004			TEST25: SCOPE	
	024112				W1:	
	024112	012737	024120	001110	MOV #1\$, \$LPERR	;SET UP THE LOOP ON ERROR ADDRESS.
4784	024120	012700	000200		1\$: MOV #200, R0	
4785	024124	170100			LDFPS R0	;SET DOUBLE MODE
4786	024126	012700	024664		MOV #WPAT00, R0	;LOAD AC0=:
4787	024132	172410			LDD (R0), AC0	
4788	024134	012737	024146	001236	MOV #W2, \$TMP2	
4789	024142	012700	024664		MOV #WPAT00, R0	
4790	024146	172010			W2: ADD (R0), AC0	;TEST INSTRUCTION.
4791	024150	170205			STFPS R5	;GET FPS
4792	024152	170011			SETD	;SET DOUBLE MODE
4793	024154	012700	024664		MOV #WPAT00, R0	
4794	024160	174010			STD AC0, (R0)	;GET THE RESULT
4795	024162	012701	024664		MOV #WPAT00, R1	
4796	024166	012702	000004		MOV #4, R2	
4797	024172	022021			W3: CMP (R0)+, (R1)+	;IS RESULT CORRECT
4798	024174	001405			BEQ W4	
4799						;NO
4800	024176	004737	024632		1\$: JSR PC, WSETUP	
4801	024202	104133			ERROR +133	
4802	024204	000137	024704		JMP WDONE	
4803	024210	077210			W4: SOB R2, W3	
4804	024212	022705	000204		CMP #204, R5	;IS FPS CORRECT
4805	024216	001410			BEQ W5	
4806						;NO
4807	024220	012737	000204	001242	MOV #204, \$TMP4	
4808	024226	010537	001240		MOV R5, \$TMP3	
4809	024232	104137			1\$: ERROR +137	
4810	024234	000137	024704		JMP WDONE	
4811	024240				W5:	
	024240	012737	024246	001110	MOV #1\$, \$LPERR	;SET UP THE LOOP ON ERROR ADDRESS.
4812	024246	012700	000200		1\$: MOV #200, R0	
4813	024252	170100			LDFPS R0	;SET DOUBLE MODE
4814	024254	012700	024664		MOV #WPAT00, R0	;LOAD AC0=0
4815	024260	172410			LDD (R0), AC0	
4816	024262	012737	024300	001236	MOV #W6, \$TMP2	
4817	024270	005000			CLR R0	
4818	024272	170100			LDFPS R0	;GO TO FLOATING MODE
4819	024274	012700	024664		MOV #WPAT00, R0	
4820	024300	172010			W6: ADDF (R0), AC0	;TEST INSTRUCTION
4821	024302	170205			STFPS R5	;GET FPS
4822	024304	170011			SETD	;RESET TO DOUBLE MODE
4823	024306	012700	024664		MOV #WPAT00, R0	
4824	024312	174010			STD AC0, (R0)	;GET THE RESULT
4825	024314	012701	024664		MOV #WPAT00, R1	
4826	024320	012702	000004		MOV #4, R2	
4827	024324	022021			W7: CMP (R0)+, (R1)+	;WAS THE RESULT

4828	024326	001402			BEQ	W10		:NO. REPORT FAILURE.
4829	024330	104134			1\$:	ERROR	+134	
4830	024332	000564				BR	WDONE	
4831	024334	077205			W10:	SOB	R2,W7	
4832	024336	022705	000004			CMP	#4,R5	:WAS FPS CORRECT
4833	024342	001407				BEQ	W11	:INCORRECT FPS.
4834								
4835	024344	012737	000004	001242		MOV	#4,\$TMP4	
4836	024352	010537	001240			MOV	R5,\$TMP3	
4837	024356	104140			1\$:	ERROR	+140	
4838	024360	000551				BR	WDONE	
4839	024362				W11:			
4840	024370	012737	024370	001110		MOV	#1\$,SLPERR	:SET UP THE LOOP ON ERROR ADDRESS.
4841	024374	170100	000200		1\$:	MOV	#200,R0	:SET DOUBLE MODE
4842	024376	012700	024664			LDFPS	R0	:LOAD AC0=0
4843	024402	172410				MOV	#WPAT00,R0	
4844	024404	012737	024416	001236		LDD	(R0),AC0	
4845	024412	012700	024664			MOV	#W12,\$TMP2	
4846	024416	173010			W12:	MOV	#WPAT00,R0	
4847	024420	170205				SUBD	(R0),AC0	:TEST INSTRUCTION
4848	024422	170011				STFPS	R5	:GET FPS
4849	024424	012700	024664			SETD		:SET DOUBLE MODE
4850	024430	174010				MOV	#WPAT00,R0	
4851	024432	012701	024664			STD	AC0,(R0)	:GET THE RESULT
4852	024436	012702	000004			MOV	#WPAT00,R1	
4853	024442	022021			W13:	MOV	#4,R2	
4854	024444	001404				CMP	(R0)+,(R1)+	:IS RESULT CORRECT?
4855						BEQ	W14	:NO.
4856	024446	004737	024632			JSR	PC,WSETUP	
4857	024452	104135			1\$:	ERROR	+135	
4858	024454	000513				BR	WDONE	
4859	024456	077207			W14:	SOB	R2,W13	
4860	024460	022705	000204			CMP	#204,R5	:IS FPS CORRECT?
4861	024464	001407				BEQ	W15	:NO.
4862								
4863	024466	012737	000204	001242		MOV	#204,\$TMP4	
4864	024474	010537	001240			MOV	R5,\$TMP3	
4865	024500	104141			1\$:	ERROR	+141	
4866	024502	000500				BR	WDONE	
4867	024504				W15:			
4868	024512	012737	024512	001110		MOV	#1\$,SLPERR	:SET UP THE LOOP ON ERROR ADDRESS.
4869	024516	170100	000200		1\$:	MOV	#200,R0	:SET DOUBLE MODE
4870	024520	012700	024664			LDFPS	R0	:LOAD AC0=0
4871	024524	172410				MOV	#WPAT00,R0	
4872	024526	012737	024544	001236		LDD	(R0),AC0	
4873	024534	005000				MOV	#W16,\$TMP2	
4874	024536	170100				CLR	R0	
4875	024540	012700	024664			LDFPS	R0	:ENTER FLOATING MODE.
4876	024544	173010			W16:	MOV	#WPAT00,R0	
4877	024546	170205				SUBF	(R0),AC0	:TEST INSTRUCTION.
4878	024550	170011				STFPS	R5	:GET FPS
4879	024552	012700	024664			SETD		:RESET TO DOUBLE MODE
4880	024556	174010				MOV	#WPAT00,R0	:GET THE RESULT.
4881	024560	012701	024664			STD	AC0,(R0)	
4882	024564	012702	000004			MOV	#WPAT00,R1	
						MOV	#4,R2	

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4883 024570 022021          W17:  CMP      (R0)+,(R1)+      ;IS RESULT CORRECT?
4884 024572 001404          BEQ      W20
4885                                ;NO.
4886 024574 004737 024632          JSR      PC,WSETUP
4887 024600 104136          1S:  ERROR  +136
4888 024602 00044C          BR      WDONE
4889 024604 077207          W20:  SOB      R2,W17
4890 024606 022705 000004          CMP      #4,R5      ;IS FPS CORRECT?
4891 024612 007434          BEQ      WDONE
4892                                ;NO
4893 024614 012737 000004 001242          MOV      #4,$TMP4
4894 024622 010537 001240          MOV      R5,$TMP3
4895 024626 104142          1S:  ERROR  +142
4896 024630 000425          BR      WDONE
4897
4898          ;SET UP FOR ERROR CALL
4899
4900 024632 012737 024664 001240 WSETUP: MOV      #WPAT00,$TMP3
4901 024640 012737 024664 001242          MOV      #WPAT00,$TMP4
4902 024646 012737 024664 001246          MOV      #WPAT00,$TMP6
4903 024654 012737 024654 001244          MOV      #WPAT00,$TMP5
4904 024662 000207          RTS      PC
4905 024664 000000          WPAT00: .WORD 0
4906 024666 000000          WPAT01: .WORD 0
4907 024670 000000          WPAT02: .WORD 0
4908 024672 000000          WPAT03: .WORD 0
4909
4910 024674 000000          WDAPO0: .WORD 0
4911 024676 000000          WDAT01: .WORD 0
4912 024700 000000          WDAT02: .WORD 0
4913 024702 000000          WDAT03: .WORD 0
4914
4915 024704          WDONE:
      024704 104413          RSETUP
                                ;GO INITIALIZE THE FPS AND STACK; AND
                                ;SEE IF THE USER HAS EXPRESSED
                                ;THE DESIRE TO CHANGE THE SOFTWARE
                                ;VIRTUAL CONSOLE SWITCH REGISTER (HAS
                                ;THE USER TYPED CONTROL G?).
4916
4917

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4924

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.SBTTL TEST # 26 - ADD AND SUB WITH FSRC=0
.....
*TEST 26      ADD AND SUB WITH FSRC=0
*
* THIS IS A TEST OF ADD AND SUB WITH FSRC=0.
*

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.....
TST26: SCOPE
X1:
4925 024706 000004
4925 024710
4926 024710 012737 024716 001110
4926 024716 012700 000200
4927 024722 170100
4928 024724 012700 025470
4929 024730 010037 025456
4930 024734 172410
4931 024736 012737 024750 001236
4932 024744 012700 025500
4933 024750 172010
4934 024752 170205
4935 024754 170011
4936 024756 012700 025460
4937 024762 174010
4938 024764 012701 025470
4939 024770 012702 000004
4940 024774 022021
4941 024776 001401
4942 025000 000561
4943 025002 077204
4944 025004 012704 000200
4945 025010 020405
4946 025012 001402
4947 025014 000137 025426
4948 025020
4949 025020 012737 025026 001110
4949 025026 012700 000200
4950 025032 170100
4951 025034 012700 025510
4952 025040 010037 025456
4953 025044 172410
4954 025046 012737 025060 001236
4955 025054 012700 025500
4956 025060 172010
4957 025062 170205
4958 025064 170011
4959 025066 012700 025460
4960 025072 174010
4961 025074 012701 025510
4962 025100 012702 000004
4963 025104 022021
4964 025106 001401
4965 025110 000515
4966 025112 077204
4967 025114 012704 000210
4968 025120 020405
4969 025122 001401
4970 025124 000540

X1:      MOV      #1$, $LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
1$:      MOV      #200,R0
          LDFPS   R0              ;SET DOUBLE MODE
          MOV      #XPAT00,R0     ;SET ACO TO POSITIVE
          MOV      R0,XTMP       ;NUMBER #0
          LDD     (R0),ACO
          MOV      #X2,$TMP2
          MOV      #XPAT10,R0    ;FSRC=0
X2:      ADDD    (R0),ACC        ;TEST INSTRUCTION
          STFPS   R5
          SETD
          MOV      #XDAT00,R0    ;GET RESULT.
          STD     ACO,(R0)
          MOV      #XPAT00,R1
          MOV      #4,R2
X3:      CMP     (R0)+,(R1)+    ;IS RESULT CORRECT?
          BEQ     X4
          BR      XERR1
X4:      SOB     R2,X3
          MOV      #200,R4
          CMP     R4,R5          ;IS FPS CORRECT?
          BEQ     X5
          JMP     XERR2
X5:      MOV      #1$, $LPERR    ;SET UP THE LOOP ON ERROR ADDRESS.
1$:      MOV      #200,R0
          LDFPS   R0              ;SET DOUBLE MODE
          MOV      #XPAT20,R0     ;SET ACO TO
          MOV      R0,XTMP       ;NEGATIVE NUMBER
          LDD     (R0),ACO
          MOV      #X6,$TMP2
          MOV      #XPAT10,R0    ;FSRC=0
X6:      ADDD    (R0),ACC        ;TEST INSTRUCTION
          STFPS   R5
          SETD
          MOV      #XDAT00,R0    ;GET RESULT
          STD     ACO,(R0)
          MOV      #XPAT20,R1
          MOV      #4,R2
X7:      CMP     (R0)+,(R1)+    ;IS RESULT CORRECT?
          BEQ     X10
          BR      XERR1
X10:     SOB     R2,X7
          MOV      #210,R4
          CMP     R4,R5          ;IS FPS CORRECT?
          BEQ     X11
          BR      XERR2

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4971 025126          012737 025134 001110  X11:  MOV    #18,SLPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      025126          012700 000200          'S:  MOV    #200,R0
4972 025134          170100          LDFPS  R0              ;SET DOUBLE MODE
4973 025140          012700 025470          MOV    #XPAT00,R0     ;SET ACO TO NON-ZERO
4974 025142          010037 025456          MOV    R0,XTMP        ;POSITIVE NUMBER
4975 025146          172410          LDD    (R0),ACO
4976 025152          012737 025166 001236  MOV    #X12,STMP2
4977 025154          012700 025500          MOV    #XPAT10,R0     ;FSRC=0
4978 025162          173010          SUBD   (R0),ACO       ;TEST INSTRUCTION
4979 025166          170205          STFPS  R5
4980 025170          170011          SETD
4981 025172          012700 025460          MOV    #XDAT00,R0     ;GET RESULT
4982 025174          174010          STD    ACO,(R0)
4983 025200          012701 025470          MOV    #XPAT00,R1
4984 025202          012702 000004          MOV    #4,R2
4985 025206          022021          X13:  CMP    (R0)+,(R1)+   ;IS RESULT CORRECT?
4986 025212          001401          BEQ    X14
4987 025214          000465          BR     XERR3
4988 025216          077204          X14:  SOB    R2,X13
4989 025220          012704 000200          MOV    #200,R4        ;IS FPS CORRECT?
4990 025222          020405          CMP    R4,R5
4991 025226          001401          BEQ    X15
4992 025230          000503          BR     XERR4
4993 025232
4994 025234          012737 025242 001110  X15:  MOV    #18,SLPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      025234          012700 000200          'S:  MOV    #200,R0
4995 025242          170100          LDFPS  R0              ;SET DOUBLE MODE
4996 025246          012700 025510          MOV    #XPAT20,R0     ;SET ACO=A NEGATIVE
4997 025250          010037 025456          MOV    R0,XTMP        ;NUMBER
4998 025254          172410          LDD    (R0),ACO
4999 025260          012737 025274 001236  MOV    #X16,STMP2
5000 025262          012700 025500          MOV    #XPAT10,R0     ;FSRC=0
5001 025270          173010          SUBD   (R0),ACO       ;TEST INSTRUCTION.
5002 025274          170205          STFPS  R5
5003 025276          170011          SETD
5004 025300          012700 025460          MOV    #XDAT00,R0     ;GET RESULT
5005 025302          174010          STD    ACO,(R0)
5006 025306          012701 025510          MOV    #XPAT20,R1
5007 025310          012702 000004          MOV    #4,R2
5008 025314          022021          X17:  CMP    (R0)+,(R1)+   ;IS RESULT CORRECT?
5009 025320          001401          BEQ    X20
5010 025322          000422          BR     XERR3
5011 025324          077204          X20:  SOB    R2,X17
5012 025326          012704 000210          MOV    #210,R4        ;IS FPS CORRECT?
5013 025330          020405          CMP    R4,R5
5014 025334          001401          BEQ    X21
5015 025336          000440          BR     XERR4
5016 025340          000466          X21:  BR     XDONE
5017 025342
5018
5019          ;REPORT DATA ERRORS
5020
5021 025344          012737 025500 001240  XERR1: MOV    #XPAT10,STMP3
5022 025352          013737 025456 001242          MOV    XTMP,STMP4
5023 025360          012737 025460 001244          MOV    #XDAT00,STMP5
5024 025366          104143          'S:  ERROR +143
5025 025370          000453          BR     XDONE
    
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5026 025372 012737 025500 001240 XERR3: MOV #XPAT10,$TMP3
5027 025400 013737 025456 001242 MOV $TMP,$TMP4
5028 025406 012737 025460 001244 MOV #XDAT00,$TMP5
5029 025414 013737 025456 001246 MOV $TMP,$TMP6
5030 025422 104144 1$: ERROR +144
5031 025424 000435 BR $XDONE
5032
5033 ;REPORT FPS ERRORS
5034
5035 025426 XERR2:
5036 025426 010537 001240 MOV R5,$TMP3
5037 025432 010437 001242 MOV R4,$TMP4
5038 025436 104145 1$: ERROR +145
5039 025440 000427 BR $XDONE
5040 025442 XERR4:
5041 025442 010537 001240 MOV R5,$TMP3
5042 025446 010437 001242 MOV R4,$TMP4
5043 025452 104146 1$: ERROR +146
5044 025454 000421 BR $XDONE
5045 025456 000000 $TMP: .WORD 0
5046 025460 000000 XDAT00: .WORD 0
5047 025462 000000 XDAT01: .WORD 0
5048 025464 000000 XDAT02: .WORD 0
5049 025466 000000 XDAT03: .WORD 0
5050
5051 025470 010421 XPAT00: .WORD 010421
5052 025472 021042 XPAT01: .WORD 021042
5053 025474 031463 XPAT02: .WORD 031463
5054 025476 042104 XPAT03: .WORD 042104
5055
5056 025500 000000 XPAT10: .WORD 0
5057 025502 000000 XPAT11: .WORD 0
5058 025504 000000 XPAT12: .WORD 0
5059 025506 000000 XPAT13: .WORD 0
5060 025510 104210 XPAT20: .WORD 104210
5061 025512 114631 XPAT21: .WORD 114631
5062 025514 125252 XPAT22: .WORD 125252
5063 025516 135673 XPAT23: .WORD 135673
5064
5065 025520 XDONE:
025520 104413 RSETUP

```

```

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

```

5066

5074

```

.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.
*

```

```

5075 025522 010004
5075 025524 005037 026060
5076 025530 012737 026100 026062
5077 025536 012737 026110 026064
5078 025544 012737 000210 026066
5079 025552
5080 025552 012737 025560 001110
5080 025560 012700 000200
5081 025560 170100
5082 025566 012700 026120
5083 025572 172410
5084 025574 013700 026062
5085 025600 173010
5086 025602 170205
5087 025604 170011
5088 025606 012700 026070
5089 025612 174010
5090 025614 012702 000004
5091 025620 013701 026064
5092 025624 022021
5093 025626 001026
5094 025630 077203
5095 025632 023705 026066
5096 025636 001401
5097 025640 000475
5098 025642 005737 026060
5099 025646 001015
5100 025650 012737 177777 026060
5101 025656 012737 026110 026062
5102 025664 012737 026100 026064
5103 025672 012737 000200 026066
5104 025700 000724
5105 025702 000512
5106 025704 012702 000004
5107 025710 012700 026062
5108 025714 012701 026070
5109 025720 022021
5110 025722 001002
5111 025724 077203
5112 025726 000421
5113 025730
5114 025730 012737 025600 001236
5115 025736 013737 026062 001240
5116 025744 012737 026120 001242
5117 025752 012737 026070 001244
5118 025760 013737 026064 001246
5119 025766 104147
5120 025770 000457

```

```

.....
TST27: SCOPE
      CLR      YFLAG
      MOV      #YPAT00,YTMP1      ;P
      MOV      #YPAT10,YTMP2      ;N
      MOV      #210,YTMP3
Y1:   MOV      #18,$LPERR          ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV      #200,R0
      LDFPS    R0                  ;SET DOUBLE MODE
      MOV      #YPAT20,R0          ;SET AC0=0
      LDD      (R0),AC0
      MOV      YTMP1,R0
Y2:   SUBD    (R0),AC0             ;TEST INSTRUCTION
      STFPS    R5
      SETD
      MOV      #YDAT00,R0          ;GET RESULT
      STD      AC0,(R0)
      MOV      #4,R2
      MOV      YTMP2,R1            ;CHECK RESULT.
Y3:   CMP     (R0)+,(R1)+
      BNE     Y6
      SOB     R2,Y3
      CMP     YTMP3,R5             ;FPS CORRECT?
      BEQ     Y4
      BR      YERR3
Y4:   TST     YFLAG                ;FINISHED TEST?
      BNE     Y5
      MOV     #-1,YFLAG
      MOV     #YPAT10,YTMP1
      MOV     #YPAT00,YTMP2
      MOV     #200,YTMP3
      BR     Y1
Y5:   BR     YDONE
Y6:   MOV     #4,R2
      MOV     #YTMP1,R0            ;DID XOR OF SIGN BIT
      MOV     #YDAT00,R1          ;FAIL?
      CMP     (R0)+,(R1)+
      BNE     YERR1
      SOB     R2,Y7
      BR     YERR2
YERR1: MOV     #Y2,$TMP2            ;DATA FAILURE
      MOV     YTMP1,$TMP3
      MOV     #YPAT20,$TMP4
      MOV     #YDAT00,$TMP5
      MOV     YTMP2,$TMP6
      BR     ERROR
      ERROR  +147
      BR     YDONE

```


5170

.SBTTL TEST # 30 - ADD WITH AC=0 TEST
 :*****
 :*TEST 30 ADD WITH AC=0 TEST

:@
 :@ THIS IS A TEST OF ADD WITH AC=0. BOTH
 :* POSITIVE AND NEGATIVE FSRC'S ARE TRIED.
 :*

:*****

5171 026132 000004
 5172 026134 005037 026370
 5173 026140 012737 026406 026372
 5174 026146 012737 000200 026374
 5175 026154 012737 026162 001110
 5176 026162 012700 000200
 5177 026166 170100
 5178 026170 012700 026426
 5179 026174 172410
 5180 026176 013700 026372
 5181 026202 172010
 5182 026204 170205
 5183 026206 170011
 5184 026210 012700 026376
 5185 026214 174010
 5186 026216 012702 000004
 5187 026222 013701 026372
 5188 026226 022021
 5189 026230 001401
 5190 026232 000423
 5191 026234 077204
 5192 026236 023705 026374
 5193 026242 001401
 5194 026244 000437
 5195 026246 005737 026370
 5196 026252 001012
 5197 026254 012737 177777 026370
 5198 026262 012737 026416 026372
 5199 026270 012737 000210 026374
 5200 026276 000726
 5201 026300 000456
 5202 026302 012737 026202 001236
 5203 026310 013737 026372 001240
 5204 026316 012737 026426 001242
 5205 026324 012737 026376 001244
 5206 026332 013737 026372 001246
 5207 026340 104152
 5208 026342 000435
 5209 026344
 5210 026344 012737 026202 001236
 5211 026352 010537 001240
 5212 026356 013737 026374 001242
 5213 026364 104153
 5214 026366 000423
 5215

TST30: SCOPE
 CLR ZFLAG
 MOV #ZPAT00,ZTMP1 ;P
 MOV #200,ZTMP2
 Z1: MOV #1\$,SLPERR ;SET UP THE LOOP ON ERROR ADDRESS.
 1\$: MOV #200,R0
 LDFPS R0 ;SET DOUBLE MODE
 MOV #ZPAT20,R0 ;SET AC0=0
 LDD (R0),AC0
 MOV ZTMP1,R0
 Z2: ADDD (R0),AC0 ;TEST INSTRUCTION
 STFPS R5
 SETD
 MOV #ZDAT00,R0 ;GET RESULT
 STD AC0,(R0)
 MOV #4,R2
 MOV ZTMP1,R1 ;RESULT CORRECT?
 Z3: CMP (R0)+,(R1)+
 BEQ Z4
 BR ZERR1
 Z4: SOB R2,Z3
 CMP ZTMP2,R5 ;FPS CORRECT?
 BEQ Z5
 BR ZERR2
 Z5: TST ZFLAG ;FINISHED TEST?
 BNE Z6
 MOV #-1,ZFLAG
 MOV #ZPAT10,ZTMP1
 MOV #210,ZTMP2
 BR Z1
 Z6: BR ZDONE
 ZERR1: ;DATA FAILURE
 MOV #Z2,\$TMP2
 MOV ZTMP1,\$TMP3
 MOV #ZPAT20,\$TMP4
 MOV #ZDAT00,\$TMP5
 MOV ZTMP1,\$TMP6
 1\$: ERROR +152
 BR ZDONE
 ZERR2:
 MOV #Z2,\$TMP2
 MOV R5,\$TMP3
 MOV ZTMP2,\$TMP4
 1\$: ERROR +153
 BR ZDONE

5216	026370	000000	ZFLAG:	.WORD	0
5217	026372	000000	ZTMP1:	.WORD	0
5218	026374	000000	ZTMP2:	.WORD	0
5219					
5220	026376	000000	ZDAT00:	.WORD	0
5221	026400	000000	ZDAT01:	.WORD	0
5222	026402	000000	ZDAT02:	.WORD	0
5223	026404	000000	ZDAT03:	.WORD	0
5224					
5225	026406	031463	ZPAT00:	.WORD	031463
5226	026410	010421	ZPAT01:	.WORD	010421
5227	026412	146314	ZPAT02:	.WORD	146314
5228	026414	156735	ZPAT03:	.WORD	156735
5229					
5230	026416	156735	ZPAT10:	.WORD	156735
5231	026420	167356	ZPAT11:	.WORD	167356
5232	026422	135673	ZPAT12:	.WORD	135673
5233	026424	146314	ZPAT13:	.WORD	146314
5234					
5235	026426	000000	ZPAT20:	.WORD	0
5236	026430	000000	ZPAT21:	.WORD	0
5237	026432	000000	ZPAT22:	.WORD	0
5238	026434	000000	ZPAT23:	.WORD	0
5239					
5240	026436		ZDONE:		
	026436	104413		RSETUP	

```

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

5241
5242

5250

..SBTTL TEST # 31 - ADDF & ADDD E(AC)=E(FSRC) & (BUT FT) TEST

 ..*TEST 31 ADDF & ADDD E(AC)=E(FSRC) & (BUT FT) TEST

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

```

5251 026440 030004
5251 026442
5252 026442 012737 026450 001110
5252 026450 012700 003240
5253 026454 170100
5254 026456 012737 027036 000244
5255 026464 012700 027414
5256
5257 026470 172410
5258 026472 012737 026504 001236
5259 026500 012700 027424
5260 026504 172010
5261
5262 026506 012700 027404
5263 026512 174010
5264 026514 012701 027434
5265 026520 012702 000004
5266 026524 022021
5267 026526 001414
5268 026530 012700 027444
5269 026534 012701 027404
5270 026540 012702 000004
5271 026544 022021
5272 026546 001401
5273 026550 000565
5274 026552 077204
5275 026554 000137 027160
5276 026560 077217
5277
5278
5279
5280 026562
5281 026562 012737 026570 001110
5281 026570 012700 003200
5282 026574 170100
5283 026576 012700 027414
5284 026602 172410
5285 026604 012737 026616 001236
5286 026612 012700 027424
5287 026616 172010
5288
5289 026620 012700 027404
5290 026624 174010
5291 026626 012701 027444
5292 026632 012702 000004
5293 026636 022021
5294 026640 001425
5295 026642 012700 027434

```

```

ST31: SCOPE
AA1:
1$: MOV #1$, $LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
MOV #3240, R0
LDFPS R0 ;SET FIV FIV FD AND FT
MOV #AAERRO, FPVECT ;IN CASE THE OVER/UNDER
MOV #AAPATO, R0 ;FLOWS IN TRAP WILL
;OCCUR
LDD (R0), ACO ;SET UP ACO
MOV #AA2, $TMP2 ;OPERAND
MOV #AAPAT1, R0
AA2: ADDD (R0), ACO ;TEST INSTRUCTION
;SHOULD TRUNCATE
AA3: MOV #AADATO, R0
STD ACO, (R0) ;GET THE RESULT
MOV #AAPAT2, R1
MOV #4, R2
AA4: CMP (R0)+, (R1)+ ;CORRECT?
BEQ AA7
MOV #AAPAT3, R0 ;DID (BUT FT) FAIL
MOV #AADATO, R1
MOV #4, R2
AA5: CMP (R0)+, (R1)+
BEQ AA6
BR AAERR1 ;DATA ERROR
AA6: SOB R2, AA5
JMP AAERR2 ;(BUT FT) ERROR
AA7: SOB R2, AA4

;NOW TEST DOUBLE FLOATING ROUND MODE.
AA10:
1$: MOV #1$, $LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
MOV #3200, R0 ;SET FD FIV FIV. FT=0
LDFPS R0
MOV #AAPATO, R0
LDD (R0), ACO ;SET UP ACO OPERAND
MOV #AA11, $TMP2
MOV #AAPAT1, R0
AA11: ADDD (R0), ACO ;TEST INSTRUCTION
;SHOULD ROUND
AA12: MOV #AADATO, R0
STD ACO, (R0) ;GET THE RESULT
MOV #AAPAT3, R1
MOV #4, R2
AA13: CMP (R0)+, (R1)+ ;CORRECT?
BEQ AA20
MOV #AAPAT2, R0 ;DID (BUT FT) FAIL?

```

```

5296 026646 012701 027404      MOV      #AADATA0,R1
5297 026652 012702 000004      MOV      #4,R2
5298 026656 022021      AA14:   CMP      (R0)+,(R1)+
5299 026660 001413      BEQ      AA17
5300 026662 012700 027454      MOV      #AAPAT4,R0      ;WAS THE FLOATING
5301 026666 012701 027404      MOV      #AADATA0,R1      ;CONSTANT USED
5302 026672 012702 000004      MOV      #4,R2      ;INSTEAD OF THE
5303 026676 022021      AA15:   CMP      (R0)+,(R1)+      ;DOUBLE CONSTANT
5304 026700 001401      BEQ      AA16      ;IN THE ROUND
5305 026702 000544      BR       AAERR3      ;FLOWS?
5306 026704 077204      AA16:   SOB      R2,AA15      ;DATA ERROR
5307 026706 000546      BR       AAERR4      ;CONSTANT ERROR
5308 026710 077216      AA17:   SOB      R2,AA14
5309 026712 000562      BR       AAERR5      ;(BUT FT) ERROR
5310 026714 077230      AA20:   SOB      R2,AA13
5311
5312      ;NOW TEST ADDF WITH FT=0, ROUND MODE
5313
5314 026716      AA21:
5315 026716 012737 026724 001110      1$:   MOV      #1$,SLPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
5316 026724 012700 003200      MOV      #3200,R0      ;FIV=1, FIV=1, FT=0
5317 026730 170100      LDFPS   RC
5318 026732 012700 027414      MOV      #AAPAT0,R0      ;LOAD ACO OPERAND
5319 026736 172410      LDD     (R0),ACO
5320 026740 170001      SETF
5321 026742 012737 026754 001236      MOV      #AA22,$TMP2      ;ENTER FLOATING MODE
5322 026750 012700 027464      MOV      #AAPAT5,R0
5323 026754 172010      AA22:   ADDF     (R0),ACO      ;TEST INSTRUCTION
5324 026756      AA23:   ;SHOULD ROUND
5325 026756 170011      SETD
5326      ;RESET TO DOUBLE
5327 026760 012700 027404      MOV      #AADATA0,R0      ;MODE
5328 026764 174010      STD     ACO,(R0)      ;GET THE RESULT
5329 026766 012701 027474      MOV      #AAPAT6,R1      ;CORRECT?
5330 026772 012702 000002      MOV      #2,R2
5331 026776 022021      AA24:   CMP      (R0)+,(R1)+
5332 027000 001413      BEQ      AA27
5333 027002 012700 027434      MOV      #AAPAT2,R0      ;WAS THE DOUBLE
5334 027006 012701 027404      MOV      #AADATA0,R1      ;CONSTANT USED INSTEAD
5335 027012 012702 000002      MOV      #2,R2      ;OF THE FLOATING
5336 027016 022011      AA25:   CMP      (R0)+,(R1)      ;CONSTANT IN THE
5337 027020 001401      BEC     AA26      ;ROUND FLOWS?
5338 027022 000534      BR       AAERR6      ;DATA ERROR
5339 027024 077204      AA26:   SOB      R2,AA25
5340 027026 000550      BR       AAERR7      ;CONSTANT ERROR
5341 027030 077216      AA27:   SOB      R2,AA24
5342 027032 000137 027504      JMP      AADONE
5343
5344      ;COME HERE IF A TRAP OCCURS TO 244.
5345
5346 027036 013700 001236      AAERR0: MOV      $TMP2,R0      ;SEE IF THE TRAP WAS
5347 027042 005720      TST     (R0)+      ;AT A TEST INSTRUCTION
5348 027044 020016      CMP     R0,(SP)
5349 027046 001402      BEQ     1$
5350 027050 000137 042534      10$:   JMP     FPSPUR
5351 027054      1$:
    
```

```

5352 027054 170300          STST   R0          ;GET FEL
5353 027056 020027 000010  CMP    R0,#10
5354 027062 001405          BEQ    20$         ;OVERFLOW
5355 027064 020027 000012  CMP    R0,#12
5356 027070 001410          BEQ    30$         ;UNDERFLOW
5357 027072 000766          BR     10$
5358 027074 027076          20$
5359 027076 011637 001236 20$.  MOV    (SP), $TMP2 ;REPORT OVERFLOW ERROR
5360 027102 020626          CMP    (SP)+, (SP)+
5361 027104 104154          21$:  ERROR  +154
5362 027106 000137 027504 25$:  JMP    AADONE
5363 027112 011637 001236 30$:  MOV    (SP), $TMP2 ;REPORT UNDERFLOW
5364 027116 022626          CMP    (SP)+, (SP)+ ;ERROR
5365 027120 104155          31$:  ERROR  +155
5366 027122 000771          BR     25$
5367
5368          ;ADD RESULT INCORRECT
5369 027124 012737 027434 001246 AAERR1: MOV    #AAPAT2, $TMP6
5370 027132 012737 027414 001242 AAERR10: MOV   #AAPAT0, $TMP4
5371 027140 012737 027424 001240          MOV   #AAPAT1, $TMP3
5372 027146 012737 027404 001244          MOV   #AADATO, $TMP5
5373 027154 104162          1$:  ERROR  +162
5374 027156 000552          BR     AADONE
5375 027160 012737 027434 001246 AAERR2: MOV   #AAPAT2, $TMP6 ;(BUT FT) FAILED.
5376 027166 012737 027414 001242          MOV   #AAPAT0, $TMP4
5377 027174 012737 027424 001240          MOV   #AAPAT1, $TMP3
5378 027202 012737 027404 001244          MOV   #AADATO, $TMP5
5379 027210 104156          1$:  ERROR  +156
5380 027212 000534          BR     AADONE
5381 027214 012737 027444 001246 AAERR3: MOV   #AAPAT3, $TMP6 ;DATA ERROR.
5382 027222 000743          BR     AAERR10
5383 027224 012737 027444 001246 AAERR4: MOV   #AAPAT3, $TMP6 ;BAD CONSTANT
5384 027232 012737 027414 001242          MOV   #AAPAT0, $TMP4
5385 027240 012737 027424 001240          MOV   #AAPAT1, $TMP3
5386 027246 012737 027404 001244          MOV   #AADATO, $TMP5
5387 027254 104160          1$:  ERROR  +160
5388 027256 000512          BR     AADONE
5389 027260 012737 027444 001246 AAERR5: MOV   #AAPAT3, $TMP6 ;(BUT FT) FAILED.
5390 027266 012737 027414 001242          MOV   #AAPAT0, $TMP4
5391 027274 012737 027424 001240          MOV   #AAPAT1, $TMP3
5392 027302 012737 027404 001244          MOV   #AADATO, $TMP5
5393 027310 104157          1$:  ERROR  +157
5394 027312 000474          BR     AADONE
5395 027314 012737 027464 001240 AAERR6: MOV   #AAPAT5, $TMP3 ;FD=0 AND
5396 027322 012737 027414 001242          MOV   #AAPAT0, $TMP4 ;DATA ERROR
5397 027330 012737 027404 001244          MOV   #AADATO, $TMP5
5398 027336 012737 027474 001246          MOV   #AAPAT6, $TMP6
5399 027344 104160          1$:  ERROR  +160
5400 027346 000456          BR     AADONE
5401 027350 012737 027464 001240 AAERR7: MOV   #AAPAT5, $TMP3 ;CONSTANT ERROR
5402 027356 012737 027414 001242          MOV   #AAPAT0, $TMP4
5403 027364 012737 027404 001244          MOV   #AADATO, $TMP5
5404 027372 012737 027474 001246          MOV   #AAPAT6, $TMP6
5405 027400 104161          1$:  ERROR  +161
5406 027402 000440          BR     AADONE
5407 027404 000000 000000 000000 AADATO: .WORD 0,0,0,0
5408 027414 000200 000000 000000 AAPATO: .WORD 200,0,0,0
    
```

5409	027424	000200	000000	000000	AAPAT1: .WORD	200,0,0,1
5410	027434	000400	000000	000000	AAPAT2: .WORD	400,0,0,0
5411	027444	000400	000000	000000	AAPAT3: .WORD	400,0,0,1
5412	027454	000400	000000	100000	AAPAT4: .WORD	400,0,100000,0
5413	027464	000200	000001	000000	AAPAT5: .WORD	200,1,0,0
5414	027474	000400	000000	000000	AAPAT6: .WORD	400,1,0,0
5415	027504				AADONE:	
	027504	104413			RSETUP	

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

5426

```
.SBTTL TEST # 32 - ADDF & ADDD WITH E(AC) LESS THAN E(FSRC) TEST
:*****
:TEST 32      ADDF & ADDD WITH E(AC) LESS THAN E(FSRC) TEST
:
:THIS IS A TEST OF THE ADDD AND ADDF
:INSTRUCTIONS AND THE ALIGN AC ALGORITHM
:FLAWS. 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 THAN E(FSRC)
:
:*****
```

```
TST32: SCOPE
:EXPONENT DIFFERENCE=57=71 (OCT) FD=1
5427 027506 000004
5428 027510
027510 012737 027516 001110 CC1:
5429 027516 012704 003200 1$: MOV #1$, $LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
5430 027522 170104 LDFPS R4 ;SET FIV,FIV, AND FD
5431 027524 012737 027544 001236 MOV #CC2,$TMP2
5432 027532 012700 031172 MOV #CCP0,R0 ;SET ACO OPERAND
5433 027536 172410 LDD (R0),AC0 ;ACO
5434 027540 012700 031212 MOV #CCP2,R0
5435 027544 172010 CC2: ADDD (R0),AC0 ;TEST INSTRUCTION
5436 027546 170205 STFPS R5 ;GET FPS
5437 027550 012700 031162 MOV #CCDAT0,R0 ;GET THE RESULT
5438 027554 174010 STD AC0,(R0)
5439 027556 012701 031212 MOV #CCP2,R1 ;IS IT CORRECT
5440 027562 012702 000004 MOV #4,R2
5441 027566 022021 CC3: CMP (R0)+,(R1)+
5442 027570 001415 BEQ CC6
5443 027572 012700 031162 MOV #CCDAT0,R0 ;DID A BAD
5444 027576 012701 031172 MOV #CCP0,R1 ;CONSTANT (NOT 57)
5445 027602 012702 000004 MOV #4,R2 ;GET GENERATED
5446 027606 022021 CC4: CMP (R0)+,(R1)+ ;FOR THE ALIGNMENT
5447 027610 001402 BEQ CC5 ;FLOWS?
5448 027612 000137 030560 JMP CCER1 ;DATA ERROR.D
5449 027616 077205 CC5: SOB R2,CC4
5450 027620 000137 030616 JMP CCER2 ;BAD CONSTANT.D
5451 027624 077220 CC6: SOB R2,CC3
5452 027626 020405 CMP R4,R5 ;FPS CORRECT?
5453 027630 001402 BEQ CC7
5454 027632 000137 030524 JMP CCER0 ;BAD FPS.
5455
:EXPONENT DIFFERENCE=56=70 (OCT) FD=1
5456 027636
027636 012737 027644 001110 CC7:
5457 027644 012704 003200 1$: MOV #1$, $LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
5458 027650 170104 LDFPS R4 ;SET FIV,FIV, AND FD
5459 027652 012737 027672 001236 MOV #CC8,$TMP2
5460 027660 012700 031172 MOV #CCP0,R0 ;SET ACO OPERAND
5461 027664 172410 LDD (R0),AC0
5462 027666 012700 031202 MOV #CCP1,R0 ;FSRC
5463 027672 172010 CC8: ADDD (R0),AC0 ;TEST INSTRUCTION
5464 027674 170205 STFPS R5 ;GET FPS
5465 027676 012700 031162 MOV #CCDAT0,R0 ;GET THE RESULT
5466 027702 174010 STD AC0,(R0)
5467 027704 012701 031262 MOV #CCP7,R1 ;IS IT CORRECT
5468 027710 012702 000004 MOV #4,R2
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5469 027714 022021          CC9:  CMP      (R0)+,(R1)+
5470 027716 001415          BEQ      CC12
5471 027720 012700 031162        MOV      #CCDAT0,R0      ;DID A BAD
5472 027724 012701 031202        MOV      #CCP1,R1      ;CONSTANT (NOT 57)
5473 027730 012702 000004        MOV      #4,R2          ;GET GENERATED
5474 027734 022021          CC10: CMP      (R0)+,(R1)+   ;FOR THE ALIGNMENT
5475 027736 001402          BEQ      CC11           ;FLOWS?
5476 027740 000137 030654        JMP      CCER3          ;DATA ERROR.D
5477 027744 077205          CC11: SOB      R2,CC10
5478 027746 000137 030672        JMP      CCER4          ;BAD CONSTANT.D
5479 027752 077220          CC12: SOB      R2,CC9
5480 027754 020405          CMP      R4,R5         ;FPS CORRECT?
5481 027756 001402          BEQ      CC13
5482 027760 000137 030524        JMP      CCER0          ;BAD FPS.
5483
5484 027764          ;EXPONENT DIFFERENCE=25=31 (OCT) FD=0
027764 012737 027772 001110      CC13: MOV      #1$, $LPERR   ;SET UP THE LOOP ON ERROR ADDRESS.
027764 012737 030020 001236      1$:  MOV      #CC14,$TMP2
5485 027772 012737 030020 001236      MOV      #CCP0,R0      ;SET UP ACO OPERAND.
5486 030000 012700 031172          MOV      (R0),ACO
5487 030004 172410          LDD      (R0),ACO
5488 030006 012704 003000        MOV      #3000,R4      ;SET FIV,FIV. CLEAR FD.
5489 030012 170104          LDFPS   R4
5490 030014 012700 031252        MOV      #CCP6,R0      ;FSRC
5491 030020 172010          CC14: ADDF   (R0),ACO    ;TEST INSTRUCTION
5492 030022 170205          STFPS   R5
5493 030024 170011          SETD
5494 030026 012700 031162        MOV      #CCDAT0,R0    ;REENTER DOUBLE MOVE
5495 030032 174010          STD      ACO,(R0)      ;GET THE RESULT
5496 030034 012701 031252        MOV      #CCP6,R1      ;IS THE RESULT CORRECT?
5497 030040 012702 000002        MOV      #2,R2
5498 030044 022021          CC15: CMP      (R0)+,(R1)+
5499 030046 001415          BEQ      CC18
5500 030050 012700 031162        MOV      #CCDAT0,R0    ;WAS A BAD CONSTANT
5501 030054 012701 031222        MOV      #CCP3,R1      ;USED (NOT 25) IN
5502 030060 012702 000002        MOV      #2,R2         ;THE ALIGN FLOWS?
5503 030064 022021          CC16: CMP      (R0)+,(R1)+
5504 030066 001402          BEQ      CC17
5505 030070 000137 030730        JMP      CCER5          ;DATA ERROR F
5506 030074 077205          CC17: SOB      R2,CC16
5507 030076 000137 030764        JMP      CCER6          ;BAD CONSTANT F
5508 030102 077220          CC18: SOB      R2,CC15
5509 030104 020405          CMP      R4,R5
5510 030106 001402          BEQ      CC19
5511 030110 000137 030542        JMP      CCER90         ;BAD FPS.
5512
5513 030114          ;EXPONENT DIFFERENCE=24=30 (OCT) FD=0
030114 012737 030122 001110      CC19: MOV      #1$, $LPERR   ;SET UP THE LOOP ON ERROR ADDRESS.
030114 012737 030150 001236      1$:  MOV      #CC20,$TMP2
5514 030122 012737 030150 001236      MOV      #CCP3,R0      ;SET UP ACO OPERAND.
5515 030130 012700 031222          MOV      (R0),ACO
5516 030134 172410          LDD      (R0),ACO
5517 030136 012704 003000        MOV      #3000,R4      ;SET FIV,FIV. CLEAR FD.
5518 030142 170104          LDFPS   R4
5519 030144 012700 031242        MOV      #CCP5,R0      ;FSRC
5520 030150 172010          CC20: ADDF   (R0),ACO    ;TEST INSTRUCTION
5521 030152 170205          STFPS   R5
5522 030154 170011          SETD
5523 030156 012700 031162        MOV      #CCDAT0,R0    ;REENTER DOUBLE MOVE
                    ;GET THE RESULT

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5524 030162 174010 STD ACO,(R0)
5525 030164 012701 031272 MOV #CCP10,R1 ;IS THE RESULT CORRECT?
5526 030170 012702 000002 MOV #2,R2
5527 030174 022021 CC21: CMP (R0)+,(R1)+
5528 030176 001415 BEQ CC24
5529 030200 012700 031162 MOV #CCDAT0,R0 ;WAS A BAD CONSTANT
5530 030204 012701 031242 MOV #CCP5,R1 ;USED (NOT 25) IN
5531 030210 012702 000002 MOV #2,R2 ;THE ALIGN FLOWS?
5532 030214 022021 CC22: CMP (R0)+,(R1)+
5533 030216 001402 BEQ CC23
5534 030220 000137 031020 JMP CCER7 ;DATA ERROR F
5535 030224 077205 CC23: SOB R2,CC22
5536 030226 000137 031036 JMP CCER8 ;BAD CONSTANT F
5537 030232 077220 CC24: SOB R2,CC21
5538 030234 020405 CMP R4,R5
5539 030236 001402 BEQ CC25
5540 030240 000137 030542 JMP CCER90 ;BAD FPS.
5541 ;EXPONENT DIFFERENCE=1 FD=1
5542 030244 CC25:
5543 030244 012737 030252 001110 MOV #18,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
5544 030252 012704 003200 1$: MOV #3200,R4 ;SET FIV,FIV, AND FD
5545 030256 170104 LDFPS R4
5546 030260 012737 030300 001236 MOV #CC26,$TMP2
5547 030266 012700 031172 MOV #CCP0,R0 ;SET ACO OPERAND
5548 030272 172410 LDD (R0),ACO
5549 030274 012700 031222 MOV #CCP3,R0 ;FSRC
5550 030300 172010 CC26: ADDD (R0),ACO ;TEST INSTRUCTION
5551 030302 170205 STFPS R5 ;GET FPS
5552 030304 012700 031162 MOV #CCDAT0,R0 ;GET THE RESULT
5553 030310 174010 STD ACO,(R0)
5554 030312 012701 031302 MOV #CCP11,R1 ;IS IT CORRECT
5555 030316 012702 000004 MOV #4,R2
5556 030322 022021 CC27: CMP (R0)+,(R1)+
5557 030324 001415 BEQ CC30
5558 030326 012700 031162 MOV #CCDAT0,R0 ;DID A BAD
5559 030332 012701 031222 MOV #CCP3,R1 ;CONSTANT (NOT 57)
5560 030336 012702 000004 MOV #4,R2 ;GET GENERATED
5561 030342 022021 CC28: CMP (R0)+,(R1)+ ;FOR THE ALIGNMENT
5562 030344 001402 BEQ CC29 ;FLOWS?
5563 030346 000137 031072 JMP CCER10 ;DATA ERROR.D
5564 030352 077205 CC29: SOB R2,CC28
5565 030354 000137 031110 JMP CCER11 ;BAD CONSTANT.D
5566 030360 077220 CC30: SOB R2,CC27
5567 030362 020405 CMP R4,R5 ;FPS CORRECT?
5568 030364 001402 BEQ CC31
5569 030366 000137 030524 JMP CCER0 ;BAD FPS.
5570 030372 ;EXPONENT DIFFERENCE=100=144 (OCT) FD=1
5571 030372 012737 030400 001110 CC31:
5572 030400 012704 003200 1$: MOV #18,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
5573 030404 170104 LDFPS R4 ;SET FIV,FIV, AND FD
5574 030406 012737 030426 001236 MOV #CC32,$TMP2
5575 030414 012700 031172 MOV #CCP0,R0 ;SET ACO OPERAND
5576 030420 172410 LDD (R0),ACO
5577 030422 012700 031232 MOV #CCP4,R0 ;FSRC
5578 030426 172010 CC32: ADDD (R0),ACO ;TEST INSTRUCTION
5579 030430 170205 STFPS R5 ;GET FPS
    
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5579	030432	012700	031162		MOV	#CCDAT0,R0	:GET THE RESULT	
5580	030436	012700			STD	AC0,(R0)		
5581	030440	012701	031232		MOV	#CCP4,R1	:IS IT CORRECT	
5582	030444	012702	000004		MOV	#4,R2		
5583	030450	022021		CC33:	CMP	(R0)+,(R1)+		
5584	030452	001415			BEQ	CC36		
5585	030454	012700	031162		MOV	#CCDAT0,R0	:DID A BAD	
5586	030460	012701	031232		MOV	#CCP4,R1	:CONSTANT (NOT 57)	
5587	030464	012702	000004		MOV	#4,R2	:GET GENERATED	
5588	030470	022021		CC34:	CMP	(R0)+,(R1)+	:FOR THE ALIGNMENT	
5589	030472	001402			BEQ	CC35	:FLOWS?	
5590	030474	000137	031126		JMP	CCER12	:DATA ERROR.D	
5591	030500	077205		CC35:	SOB	R2,CC34		
5592	030502	000137	031144		JMP	CCER13	:BAD CONSTANT.D	
5593	030506	077220		CC36:	SOB	R2,CC33		
5594	030510	020405			CMP	R4,R5	:FPS CORRECT?	
5595	030512	001402			BEQ	CC37		
5596	030514	000137	030524		JMP	CCER0	:BAD FPS.	
5597	030520	000137	031322	CC37:	JMP	CCDONE		
5598	030524	010437	001242	CCER0:	MOV	R4,\$TMP4	:FPS ERROR D	
5599	030530	010537	001240		MOV	R5,\$TMP3		
5600	030534	104164		1\$:	ERROR	+164		
5601	030536	000137	031322		JMP	CCDONE		
5602	030542	010437	001242	CCER90:	MOV	R4,\$TMP4	:FPS ERROR F	
5603	030546	010537	001240		MOV	R5,\$TMP3		
5604	030552	104165		1\$:	ERROR	+165		
5605	030554	000137	031322		JMP	CCDONE		
5606	030560	012737	031212	001240	CCER1:	MOV	#CCP2,\$TMP3	:DATA ERROR D
5607	030566	012737	031212	001246		MOV	#CCP2,\$TMP6	
5608	030574	012737	031172	001242	CCER50:	MOV	#CCP0,\$TMP4	
5609	030602	012737	031162	001244		MOV	#CCDAT0,\$TMP5	
5610	030610	104166		1\$:	ERROR	+166		
5611	030612	000137	031322		JMP	CCDONE		
5612	030616	012737	031212	001240	CCER2:	MOV	#CCP2,\$TMP3	:CONSTANT BAD D(B)
5613	030624	012737	031212	001246		MOV	#CCP2,\$TMP6	
5614	030632	012737	031172	001242	CCER22:	MOV	#CCP0,\$TMP4	
5615	030640	012737	031162	001244		MOV	#CCDAT0,\$TMP5	
5616	030646	104172		1\$:	ERROR	+172		
5617	030650	000137	031322		JMP	CCDONE		
5618	030654	012737	031202	001240	CCER3:	MOV	#CCP1,\$TMP3	
5619	030662	012737	031262	001246		MOV	#CCP7,\$TMP6	
5620	030670	000741			BR	CCER50		
5621	030672	012737	031202	001240	CCER4:	MOV	#CCP1,\$TMP3	:CONSTANT BAD D(G)
5622	030700	012737	031262	001246		MOV	#CCP7,\$TMP6	
5623	030706	012737	031172	001242	CCER44:	MOV	#CCP0,\$TMP4	
5624	030714	012737	031162	001244		MOV	#CCDAT0,\$TMP5	
5625	030722	104173		1\$:	ERROR	+173		
5626	030724	000137	031322		JMP	CCDONE		
5627	030730	012737	031252	001240	CCER5:	MOV	#CCP6,\$TMP3	:DATA ERROR F
5628	030736	012737	031252	001246		MOV	#CCP6,\$TMP6	
5629	030744	012737	031172	001242	CCER55:	MOV	#CCP0,\$TMP4	
5630	030752	012737	031162	001244		MOV	#CCDAT0,\$TMP5	
5631	030760	104170		1\$:	ERROR	+170		
5632	030762	000557			BR	CCDONE		
5633	030764	012737	031252	001240	CCER6:	MOV	#CCP6,\$TMP3	:CONSTANT BAD F(B)
5634	030772	012737	031252	001246		MOV	#CCP6,\$TMP6	
5635	031000	012737	031172	001242		MOV	#CCP0,\$TMP4	

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5636 031006 012737 031162 001244      MOV      #CCDAT0,$TMP5
5637 031014 104174      1$:     ERROR    +174
5638 031016 000541      BR      CCDONE
5639 031020 012737 031242 001240  CCER7:  MOV      #CCP5,$TMP3      ;DATA ERROR F
5640 031026 012737 031272 001246      MOV      #CCP10,$TMP6
5641 031034 000743      BR      CCER55
5642 031036 012737 031242 001240  CCER8:  MOV      #CCP5,$TMP3      ;CONSTANT BAD F(G)
5643 031044 012737 031272 001246      MOV      #CCP10,$TMP6
5644 031052 012737 031162 001244      MOV      #CCDAT0,$TMP5
5645 031060 012737 031172 001242      MOV      #CCP0,$TMP4
5646 031066 104175      1$:     ERROR    +175
5647 031070 000514      BR      CCDONE
5648 031072 012737 031222 001240  CCER10: MOV      #CCP3,$TMP3      ;DATA ERROR D
5649 031100 012737 031302 001246      MOV      #CCP11,$TMP6
5650 031106 000632      BR      CCER50
5651 031110 012737 031222 001240  CCER11: MOV      #CCP3,$TMP3      ;CONSTANT BAD D(G)
5652 031116 012737 031302 001246      MOV      #CCP11,$TMP6
5653 031124 000670      BR      CCER44
5654 031126 012737 031232 001240  CCER12: MOV      #CCP4,$TMP3      ;DATA ERROR D
5655 031134 012737 031232 001246      MOV      #CCP4,$TMP6
5656 031142 000614      BR      CCER50
5657 031144 012737 031232 001240  CCER13: MOV      #CCP4,$TMP3      ;CONSTANT BAD D(B)
5658 031152 012737 031232 001246      MOV      #CCP4,$TMP6
5659 031160 000624      BR      CCER22
5660 031162 000000 000000 000000  CCDAT0: .WORD    0,0,0,0
5661 031172 000200 000000 000000  CCP0:   .WORD    200,0,0,0      ;E(AC)=1
5662 031202 016200 000000 000000  CCP1:   .WORD    16200,0,0,0     ;E(FSRC)=E(AC)+56=57
5663 031212 016400 000000 000000  CCP2:   .WORD    16400,0,0,0     ;E(FSRC)=E(AC)+57=58
5664 031222 000400 000000 000000  CCP3:   .WORD    400,0,0,0       ;E(FSRC)=E(AC)+1=2
5665 031232 031200 000000 000000  CCP4:   .WORD    31200,0,0,0     ;E(FSRC)=E(AC)+100=101=145(OCT)
5666 031242 006200 000000 000000  CCP5:   .WORD    6200,0,0,0      ;E(FSRC)=E(AC)+24=25=31(OCT)
5667 031252 006400 000000 000000  CCP6:   .WORD    6400,0,0,0      ;E(FSRC)=E(AC)+25=26=32(OCT)
5668 031262 016200 000000 000000  CCP7:   .WORD    16200,0,0,1     ;CCP1 RES
5669 031272 006200 000001 000000  CCP10:  .WORD    6200,1,0,0          ;CCP5 RES
5670 031302 000500 000000 000000  CCP11:  .WORD    500,0,0,0            ;CCP3 RES
5671 031312 000200 000000 000000  CCP12:  .WORD    200,0,0,0            ;BAD CONSTANT ;RES CCP2,CCP4
5672 031322 000000 000000 000000  CCDONE:
      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?).
5673

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5684

..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).
 ..:
 ..:.....

5685 031324 000004
 5686 031326
 5687 031334 012737 031334 001110
 5688 031340 170104 003200
 5689 031342 012737 032214 000244
 5690 031350 012737 031370 001236
 5691
 5692 031356 012700 032556
 5693 031362 172410
 5694 031364 012700 032546
 5695 031370 172010
 5696 031372 170205
 5697 031374 012700 032526
 5698 031400 174010
 5699 031402 012701 032556
 5700 031406 012702 000004
 5701 031412 022021
 5702 031414 001402
 5703 031416 000137 032254
 5704 031422 077205
 5705
 5706 031424 020405
 5707 031426 001402
 5708 031430 000137 032214
 5709
 5710 031434
 5711 031434 012737 031442 001110
 5712 031442 012704 003200
 5713 031446 170104
 5714 031450 012737 031470 001236
 5715 031456 012700 032576
 5716 031462 172410
 5717 031464 012700 032546
 5718 031470 172010
 5719 031472 170205
 5720 031474 012700 032526
 5721 031500 174010
 5722 031502 012701 032636
 5723 031506 012702 000004
 5724 031512 022021
 5725 031514 001415
 5726 031516 012700 032526
 5727 031522 012701 032576

TST33: SCOPE
 :EXPONENT DIFFERENCE=57=71 (OCT) FD=1
 BB1:
 1\$: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
 MOV #3200,R4 ;SET FIV FIV, AND FD
 LDFPS R4
 MCV #BBERO,FPVECT ;SET UP FOR ERROR
 MOV #BB2,\$TMP2 ;IN CASE THE OVER\
 ;UNDER FLOWS FAIL.
 ;SET ACO OPERAND.
 MOV #BBPAT2,R0
 LDD (R0),ACO
 MOV #BBPAT1,R0 ;FSRC
 BB2: ADDD (R0),ACO ;TEST INSTRUCTION
 STFPS R5
 BB3: MOV #BBDAT0,R0 ;GET THE RESULT
 STD ACO,(R0)
 MOV #BBPAT2,R1 ;RESULT CORRECT?
 MOV #4,R2
 BB4: CMP (R0)+,(R1)+
 BEQ BB5
 JMP BBER1 ;DATA ERROR D
 BB5: SOB R2,BB4 ;WAS FPS CORRECT?
 CMP R4,R5
 BEQ BB6
 JMP BBER0 ;FPS ERROR
 :EXPONENT DIFFERENCE=56=70 (OCT) FD=1
 BB6:
 1\$: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
 MOV #3200,R4 ;SET FIV,FIV, AND FD
 LDFPS R4
 MOV #BB7,\$TMP2
 MOV #BBPAT4,R0 ;SET ACO OPERAND
 LDD (R0),ACO
 MOV #BBPAT1,R0 ;FSRC
 BB7: ADDD (R0),ACO ;TEST INSTRUCTION
 STFPS R5 ;GET FPS
 MOV #BBDAT0,R0 ;GET THE RESULT
 STD ACO,(R0)
 MOV #BBP10,R1 ;IS IT CORRECT
 MOV #4,R2
 BB10: CMP (R0)+,(R1)+
 BEQ BB13
 MOV #BBDAT0,R0 ;DID A BAD
 MOV #BBPAT4,R1 ;CONSTANT (NOT 57)

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5727 031526 012702 000004          MOV      #4,R2          :GET GENERATED
5728 031532 022021          BB11:  CMP      (R0)+,(R1)+ :FOR THE ALIGNMENT
5729 031534 001402          BEQ      BB12          :FLOWS?
5730 031536 000137 032312          JMP      BB2R2        :DATA ERROR.D
5731 031542 077205          BB12:  SOB      R2,BB11
5732 031544 000137 032330          JMP      BB2R3        :BAD CONSTANT.D
5733 031550 077220          BB13:  SOB      R2,BB10
5734 031552 020405          CMP      R4,R5        :FPS CORRECT?
5735 031554 001402          BEQ      BB14
5736 031556 000137 032214          JMP      BB2R0        :BAD FPS.
5737          :EXPONENT DIFFERENCE=25=31 (OCT) FD=0
5738 031562          BB14:
5739 031562 012737 031570 001110          MOV      #1$,SLPERR   :SET UP THE LOOP ON ERROR ADDRESS.
5740 031570 012737 031616 001236          1$:  MOV      #BB15,$TMP2
5741 031576 012700 032536          MOV      #BBPAT0,R0   :SET UP ACO OPERAND
5742 031604 012704 003000          LDD      (R0),AC0
5743          MOV      #3000,R4   :SET FIV AND FIV
5744 031610 170104          LDFPS   R4            :CLEAR FD
5745 031612 012700 032546          BB15:  MOV      #BBPAT1,R0   :FSRC
5746 031616 172010          ADDF    (R0),AC0     :TEST INSTRUCTION
5747 031620 170205          STFPS  R5
5748 031622 170011          SETD
5749 031624 012700 032526          MOV      #BBDAT0,R0   :REENTERED DOUBLE MODE.
5750 031630 174010          STD     AC0,(R0)     :GET THE RESULT
5751 031632 012701 032536          MOV      #BBPAT0,R1
5752 031636 012702 000002          MOV      #2,R2
5753 031642 022021          BB16:  CMP      (R0)+,(R1)+ :IS THE RESULT
5754 031644 001402          BEQ      BB17        :CORRECT?
5755 031646 000137 032364          JMP      BB2R4        :DATA ERROR F
5756 031652 077205          BB17:  SOB      R2,BB16
5757 031654 020405          CMP      R4,R5        :IS FPS CORRECT?
5758 031656 001402          BEQ      BB20
5759 031660 000137 032234          JMP      BB2R10       :FPS ERROR.
5760          :EXPONENT DIFFERENCE=24=30 (OCT)
5761 031664          BB20:
5762 031664 012737 031672 001110          MOV      #1$,SLPERR   :SET UP THE LOOP ON ERROR ADDRESS.
5763 031672 012737 031720 001236          1$:  MOV      #BB21,$TMP2
5764 031700 012700 032566          MOV      #BBPAT3,R0   :SET UP ACO OPERAND.
5765 031704 172410          LDD      (R0),AC0
5766 031706 012704 003000          MOV      #3000,R4
5767 031712 170104          LDFPS   R4            :SET FIV,FIV. CLEAR FD.
5768 031714 012700 032546          BB21:  MOV      #BBPAT1,R0   :FSRC
5769 031722 172010          ADDF    (R0),AC0     :TEST INSTRUCTION
5770 031724 170205          STFPS  R5
5771 031726 012700 032526          SETD
5772 031732 174010          MOV      #BBDAT0,R0   :REENTER DOUBLE MODE
5773 031734 012701 032626          STD     AC0,(R0)     :GET THE RESULT
5774 031740 012702 000002          MOV      #BBP7,R1
5775 031744 022021          BB22:  MOV      #2,R2
5776 031746 001415          CMP      (R0)+,(R1)+ :IS THE RESULT CORRECT?
5777 031750 012700 032526          BEQ      BB25
5778 031754 012701 032566          MOV      #BBDAT0,R0   :WAS A BAD CONSTANT
5779 031760 012702 000002          MOV      #BBPAT3,R1   :USED (NOT 25) IN
5780 031764 022021          BB23:  MOV      #2,R2
5781 031766 001402          CMP      (R0)+,(R1)+ :THE ALLIGN FLOWS?
5781          BEQ      BB24

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5782 031770 000137 032420          JMP      BBER5          ;DATA ERROR F
5783 031774 077205          SOB      R2,BB23
5784 031776 000137 032436          JMP      BBER6          ;BAD CONSTANT F
5785 032002 077220          SOB      R2,BB22
5786 032004 020405          CMP      R4,R5
5787 032006 001402          BEQ      BB26
5788 032010 000137 032234          JMP      BBER10         ;BAD FPS.
5789                                ;EXPONENT DIFFERENCE=1
5790 032014          BB26:  MOV      #1$, $LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      032014 012737 032022 001110 1$:  MOV      #BB27,$TMP2
      032022 012737 032050 001236  MOV      #3200,R4
5791 032022 012737 032050 001236  MOV      #3200,R4
5792 032030 012704 003200          LDFPS   R4              ;SET UP ACO OPERAND
5793 032034 170104          MOV      #BBPAT5,R0
5794 032036 012700 032606          LDD      (R0),ACO
5795 032042 172410          MOV      #BBPAT1,R0    ;FSRC
5796 032044 012700 032546          BB27:  ADDD   (R0),ACO      ;TEST INSTRUCTION
5797 032050 172010          STFPS   R5
5798 032052 170205          MOV      #BBDAT0,R0    ;GET THE RESULT.
5799 032054 012700 032526          STD      ACO,(R0)
5800 032060 174010          MOV      #BBP11,R1    ;IS IT CORRECT?
5801 032062 012701 032646          MOV      #4,R2
5802 032066 012702 000004          BB30:  CMP      (R0)+,(R1)+
5803 032072 022021          BEQ      BB31
5804 032074 001402          JMP      BBER7          ;DATA ERROR D
5805 032076 000137 032472          BB31:  SOB      R2,BB30
5806 032102 077205          CMP      R4,R5          ;IS FPS CORRECT
5807 032104 020405          BEQ      BB32
5808 032106 001402          JMP      BBER0
5809 032110 000137 032214          ;EXPONENT DIFFERENCE=100=144 (OCT)
5810                                BB32:
5811 032114          1$:  MOV      #1$, $LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
      032114 012737 032122 001110  MOV      #BB33,$TMP2
      032122 012737 032150 001236  MOV      #3200,R4
5812 032122 012737 032150 001236  MOV      #3200,R4
5813 032130 012704 003200          LDFPS   R4              ;SET FIV,FIV AND FD
5814 032134 170104          MOV      #BBPAT6,R0    ;SET UP ACO OPERAND.
5815 032136 012700 032616          LDD      (R0),ACO
5816 032142 172410          MOV      #BBPAT1,R0    ;FSRC
5817 032144 012700 032546          BB33:  ADDD   (R0),ACO      ;TEST INSTRUCTION
5818 032150 172010          STFPS   R5
5819 032152 170205          MOV      #BBDAT0,R0    ;GET THE RESULT
5820 032154 012700 032526          STD      ACO,(R0)
5821 032160 174010          MOV      #BBPAT6,R1    ;IS IT CORRECT
5822 032162 012701 032616          MOV      #4,R2
5823 032166 012702 000004          BB34:  CMP      (R0)+,(R1)+
5824 032172 022021          BEQ      BB35
5825 032174 001402          JMP      BBER8          ;DATA ERROR D
5826 032176 000137 032510          BB35:  SOB      R2,BB34
5827 032202 077205          CMP      R4,R5          ;IS FPS CORRECT
5828 032204 020405          BNE     BBER0
5829 032206 001002          JMP      BBDONE
5830 032210 000137 032656          BBERO: MOV      R4,$TMP4
5831 032214 010437 001242          MOV      R5,$TMP3
5832 032220 010537 001240          1$:  ERROR  +164
5833 032224 104164
5834 032226 104413          RSETUP

;GO INITIALIZE THE FPS AND STACK; AND
;SEE IF THE USER HAS EXPRESSED
;THE DESIRE TO CHANGE THE SOFTWARE

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5835 032230 000137 032656          JMP      BBDONE
5836 032234 010437 001242      BBER10: MOV      R4,$TMP4
5837 032240 010537 001240          MOV      R5,$TMP3
5838 032244 104165          1$:      ERROR   +165
5839 032246 104113          RSETUP

;VIRTUAL CONSOLE SWITCH REGISTER (HAS
;THE USER TYPED CONTROL G?).

;FPS ERROR F

;C) 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?).

5840 032250 000137 032656          JMP      BBDONE
5841 032254 012737 032556 001242      BBER1:  MOV      #BBPAT2,$TMP4
5842 032262 012737 032556 001246          MOV      #BBPAT2,$TMP6
5843 032270 012737 032546 001240      BBER11: MOV      #BBPAT1,$TMP3
5844 032276 012737 032526 001244          MOV      #BBDATO,$TMP5
5845 032304 104166          1$:      ERROR   +166
5846 032306 000137 032656          JMP      BBDONE
5847 032312 012737 032576 001242      BBER2:  MOV      #BBPAT4,$TMP4
5848 032320 012737 032636 001246          MOV      #BBP10,$TMP6
5849 032326 000760          BR       BBER11
5850 032330 012737 032576 001242      BBER3:  MOV      #BBPAT4,$TMP4
5851 032336 012737 032636 001246          MOV      #BBP10,$TMP6
5852 032344 012737 032546 001240          MOV      #BBPAT1,$TMP3
5853 032352 012737 032526 001244          MOV      #BBDATO,$TMP5
5854 032360 104167          1$:      ERROR   +167
5855 032362 000535          BR       BBDONE
5856 032364 012737 032536 001242      BBER4:  MOV      #BBPAT0,$TMP4
5857 032372 012737 032536 001246          MOV      #BBPAT0,$TMP6
5858 032400 012737 032546 001240      BBER40: MOV      #BBPAT1,$TMP3
5859 032406 012737 032526 001244          MOV      #BBDATO,$TMP5
5860 032414 104170          1$:      ERROR   +170
5861 032416 000517          BR       BBDONE
5862 032420 012737 032566 001242      BBER5:  MOV      #BBPAT3,$TMP4
5863 032426 012737 032626 001246          MOV      #BBP7,$TMP6
5864 032434 000761          BR       BBER40
5865 032436 012737 032566 001242      BBER6:  MOV      #BBPAT3,$TMP4
5866 032444 012737 032626 001246          MOV      #BBP7,$TMP6
5867 032452 012737 032546 001240          MOV      #BBPAT1,$TMP3
5868 032460 012737 032526 001244          MOV      #BBDATO,$TMP5
5869 032466 104171          1$:      ERROR   +171
5870 032470 000472          BR       BBDONE
5871 032472 012737 032606 001242      BBER7:  MOV      #BBPAT5,$TMP4
5872 032500 012737 032546 001246          MOV      #BBPAT11,$TMP6
5873 032506 000670          BR       BBER11
5874 032510 012737 032616 001242      BBER8:  MOV      #BBPAT6,$TMP4
5875 032516 012737 032616 001246          MOV      #BBPAT6,$TMP6
5876 032524 000661          BR       BBER11
5877 032526 000000 000000 000000      BBDATO: .WORD   0,0,0,0
5878 032536 006400 000000 000000      BBPAT0: .WORD   6400,0,0,0
5879 032546 000200 000000 000000      BBPAT1: .WORD   200,0,0,0
5880 032556 016400 000000 000000      BBPAT2: .WORD   16400,0,0,0
5881 032566 006200 000000 000000      BBPAT3: .WORD   6200,0,0,0
5882 032576 016200 000000 000000      BBPAT4: .WORD   16200,0,0,0
5883 032606 000400 000000 000000      BBPAT5: .WORD   400,0,0,0
5884 032616 031200 000000 000000      BBPAT6: .WORD   31200,0,0,0
5885 032626 006200 000001 000000      BBP7:   .WORD   6200,1,0,0

;F(AC)=E(FSRC)+25=26=32(OCT)
;E(FSRC)=1
;E(AC)=E(FSRC)+57=58=72(OCT)
;E(AC)=E(FSRC)+24=25=31(OCT)
;E(AC)=E(FSRC)+56=57=71(OCT)
;E(AC)=E(FSRC)+1=2
;E(AC)=E(FSRC)+100=101=145(OCT)
;BBPAT3 RES

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5886	032636	016200	000000	000000	BBP10:	.WORD	16200,0,0,1	:BBPAT4 RES
5887	032646	000500	000000	000000	BBP11:	.WORD	500,0,0,0	:BBPAT5 RES
5888	032656				BBDONE:			
	032656	104413			RSETUP			:GO INITIALIZE THE FPS AND STACK; AND
								:SEE IF THE USER HAS EXPRESSED
								:THE DESIRE TO CHANGE THE SOFTWARE
								:VIRTUAL CONSOLE SWITCH REGISTER (HAS
								:THE USER TYPED CONTROL G?).

5896

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.SBTTL TEST # 34 - ADDD WITH NEGATIVE OPRANDS TEST
:*****
:TEST 34      ADDD WITH NEGATIVE OPRANDS TEST
:
:THIS IS A TEST OF THE ADDD INSTRUCTION
:WITH NEGATIVE OPERANDS. EVERY COMBINATION OF
:OPERAND SIGNS IS TRIED.
:*****
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```
5897 032660 030004
5898 032662
5899 032662 012737 032670 001110
5900 032674 170104
5901 032676 012737 032716 001236
5902 032704 012700 034576
5903 032710 172410
5904 032712 012700 034576
5905 032716 172010
5906 032720 170205
5907 032722 012700 034556
5908 032726 174010
5909 032730 012701 034676
5910 032734 012702 000004
5911 032740 022021
5912 032742 001415
5913 032744 012700 034556
5914 032750 012701 034626
5915 032754 012702 000004
5916 032760 022021
5917 032762 001402
5918 032764 000137 034006
5919 032770 077205
5920 032772 000137 034044
5921 032776 077220
5922 033000 052704 000010
5923 033004 020405
5924 033006 001402
5925 033010 000137 033770
5926
5927 033014
5928 033014 012737 033022 001110
5929 033022 012704 003200
5930 033026 170104
5931 033030 012737 033050 001236
5932 033042 172410
5933 033044 012700 034576
5934 033050 172010
5935 033052 170205
5936 033054 012700 034556
5937 033060 174010
5938 033062 012701 034566
5939 033066 012702 000004
5940 033072 022021
5941 033074 001402

TST34: SCOPE
: BOTH OPERANDS NEGATIVE
DD1:
1S:  MOV #18,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #3200,R4 ;SET F10, F1V, AND FD
      LDFPS R4
      MOV #DD2,$TMP2
      MOV #DDP1,R0 ;SET ACO OPERAND
      LDD (R0),ACO
      MOV #DDP1,R0 ;ESRC
      ADDD (R0),ACO ;TEST INSTRUCTION
      STFPS R5 ;GET FPS
      MOV #DDDATO,R0 ;GET THE RESULT
      STD ACO,(R0)
      MOV #DDP9,R1 ;IS IT CORRECT
      MOV #4,R2
      DD3:  CMP (R0)+,(R1)+
            BEQ DD6
            MOV #DDDATO,R0 ;DID A ADD-SUB
            MOV #DDP4,R1 ;FLOW A FAILURE
            MOV #4,R2
      DD4:  CMP (R0)+,(R1)+
            BEQ DD5 ;216,442,500
            JMP DDERR1 ;DATA ERRCR,D
      DD5:  SOB R2,DD4
            JMP DDERR2 ;FLOW FAILURE,D
      DD6:  SOB R2,DD3
            BIS #10,R4
            CMP R4,R5 ;FPS CORRECT?
            BEQ DD7
            JMP DDERR0 ;BAD,FPS
:AC POS FSRC NEG AC=-FSRC
DD7:
1S:  MOV #18,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
      MOV #3200,R4 ;SET F10, F1V, AND FD
      LDFPS R4
      MOV #DD8,$TMP2
      MOV #DDP2,R0 ;SET ACO OPERAND
      LDD (R0),ACO
      MOV #DDP1,R0 ;FSRC
      ADDD (R0),ACO ;TEST INSTRUCTION
      STFPS R5 ;GET FPS
      MOV #DDDATO,R0 ;GET THE RESULT
      STD ACO,(R0)
      MOV #DDP0,R1 ;IS IT CORRECT
      DD10:  MOV #4,R2
            CMP (R0)+,(R1)+
            BEQ DD11
```


5942	033076	000137	034102			JMP	DDER3		:FLOW FAILURE
5943	033102	077205			DD11:	SOB	R2,DD10		
5944	033104	052704	000004			BIS	#4,R4		
5945	033110	020405				CMP	R4,R5		:FPS CORRECT?
5946	033112	001402				BEQ	DD12		
5947	033114	000137	033770			JMP	DDERO		:BAD FPS
5948									
5949	033120								
	033120	012737	033126	001110					
5950	033126	012704	003200		1\$:	MOV	#1\$,SLPERR		:SET UP THE LOOP ON ERROR ADDRESS.
5951	033132	170104				MOV	#3200,R4		:SET FIU, FIV, AND FD
5952	033134	012737	033154	001236		LDFPS	R4		
5953	033142	012700	034576			MOV	#DD13,\$TMP2		
5954	033146	172410				MOV	#DDP1,R0		:SET ACO OPERAND
5955	033150	012700	034606			LDD	(R0),ACO		
5956	033154	172010			DD13:	MOV	#DDP2,R0		:FSRC
5957	033156	170205				ADDD	(R0),ACO		:TEST INSTRUCTION
5958	033160	012700	034556			STFPS	R5		:GET FPS
5959	033164	174010				MOV	#DDDATO,R0		:GET THE RESULT
5960	033166	012701	034566			STD	ACO,(R0)		
5961	033172	012702	000004			MOV	#DDP0,R1		:IS IT CORRECT
5962	033176	022021			DD14:	MOV	#4,R2		
5963	033200	001402				CMP	(R0)+,(R1)+		
5964	033202	000137	034140			BEQ	DD15		
5965	033206	077205			DD15:	JMP	DDER4		:FLOW FAILURE 216,440,121
5966	033210	052704	000004			SOB	R2,DD14		
5967	033214	020405				BIS	#4,R4		
5968	033216	001402				CMP	R4,R5		:EPS CORRECT?
5969	033220	000137	033770			BEQ	DD16		
5970						JMP	DDERO		:BAD FPS
5971	033224								
	033224	012737	033232	001110					
5972	033232	012704	003200		1\$:	MOV	#1\$,SLPERR		:SET UP THE LOOP ON ERROR ADDRESS.
5973	033236	170104				MOV	#3200,R4		:SET FIV, FIV AND FD
5974	033240	012737	033260	001236		LDFPS	R4		
5975	033246	012700	034616			MOV	#DD17,\$TMP2		
5976	033252	172410				MOV	#DDP3,R0		:SET ACO OPERAND
5977	033254	012700	034646			LDD	(R0),ACO		
5978	033260	172010			DD17:	MOV	#DDP6,R0		:ESPC
5979	033262	170205				ADDD	(R0),ACO		:TEST INSTRUCTION
5980	033264	012700	034556			STFPS	R5		:GET FPS
5981	033270	174010				MOV	#DDDATO,R0		:GET THE RESULT
5982	033272	012701	034656			STD	ACO,(R0)		
5983	033276	012702	000004			MOV	#DDP7,R1		:IS IT CORRECT
5984	033302	022021			DD18:	MOV	#4,R2		
5985	033304	001415				CMP	(R0)+,(R1)+		
5986	033306	012700	034556			BEQ	DD21		
5987	033312	012701	034666			MOV	#DDDATO,R0		:FLOW FAILURE
5988	033316	012702	000004			MOV	#DDP8,R1		:216,440,101
5989	033322	022021				MOV	#4,R2		:GET GENERATED
5990	033324	001402			DD19:	CMP	(R0)+,(R1)+		
5991	033326	000137	034176			BEQ	DD20		
5992	033332	077205			DD20:	JMP	DDER5		:DATA ERROR.
5993	033334	000137	034234			SOB	R2,DD19		
5994	033340	077220			DD21:	JMP	DDER6		
5995	033342	020405				SOB	R2,DD18		
5996	033344	001402				CMP	R4,R5		:EPS CORRECT?
						BEQ	DD22		

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5997 033346 000137 033770      JMP      DDER0      ;BAD FPS
5998      ;AC NEG FSRC      POS      /FSRC/ > /AC/
5999 033352      DD22:
      033352 012737 033360 001110      MOV      #1$, $LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
6000 033360 012704 003200      1$:      MOV      #3200,R4      ;SET FIO,FIV, AND FD
6001 033364 170104      LDFPS      R4
6002 033366 012737 033406 001236      MOV      #DD23,$TMP2
6003 033374 012700 034646      MOV      #DDP6,R0      ;SET ACO OPERAND
6004 033400 172410      LDD      (R0),ACO
6005 033402 012700 034616      MOV      #DDP3,R0      ;FSPC
6006 033406 172010      DD23:      ADDD      (R0),ACO      ;TEST INSTRUCTION
6007 033410 170205      STFPS      R5      ;GET FPS
6008 033412 012700 034556      MOV      #DDDAT0,R0      ;GET THE RESULT
6009 033416 174010      STD      ACO,(R0)
6010 033420 012701 034656      MOV      #DDP7,R1      ;IS IT CORRECT?
6011 033424 012702 000004      MOV      #4,R2
6012 033430 022021      DD24:      CMP      (R0)+,(R1)+
6013 033432 001415      BEQ      DD27
6014 033434 012700 034556      MOV      #DDDAT0,R0      ;FLO,S FAILURE
6015 033440 012701 034666      MOV      #DDP8,R1      ;CONSTANT (NOT 57)
6016 033444 012702 000004      MOV      #4,R2      ;216,042,101
6017 033450 021011      DD25:      CMP      (R0),(R1)
6018 033452 001402      BEQ      DD26
6019 033454 000137 034272      JMP      DDER7      ;DATA ERROR.
6020 033460 077205      DD26:      SOB      R2,DD25
6021 033462 000137 034330      JMP      DDER8
6022 033466 077220      DD27:      SOB      R2,DD24
6023 033470 020405      CMP      R4,R5      ;FPS CORRECT?
6024 033472 001402      BEQ      DD30
6025 033474 000137 033770      JMP      DDER0      ;BAD FPS
6026      ;ACO POS      FSRC      NEG      /AC/ < /FRSRC/
6027 033500      DD30:
      033500 012737 033506 001110      MOV      #1$, $LPERR      ;SET UP THE LOOP ON ERROR ADDRESS.
6028 033506 012704 003200      1$:      MOV      #3200,R4      ;SET FIO,FIV,AND FD
6029 033512 170104      LDFPS      R4
6030 033514 012737 033534 001236      MOV      #DD31,$TMP2
6031 033522 012700 034626      MOV      #DDP4,R0      ;SET ACO OPERAND
6032 033526 172410      LDD      (R0),ACO
6033 033530 012700 034636      MOV      #DDP5,R0      ;FSPC
6034 033534 172010      DD31:      ADDD      (R0),ACO      ;TEST INSTRUCTION
6035 033536 170205      STFPS      R5      ;GET FPS
6036 033540 012700 034556      MOV      #DDDAT0,R0      ;GET THE RESULT
6037 033544 174010      STE      ACO,(R0)
6038 033546 012701 034666      MOV      #DDP8,R1      ;IS IT CORRECT
6039 033552 012702 000004      MOV      #4,R2
6040 033556 022021      DD32:      CMP      (R0)+,(R1)+
6041 033560 001415      BEQ      DD35      ;ADD-SUB
6042 033562 012700 034556      MOV      #DDDAT0,R0      ;FLOWAS FAILURE
6043 033566 012701 034656      MOV      #DDP7,R1      ;CON 216 N440 NOT 141
6044 033572 012702 000004      MOV      #4,R2      ;GET GENERATED
6045 033576 022021      DD33:      CMP      (R0)+,(R1)+      ;FOR THE ALLIGNMENT
6046 033600 001402      BEQ      DD34      ;FLOWS?
6047 033602 000137 034366      JMP      DDER9      ;DATA ERROR, D
6048 033606 077205      DD34:      SOB      R2,DD33
6049 033610 000137 034424      JMP      DDER10
6050 033614 077220      DD35:      SOB      R2,DD32
6051 033616 052704 000010      BIS      #10,R4
    
```

6052	033622	020405				CMP	R4,R5		:FPS CORRECT?
6053	033624	001402				BEQ	DD36		
6054	033626	000137	033770			JMP	DDERO		:BAD FPS
6055							FSRC	POS	/FSRC/</AC/
6056	033632								
	033632	012737	033640	001110		DD36:			
6057	033640	012704	003200		1\$:	MOV	#1\$,\$LPERR		:SET UP THE LOOP ON ERROR ADDRESS.
6058	033644	170104				MOV	#3200,R4		:SET F10, F1V, AND FD
6059	033646	012737	033666	001236		LDFPS	R4		
6060	033654	012700	034636			MOV	#DD37,\$TMP2		
6061	033660	172410				MOV	#DDP5,R0		:SET ACO OPERAND
6062	033662	012700	034626			LDD	(R0),ACO		
6063	033666	172010				DD37:	MOV	#DDP4,R0	:FSPC
6064	033670	170205				ADD	(R0),ACO		:TEST INSTRUCTION
6065	033672	012700	034556			STFPS	R5		:GET FPS
6066	033676	174010				MOV	#DDDATO,R0		:GET THE RESULT
6067	033700	012701	034666			STD	ACO,(R0)		
6068	033704	012702	000004			MOV	#DDP8,R1		:IS IT CORRECT
6069	033710	022021				DD38:	MOV	#4,R2	
6070	033712	001415				CMP	(R0)+,(R1)+		
6071	033714	012700	034556			BEQ	DD41		
6072	033720	012701	034656			MOV	#DDDATO,R0		:ADD SUB
6073	033724	012702	000004			MOV	#DDP7,R1		:FLOWS FAILURES
6074	033730	022021				DD39:	MOV	#4,R2	:GET 216,042,141
6075	033732	001402				CMP	(R0)+,(R1)+		:FOR THE ALLIGNMENT
6076	033734	000137	034462			BEQ	DD40		:FLOWS?
6077	033740	077205				JMP	DDER11		:DATA ERROR. D
6078	033742	000137	034520			DD40:	SOB	R2,DD39	
6079	033746	077220				JMP	DDER12		:BAD CONSTANT.D
6080	033750	052704	000010			DD41:	SOB	R2,DD38	
6081	033754	020405				BIS	#10,R4		
6082	033756	001402				CMP	R4,R5		:FPS CORRECT?
6083	033760	000137	033770			BEQ	DD42		
6084	033764	000137	034706			JMP	DDERO		:BAD FPS
6085	033770	010437	001242			DD42:	JMP	DDDONE	
6086	033774	010537	001240			DDERO:	MOV	R4,\$TMP4	:FPS ERROR
6087	034000	104164				1\$:	MOV	R5,\$TMP3	
6088	034002	000137	034706			ERROR	+164		
6089	034006					JMP	DDDONE		
	034006	012737	034576	001240		DDER1:	MOV	#DDP1,\$TMP3	
	034014	012737	034576	001242			MOV	#DDP1,\$TMP4	
	034022	012737	034556	001244			MOV	#DDDATO,\$TMP5	
	034030	012737	034676	001246			MOV	#DDP9,\$TMP6	
	034036	104165				1\$:	ERROR	+165	
	034040	000137	034706			JMP	DDDONE		
6090	034044					DDER2:			
	034044	012737	034576	001240			MOV	#DDP1,\$TMP3	
	034052	012737	034576	001242			MOV	#DDP1,\$TMP4	
	034060	012737	034556	001244			MOV	#DDDATO,\$TMP5	
	034066	012737	034676	001246			MOV	#DDP9,\$TMP6	
	034074	104176				1\$:	ERROR	+176	
	034076	000137	034706			JMP	DDDONE		
6091	034102					DDER3:			
	034102	012737	034576	001240			MOV	#DDP1,\$TMP3	
	034110	012737	034606	001242			MOV	#DDP2,\$TMP4	
	034116	012737	034556	001244			MOV	#DDDATO,\$TMP5	
	034124	012737	034566	001246			MOV	#DDP0,\$TMP6	

	034132	104214			1\$:	ERROR	+24
	034134	000137	034706			JMP	DDDONE
6092	034140				DDER4:		
	034140	012737	034606	001240		MOV	#DDP2,\$TMP3
	034146	012737	034576	001242		MOV	#DDP1,\$TMP4
	034154	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034162	012737	034566	001246		MOV	#DDP0,\$TMP6
	034170	104200			1\$:	ERROR	+200
	034172	000137	034706			JMP	DDDONE
6093	034176				DDER5:		
	034176	012737	034646	001240		MOV	#DDP6,\$TMP3
	034204	012737	034616	001242		MOV	#DDP3,\$TMP4
	034212	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034220	012737	034656	001246		MOV	#DDP7,\$TMP6
	034226	104165			1\$:	ERROR	+165
	034230	000137	034706			JMP	DDDONE
6094	034234				DDER6:		
	034234	012737	034646	001240		MOV	#DDP6,\$TMP3
	034242	012737	034616	001242		MOV	#DDP3,\$TMP4
	034250	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034256	012737	034656	001246		MOV	#DDP7,\$TMP6
	034264	104201			1\$:	ERROR	+201
	034266	000137	034706			JMP	DDDONE
6095	034272				DDER7:		
	034272	012737	034616	001240		MOV	#DDP3,\$TMP3
	034300	012737	034646	001242		MOV	#DDP6,\$TMP4
	034306	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034314	012737	034656	001246		MOV	#DDP7,\$TMP6
	034322	104165			1\$:	ERROR	+165
	034324	000137	034706			JMP	DDDONE
6096	034330				DDER8:		
	034330	012737	034616	001240		MOV	#DDP3,\$TMP3
	034336	012737	034646	001242		MOV	#DDP6,\$TMP4
	034344	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034352	012737	034656	001246		MOV	#DDP7,\$TMP6
	034360	104202			1\$:	ERROR	+202
	034362	000137	034706			JMP	DDDONE
6097	034366				DDER9:		
	034366	012737	034636	001240		MOV	#DDP5,\$TMP3
	034374	012737	034626	001242		MOV	#DDP4,\$TMP4
	034402	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034410	012737	034666	001246		MOV	#DDP8,\$TMP6
	034416	104165			1\$:	ERROR	+165
	034420	000137	034706			JMP	DDDONE
6098	034424				DDER10:		
	034424	012737	034636	001240		MOV	#DDP5,\$TMP3
	034432	012737	034626	001242		MOV	#DDP4,\$TMP4
	034440	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034446	012737	034666	001246		MOV	#DDP8,\$TMP6
	034454	104203			1\$:	ERROR	+203
	034456	000137	034706			JMP	DDDONE
6099	034462				DDER11:		
	034462	012737	034626	001240		MOV	#DDP4,\$TMP3
	034470	012737	034636	001242		MOV	#DDP5,\$TMP4
	034476	012737	034556	001244		MOV	#DDDAT0,\$TMP5
	034504	012737	034666	001246		MOV	#DDP8,\$TMP6
	034512	104165			1\$:	ERROR	+165

```

034514 000137 034706
034520 012737 034026 001240
034526 012737 034636 001242
034534 012737 034556 001244
034542 012737 034666 001246
034550 104204
034552 000137 034706
6101 034556 000000 000000 000000
6102 034566 000000 000000 000000
6103 034576 100200 000000 000000
6104 034606 000200 000000 000000
6105 034616 001100 000000 000000
6106 034626 000600 000000 000000
6107 034636 101100 000000 000000
6108 034646 100600 000000 000000
6109 034656 001000 000000 000000
6110 034666 101000 000000 000000
6111 034676 100400 000000 000000
6112 034706
034706 104413
    
```

```

DDER*2: JMP DDDONE
MOV #DDP4,$TMP3
MOV #DDP5,$TMP4
MOV #DDDAT0,$TMP5
MOV #DDP8,$TMP6
*8: ERROR +204
JMP DDDONE
DDDAT0: .WORD 0,0,0,0
DDP0: .WORD 0,0,0,0
DDP1: .WORD 100200,0,0,0
DDP2: .WORD 200,0,0,0
DDP3: .WORD 1100,0,0,0
DDP4: .WORD 600,0,0,0
DDP5: .WORD 101100,0,0,0
DDP6: .WORD 100600,0,0,0
DDP7: .WORD 1000,0,0,0
DDP8: .WORD 101000,0,0,0
DDP9: .WORD 100400,0,0,0
DDDONE: RSETUP
    
```

```

;-DDP2
;-DDP1
:EXP=4 :FRAC=...110...
:EXP=3 :FRAC=...100...
;-DDP3
;-DDP4
:DDP3+DDP6
:DDP5+DDP4
:DDP1+DDP1
    
```

```

;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?).
    
```

5120

.....
: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
:.....

ST35: SCOPE
: USE POSITIVE OPERANDS

6121 034710 010004
6122 034712
6123 034712 012737 034720 001110
6124 034720 012704 003200
6125 034724 170104
6126 034726 012737 034746 001236
6127 034734 012700 035432
6128 034740 172410
6129 034742 012700 035432
6130 034746 173010
6131 034750 170205
6132 034752 012700 035410
6133 034756 174010
6134 034760 012701 035420
6135 034764 012702 000004
6136 034770 022021
6137 034772 001415
6138 034774 012700 035410
6139 035000 012701 035442
6140 035004 012702 000004
6141 035010 022021
6142 035012 001402
6143 035014 000137 035220
6144 035020 077205
6145 035022 000137 035256
6146 035026 077220
6147 035030 052704 000004
6148 035034 020405
6149 035036 001402
6150 035040 000137 035202
6151 035044
6152 035044 012737 035052 001110
6153 035052 012704 003200
6154 035056 170104
6155 035060 012737 035100 001236
6156 035066 012700 035452
6157 035072 172410
6158 035074 012700 035452
6159 035100 173010
6160 035102 170205
6161 035104 012700 035410
6162 035110 174010
6163 035112 012701 035420
6164 035116 012702 000004
6165 035122 022021
6166 035124 001415

EE1: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
MOV #3200, R4 ;SET F10, F1V, AND FD
LDFPS R4
MOV #EE2, \$TMP2
MOV #EEP1, R0 ;SET ACO OPERAND
LDD (R0), ACO
MCP #EEP1, RC ;FSPC
EE2: SUBD (R0), ACO ;TEST INSTRUCTION
STFPS R5 ;GET FPS
MOV #EEDATO, R0 ;GET THE RESULT
STD ACO, (R0)
MOV #EEO, R1 ;IS IT CORRECT?
MOV #4, R2
EE3: CMP (R0)+, (R1)+
BEQ EE6
MOV #EEDATO, R0 ;DID A BAD
MOV #EEP2, R1 ;CONSTANT (NOT 57)
MOV #4, R2 ;GET GENERATED
EE4: CMP (R0)+, (R1)+ ;FOR THE ALLIGNMENT
BEQ EE5 ;FLOWS?
JMP EEER1 ;DATA ERROR.D
EE5: SOB R2, EE4 ;BAD CONSTANT.D
JMP EEER2
EE6: SOB R2, EE3
BIS #4, R4
CMP R4, R5 ;FPS CORRECT?
BEQ EE7
JMP EEER0 ;BAD FPS
:USE NEGATIVE OPERANDS
EE7: MOV #1\$, \$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
MOV #3200, R4 ;SET F10, F1V, AND FD
LDFPS R4
MOV #EE8, \$TMP2
MOV #EEP3, R0 ;SET ACO OPERAND
LDD (R0), ACO
MOV #EEP3, R0 ;FSPC
EE8: SUBD (R0), ACO ;TEST INSTRUCTION
STFPS R5 ;GET FPS
MOV #EEDATO, R0 ;GET THE RESULT
STD ACO, (R0)
MOV #EEO, R1 ;IS IT CORRECT?
MOV #4, R2
EE9: CMP (R0)+, (R1)+
BEQ EE12

```

6166 035126 012700 035410      MOV      #EEDATO,R0      ;DID A BAD
6167 035132 012701 035462      MOV      #EEP4,R1      ;CONSTANT (NOT 57)
6168 035136 012702 000J04      MOV      #4,R2         ;GET GENERATED
6169 035142 022021          EE10:    CMP      (R0)+,(R1)+   ;FOR THE ALLIGNMENT
6170 035144 001402          BEQ      EE11          ;FLOWS?
6171 035146 000137 035314      JMP      EEER3        ;DATA ERROR.D
6172 035152 077205          EE11:    SOB      R2,EE10
6173 035154 000137 035352      JMP      EEER4        ;BAD CONSTANT.D
6174 035160 077220          EE12:    SOB      R2,EE9
6175 035162 052704 000004      BIS      #4,R4
6176 035166 020405          CMP      R4,R5        ;FPS CORRECT?
6177 035170 001402          BEQ      EE13
6178 035172 000137 035202      JMP      EEER0        ;BAD FPS.
6179 035176 000137 035472          EE13:    JMP      EEDONE
6180 035202 010437 001242          EEER0:   MOV      R4,$TMP4      ;BAD FPS
6181 035206 010537 001240          MOV      R5,$TMP3
6182 035212 104205          1$:     ERROR   +205
6183 035214 000137 035472          JMP      EEDONE
6184 035220          EEER1:   MOV      #EEP1,$TMP3
        035220 012737 035432 001240      MOV      #EEP1,$TMP4
        035226 012737 035432 001242      MOV      #EEDATO,$TMP5
        035234 012737 035410 001244      MOV      #EEP0,$TMP6
        035242 012737 035420 001246          1$:     ERROR   +206
        035250 104206          JMP      EEDONE
        035252 000137 035472
6185 035256          EEER2:   MOV      #EEP1,$TMP3
        035256 012737 035432 001240      MOV      #EEP1,$TMP4
        035264 012737 035432 001242      MOV      #EEDATO,$TMP5
        035272 012737 035410 001244      MOV      #EEP0,$TMP6
        035300 012737 035420 001246          1$:     ERROR   +207
        035306 104207          JMP      EEDONE
        035310 000137 035472
6186 035314          EEER3:   MOV      #EEP3,$TMP3
        035314 012737 035452 001240      MOV      #EEP3,$TMP4
        035322 012737 035452 001242      MOV      #EEDATO,$TMP5
        035330 012737 035410 001244      MOV      #EEP0,$TMP6
        035336 012737 035420 001246          1$:     ERROR   +206
        035344 104206          JMP      EEDONE
        035346 000137 035472
6187 035352          EEER4:   MOV      #EEP3,$TMP3
        035352 012737 035452 001240      MOV      #EEP3,$TMP4
        035360 012737 035452 001242      MOV      #EEDATO,$TMP5
        035366 012737 035410 001244      MOV      #EEP0,$TMP6
        035374 012737 035420 001246          1$:     ERROR   +207
        035402 104207          JMP      EEDONE
        035404 000137 035472
6188 035410 000000 000000 000000  EEDATO:  .WORD  0,0,0,0
6189 035420 000000 000000 000000  EEP0:   .WORD  0,0,0,0,0
6190 035432 000200 000000 000000  EEP1:   .WORD  200,0,0,0
6191 035442 000400 000000 000000  EEP2:   .WORD  400,0,0,0
6192 035452 100200 000000 000000  EEP3:   .WORD  100200,0,0,0
6193 035462 100400 000000 000000  EEP4:   .WORD  100400,0,0,0
6194 035472          EEDONE:
        035472 104413          RSETUP      ;GO INITIALIZE THE FPS AND STACK; AND
        ;SEE IF THE USER HAS EXPRESSED
        ;THE DESIRE TO CHANGE THE SOFTWARE
        ;VIRTUAL CONSOLE SWITCH REGISTER (HAS

```

:THE USER TYPED (CONTROL G?).

6204

```

.SBTTL TEST # 36 - NORMALIZE ALGORITHM TEST
.....
:TEST 36      NORMALIZE ALGORITHM TEST
:
: THIS IS A TEST OF THE NORMALIZE
: FLOW ALGORITHM. TWO PATTEPNS ARE USED,
: FIRST THE MINIMUM SITUATION REQUIRING ONE
: LEFT SHIFT AND THEN THE MAXIMUM SITJATION
: REQUIRING 56 SHIFTS.
:
:.....

```

```

035474 000004
6205 035476 012737 035504 001110
6206 035476 012704 003200
6207 035504 170104
6208 035510 012737 035532 001236
6209 035512 012700 036030
6210 035520 172410
6211 035524 012700 036040
6212 035526 172010
6213 035532 170205
6214 035534 012700 036000
6215 035536 174010
6216 035542 012701 036050
6217 035544 012702 000004
6218 035550 022021
6219 035554 001401
6220 035556 000470
6221 035560 077204
6222 035562 020405
6223 035564 001401
6224 035566 000437
6225 035570
6226
6227
6228 035572 012737 035600 001110
6229 035572 012704 003200
6230 035604 170104
6231 035606 012737 035626 001236
6232 035614 012700 036010
6233 035620 172410
6234 035622 012700 036020
6235 035626 172010
6236 035630 012700 036000
6237 035632 174010
6238 035636 012701 036050
6239 035640 012702 000004
6240 035644 022021
6241 035650 001401
6242 035652 000413
6243 035654 077204
6244 035656 020405
6245 035660 001401
6246 035662 000401
6247 035664

TST36: SCOPE
:USE DATA PATTERNS THAT REQUIRE ONLY ONE LEFT SHIFT TO NORMALIZE
FF1:
18:  MOV #18,$LPERR ;SET JP THE LOOP ON ERROR ADDRESS.
    MOV #3200,R4 ;SET F10, F1V, AND FD
    LDFPS R4
    MOV #FF2,$TMP2
    MCV #FFP2,R0 ;SET ACO OPERAND
    LDD (R0),ACO
    MOV #FFP3,R0 ;FSPC
FF2:  ADDD (R0),ACO ;TEST INSTRUCTION
    STFPS R5 ;GET FPS
    MOV #FFDAT0,R0 ;GET THE RESULT
    STD ACO,(R0)
    MOV #FFP4,R1 ;IS IT CORRECT
    MOV #4,R2
FF3:  CMP (R0)+,(R1)+
    BEQ FF4
    BR FFER2 ;BAD DATA
FF4:  SOB R2,FF3
    CMP R4,R5 ;FPS CORRECT?
    BEQ FF5
    BR FFER0 ;BAD FPS
:USE DATA PATTERNS WHICH REQUIRE 56 LEFT SHIFTS TO NORMALIZE
:THE RESULT
FF5:
18:  MOV #18,$LPERR ;SET UP THE LOOP ON ERROR ADDRESS.
    MOV #3200,R4 ;SET F1U, F1V, AND FD
    LDFPS R4
    MOV #FF6,$TMP2
    MOV #FFP0,R0 ;SET ACO OPERAND
    LDI (R0),ACO
    MOV #FFP1,R0 ;FSRC
FF6:  ADDD (R0),ACO ;TEST INSTRUCTION
    STFPS R5 ;GET FPS
    MOV #FFDAT0,R0 ;GET THE RESULT
    STD ACO,(R0)
    MOV #FFP4,R1 ;IS IT CORRECT
    MOV #4,R2
FF7:  CMP (R0)+,(R1)+
    BEQ FF10
    BR FFER1 ;BATA
FF10: SOB R2,FF7
    CMP R4,R5 ;FPS CORRECT?
    BEQ FF11
    BR FFER0 ;BAD FPS

```

FFPACU... FLYS FNT PR A
TEST # 30 - NORMALIZE ALGORITHM TEST

```

6248 035666 000474          FF11:  BR      FFDONE
6249
6250 035670 010537 001240    FFER0: MOV     R5,$TMP3
6251 035674 010437 001242      MOV     R4,$TMP4
6252 035700 104164          1$:     ERROR   +164
6253 035702 000466          BR      FFDONE
6254
6255 035704          FFER1:
      035704 012737 036020 001240    MOV     #FFP1,$TMP3
      035712 012737 036010 001242      MOV     #FFP0,$TMP4
      035720 012737 036000 001244      MOV     #FFDAT0,$TMP5
      035726 012737 036050 001246      MOV     #FFP4,$TMP6
      035734 104210          1$:     ERROR   +210
      035736 000137 036060      JMP     FFDONE
6256
6257 035742          FFER2:
      035742 012737 036040 001240    MOV     #FFP3,$TMP3
      035750 012737 036030 001242      MOV     #FFP2,$TMP4
      035756 012737 036000 001244      MOV     #FFDAT0,$TMP5
      035764 012737 036050 001246      MOV     #FFP4,$TMP6
      035772 104210          1$:     ERROR   +210
      035774 000137 036060      JMP     FFDONE
6258
6259
6260 036000 000000 000000 000000  FFDAT0: .WORD  0,0,0,0
6261 036010 016000 000000 000000  FFPO:   .WORD  16000,0,0,1
6262 036020 116000 000000 000000  FFP1:   .WORD  116000,0,0,0
6263 036030 000500 000000 000000  FFP2:   .WORD  500,0,0,0
6264 036040 100400 000000 000000  FFP3:   .WORD  100400,0,0,0
6265 036050 000200 000000 000000  FFP4:   .WORD  200,0,0,0
6266 036060          FFDONE:
6267 036060          TST37:

```

:FFP4=FFP0+FFP1=FFP3+FFP4

5269

.SBTTL END OF PASS ROUTINE

```
*****
* INCREMENT THE PASS NUMBER ($PASS)
* INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
* IF SW12=1 INHIBIT TRACE TRAP
* IF THERES A MONITOR GO TO IT
* IF THERE ISN'T JUMP TO LOOP
$EOP:
036060 036060 030004          SCOPE
036062 005037 001102      CLR      $TSTNM      ;;ZERO THE TEST NUMBER
036066 005037 001302      CLR      $TIMES      ;;ZERO THE NUMBER OF ITERATIONS
036072 005237 001324      INC      $PASS       ;;INCREMENT THE PASS NUMBER
036076 100004          BPL      1000$      ;;BRANCH IF STILL PLUS      :DPM002
036100 005037 001324      CLR      $PASS       ;;CLEAR THE PASS COUNTER    :DPM002
036104 005237 036514      INC      $PASS2      ;;INCREMENT OVERFLOW PASS COUNTER :DPM002
036110 005327          1000$: DEC      (PC)+      ;;LOOP?
036112 000001          $EOPCT: .WORD      1
036114 003402          BLE      999$      ;;NO      :DPM002
036116 000137 036442      JMP      $DOAGN
036122 012737          999$:  MOV      (PC)+, @ (PC)+ ;;RESTORE COUNTER
036124 000001          $ENDCT: .WORD      1
036126 036112          $EOPCT
036130 005737 001112      TST      $ERTTL      ;;SEE IF ANY ERRORS THIS PASS  :DPM002
036134 001007          BNE      5000$      ;;BRANCH IF SO TO PRINT THE EOP :DPM002
036136 005737 036512      TST      $PENDS      ;;SEE IF EOP MSGS ARE DISABLED  :DPM002
036142 001120          BNE      $GET42      ;;BRANCH IF SO      :DPM002
036144 032737 000003 001324 BIT      #3, $PASS    ;;PRINT EOP EVERY 4TH PASS    :DPM002
036152 001114          BNE      $GET42      ;;BRANCH IF NOT MULTIPLE OF 10 :DPM002
036154          5000$:
036154 104401 036162      TYPE      ,65$      ;;TYPE ASCIZ STRING
036160 000407          BR      64$      ;;GET OVER THE ASCIZ
;;65$: .ASCIZ <12><15>/END PASS # /
64$:
036200 005737 036514      TST      $PASS2      ;;SEE IF OVERFLOW HAS NON-ZERO VALUE :DPM002
036204 001440          BEQ      4900$      ;;BRANCH IF ZERO
036206 013746 036514      MOV      $PASS2, -(SP) ;;SAVE $PASS2 FOR TYPEOUT
;;TYPE OVERFLOW PASS NUMBER IN OCTAL :DPM002
036212 104403          TYPOS
036214 006          .BYTE      6      ;;TYPE 6 DIGITS
036215 000          .BYTE      0      ;;SUPPRESS LEADING ZEROS
036216 005737 001324      TST      $PASS       ;;SEE IF PASS COUNT IS ZERO    :DPM002
036222 001007          BNE      3000$      ;;BRANCH IF NOT      :DPM002
036224 104401 036232      TYPE      ,67$      ;;TYPE ASCIZ STRING
036230 000403          BR      66$      ;;GET OVER THE ASCIZ
;;67$: .ASCIZ '00000.'
66$:
036240          BR      4910$      ;;GO TEST $ERTTL      :DPM002
036242 000426 070000 001244 3000$: MOV      #70000, $TMP5 ;;CHECK 5TH OCTAL DIGIT FIRST  :DPM002
036250 033737 001244 001324 4000$: BIT      $TMP5, $PASS ;;CHECK TO SEE IF OCTAL DIGIT IS ZERO :DPM002
036256 001013          BNE      4900$      ;;BRANCH OUT IF ZERO    :DPM002
036260 104401 036266      TYPE      ,69$      ;;TYPE ASCIZ STRING
036264 000401          BR      68$      ;;GET OVER THE ASCIZ
;;69$: .ASCIZ '0'
68$:
036270          ASR      $TMP5      ;;SHIFT THE THREE BITS RIGHT 3 PLACES :DPM002
036270 006237 001244      ASR      $TMP5      :
036274 006237 001244
```

```

036300 006237 001244 ASR $TMP5 ;
036304 000761 BR 4000$ ;BRANCH BACK TO CHECK $PASS ;DPM002
036306 4900$: MOV $PASS,-(SP) ;:SAVE $PASS FOR TYPEOUT ;DPM002
036306 013746 001324 ;:TYPE PASS NUMBER IN OCTAL
036312 104403 TYPOS ;:GO TYPE--OCTAL ASCII
036314 006 .BYTE 6 ;:TYPE 6 DIGITS
036315 000 .BYTE 0 ;:SUPPRESS LEADING ZEROS
036316 007737 001112 4910$: TST $ERTTL ;SEE IF ANY ERRORS THIS PASS ;DPM002
036322 011426 BEQ 5001$ ;BRANCH AROUND REPORT IF NONE ;DPM002
036324 104401 036332 TYPE 71$ ;:TYPE ASCII STRING
036330 000415 BR 70$ ;:GET OVER THE ASCIIZ
036364 71$: .ASCIIZ / TOTAL ERRORS THIS PASS /
036364 013746 001112 70$: MOV $ERTTL,-(SP) ;:SAVE $ERTTL FOR TYPEOUT
036370 104403 TYPOS ;:TOTAL NUMBER OF ERRORS IN OCTAL
036372 006 .BYTE 6 ;:GO TYPE--OCTAL ASCII
036373 000 .BYTE 0 ;:TYPE 6 DIGITS
036374 005037 001112 CLR $ERTTL ;:SUPPRESS LEADING ZEROS
036400 104401 001313 5001$: TYPE ,SCLRF ;:CLEAR ERROR TOTAL
036404 013700 000042 $GET42: MOV @#42,R0 ;:TYPE CARRIAGE RETURN, LINE FEED
036410 001414 BEQ $DOAGN ;:GET MONITOR ADDRESS
036412 005046 CLR -(SP) ;:BRANCH IF NO MONITOR
036414 012746 036422 MOV #$CLR.T,-(SP) ;:INSURE THE 'T' BIT IS CLEAR
036420 000426 BR $RTRN ;:SETUP FOR AN RTI OR RTT
036422 $CLR.T: ;:GO DO AN RTI OR RTT TO LOAD THE PSW
036422 013700 000042 MOV @#42,R0 ;:WITH A CLEARED 'T' BIT
036426 001405 BEQ $DOAGN ;:INSURE R0 CONTAINS THE MONITORS
036430 000005 RESET ;:RETURN ADDRESS
036432 004710 $ENDAD: JSR PC,(R0) ;:CLEAR THE WORLD
036434 000240 NOP ;:GO TO MONITOR
036436 000240 NOP ;:SAVE ROOM
036440 000240 NOP ;:FOR
036442 $DOAGN: ;:ACT11
036442 104400 TRAP ;:PUSH OLD PSW AND PC ON STACK
036444 042716 000020 BIC #20,(SP) ;:CLEAR THE 'T' BIT
036450 032777 010000 142462 BIT #BIT12,@SWR ;:RUN WITH TRACE TRAP?
036456 001005 BNE 1$ ;:BR IF NO
036460 005137 036504 COM $TBIT ;:IS IT TIME FOR TRACE TRAP
036464 100402 BMI 1$ ;:BR IF NO
036466 052716 000020 BIS #20,(SP) ;:SET TRACE TRAP
036472 012746 036500 1$: MOV #$LOOP,-(SP) ;:JUMP TO START OF TEST
036476 000002 $RTRN: RTI ;:RETURN--THIS IS CHANGED TO
;:AN 'RTT' IF 'RTT' IS A LEGAL
;:INSTRUCTION
036500 $LOOP: ;:RETJRN
036500 000137 JMP @ (PC)+
036502 004456 $RTNAD: .WORD LOOP
036504 000000 $TBIT: .WORD 0 ;:'T' BIT STATE INDICATOR
036506 377 377 000 $ENULL: .BYTE -1,-1,0 ;:NULL CHARACTER STRING
036512 000000 EPENDS: .WORD 0 ;:LOCATION FOR EOP PRINT FLAG ;DPM002
036514 000000 $PASS2: .WORD 0 ;:LOCATION FOR PASS COUNT OVERFLOW ;DPM002

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627*

.SBTTL SCOPE HANDLER ROUTINE

```

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

```

036516 105777 142422          $SCOPE: TSTB      @STKS          ;IS A CHARACTER WAITING?          ;DPM002
036522 100042                BPL          9000$          ;BRANCH IF NOT                    ;DPM002
036524 013737 001146 001244  MOV      $TKB,$TMP5      ;WASTE THE CHARACTER, CLEARING READY ;DPM002
036532 005737 036512                TST      EPENDS          ;SEE WHICH STATE ENABLE/DISABLE IS IN ;DPM002
036536 001017                BNE      8000$          ;BRANCH IF EOP'S DISABLED          ;DPM002
036540 005237 036512                INC      EPENDS          ;SET FLAG DISABLING PRINTOUTS      ;DPM002
036544 104401 036552                TYPE     ,65$          ;;TYPE ASCIZ STRING
036550 000411                BR       64$          ;;GET OVER THE ASCIZ
;;65$: .ASCIZ <CRLF>:EOP'S DISABLED!<CRLF>
64$:
036574 000415                BR       9000$          ;BRANCH OVER ENABLE ROUTINE        ;DPM002
036576 005037 036512                CLR      EPENDS          ;CLEAR FLAG ENABLING PRINTOUTS     ;DPM002
036602 104401 036610                TYPE     ,67$          ;;TYPE ASCIZ STRING
036606 000410                BR       66$          ;;GET OVER THE ASCIZ
;;67$: .ASCIZ <CRLF>:EOP'S ENABLED!<CRLF>
66$:
036630 000000                9000$:
036630 104407                CKSWR
036632 032777 040000 142300 1$: BIT      #BIT14,@SWR      ;;TEST FOR CHANGE IN SOFT-SWR
036640 001131                BNE      $OVER          ;;LOOP ON PRESENT TEST?
;;YES IF SW14=1
:#####START OF CODE FOR THE XOR TESTER#####
036642 000416                $XTSTR: BR      6$          ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
036644 013746 000004                MOV      @ERRVEC,-(SP)    ;;SAVE THE CONTENTS OF THE ERROR VECTOR
036650 012737 036670 000004  MOV      #5$,@ERRVEC     ;;SET FOR TIMEOUT
036656 005737 177060                TST      @#177060        ;;TIME OUT ON XOR?
036662 012637 000004                MOV      (SP)+,@ERRVEC   ;;RESTORE THE ERROR VECTOR
036666 000500                BR       $$VLAD          ;;GO TO THE NEXT TEST
036670 022626                5$: CMF      (SP)+,(SP)+  ;;CLEAR THE STACK AFTER A TIME OUT
036672 012637 000004                MOV      (SP)+,@ERRVEC   ;;RESTORE THE ERROR VECTOR
036676 000440                BR       7$          ;;LOOP ON THE PRESENT TEST
036700                6$:;#####END OF CODE FOR THE XOR TESTER#####
036700 032777 000400 142232  BIT      #BIT08,@SWR      ;;LOOP ON SPEC. TEST?
036706 001404                BEQ      2$          ;;BR IF NO
036710 127737 142224 001102  CMPB     @SWR,$STNM      ;;ON THE RIGHT TEST? SWR<7:0>
036716 001502                BEQ      $OVER          ;;BR IF YES
036720 013737 177766 037142 2$: MOV      177766,CPSAVE    ;;MOVE CPU ERR REG VALUE TO LOC FOR TST ;DPM001
036726 032737 000001 037142  BIT      #BIT00,CPSAVE   ;;SEE IF THE POWER MONITOR BIT IS ON ;DPM001
036734 001406                BEQ      2000$          ;BRANCH TO CONTINUE ROUTINE IF CLEAR ;DPM001
036736 042737 000001 177766  BIC      #BIT00,177766   ;CLEAR THE BIT FOUND TO BE SET      ;DPM001
036744 104177                ERROR    +177          ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
036746 105037 001103                CLRB     $ERFLG         ;CLEAR THE ERROR FLAG FOR NEXT TEST ;DPM001
036752 105737 001103                2000$: TSTB     $ERFLG         ;;HAS AN ERROR OCCURRED?
    
```

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

6273

.SBTTL ERROR HANDLER ROUTINE

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

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

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

```


6275

.SBTTL SAVE AND RESTORE R0-R5 ROUTINES

 *SAVE R0-R5
 *CALL:
 * SAVREG
 *UPON RETURN FROM \$SAVREG THE STACK WILL LOOK LIKE:
 *
 *TOP---(+16)
 * +2---(+18)
 * +4---R5
 * +6---R4
 * +8---R3
 *+10---R2
 *+12---R1
 *+14---R0
 \$SAVREG:

037504			MOV	R0,-(SP)	:::PUSH R0 ON STACK
037504	010046		MOV	R1,-(SP)	:::PUSH R1 ON STACK
037506	010146		MOV	R2,-(SP)	:::PUSH R2 ON STACK
037510	010246		MOV	R3,-(SP)	:::PUSH R3 ON STACK
037512	010346		MOV	R4,-(SP)	:::PUSH R4 ON STACK
037514	010446		MOV	R5,-(SP)	:::PUSH R5 ON STACK
037516	010546		MOV	22(SP),-(SP)	:::SAVE PS OF MAIN FLOW
037520	016646	000022	MOV	22(SP),-(SP)	:::SAVE PC OF MAIN FLOW
037524	016646	000022	MOV	22(SP),-(SP)	:::SAVE PS OF CALL
037530	016646	000022	MOV	22(SP),-(SP)	:::SAVE PC OF CALL
037534	016646	000022	MOV	22(SP),-(SP)	:::SAVE PC OF CALL
037540	000002		RTI		

*RESTORE R0-R5

*CALL:

* RESREG

\$RESREG:

037542			MOV	(SP)+,22(SP)	:::RESTORE PC OF CALL
037542	012666	000022	MOV	(SP)+,22(SP)	:::RESTORE PS OF CALL
037546	012666	000022	MOV	(SP)+,22(SP)	:::RESTORE PC OF MAIN FLOW
037552	012666	000022	MOV	(SP)+,22(SP)	:::RESTORE PS OF MAIN FLOW
037556	012666	000022	MOV	(SP)+,R5	:::POP STACK INTO R5
037562	012605		MOV	(SP)+,R4	:::POP STACK INTO R4
037564	012604		MOV	(SP)+,R3	:::POP STACK INTO R3
037566	012603		MOV	(SP)+,R2	:::POP STACK INTO R2
037570	012602		MOV	(SP)+,R1	:::POP STACK INTO R1
037572	012601		MOV	(SP)+,R0	:::POP STACK INTO R0
037574	012600		MOV	(SP)+,R0	:::POP STACK INTO R0
037576	000002		RTI		

6277

```
.SRTL TYPE ROUTINE
*****
*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
*NOTE1: $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
*NOTE2: $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
*NOTE3: $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
*
*CALL:
*1) USING A TRAP INSTRUCTION
*   TYPE      ,MESADR      ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
*OR
*   TYPE
*   MESADR
*
037600 105737 001157 $TYPE: TSTB $IPFLG      ;;IS THERE A TERMINAL?
037604 100002          BPL 1$              ;;BR IF YES
037606 000000          HALT              ;;HALT HERE IF NO TERMINAL
037610 000430          BR 3$              ;;LEAVE
037612 010046          1$: MOV RO,-(SP)    ;;SAVE RO
037614 017600 000002  MOV @2(SP),RO      ;;GET ADDRESS OF ASCIZ STRING
037620 122737 000001 001336  CMPB #APTENV,$ENV      ;;RUNNING IN APT MODE
037626 001011          BNE 62$          ;;NO,GO CHECK FOR APT CONSOLE
037630 132737 000100 001337  BITB #APTSPOOL,$ENVM  ;;SPOOL MESSAGE TO APT
037636 001405          BEQ 62$          ;;NO,GO CHECK FOR CONSOLE
037640 010037 037650  MOV RO,61$          ;;SETUP MESSAGE ADDRESS FOR APT
037644 004737 040632  JSR PC,$ATY3        ;;SPOOL MESSAGE TO APT
037650 000000          61$: .WORD 0      ;;MESSAGE ADDRESS
037652 132737 000040 001337  62$: BITB #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
037660 001003          BNE 60$          ;;YES,SKIP TYPE OUT
037662 112046          2$: MOVB (RO)+,-(SP)  ;;PUSH CHARACTER TO BE TYPED ONTO STACK
037664 001005          BNE 4$           ;;BR IF IT ISN'T THE TERMINATOR
037666 005726          TST (SP)+        ;;IF TERMINATOR POP IT OFF THE STACK
037670 012600          60$: MOV (SP)+,RO    ;;RESTORE RO
037672 062716 000002  3$: ADD #L,(SP)      ;;ADJUST RETURN PC
037676 000002          RTI              ;;RETURN
037700 122716 000011  4$: CMPB #HT,(SP)    ;;BRANCH IF <HT>
037704 001430          BEQ 8$           ;;
037706 122716 000200  CMPB #CRLF,(SP)    ;;BRANCH IF NOT <CRLF>
037712 001006          BNE 5$           ;;
037714 005726          TST (SP)+        ;;POP <CR><LF> EQUIV
037716 104401          TYPE            ;;TYPE A CR AND LF
037720 001313          $CFLF
037722 105037 040140  CLRB $CHARCNT      ;;CLEAR CHARACTER COUNT
037726 000755          BR 2$           ;;GET NEXT CHARACTER
037730 004737 040012  5$: JSR PC,$TYPEC      ;;GO TYPE THIS CHARACTER
037734 123726 001156  6$: CMPB $FILLC,(SP)+  ;;IS IT TIME FOR FILLER CHARS.?
037740 001350          BNE 2$           ;;IF NO GO GET NEXT CHAR.
037742 013746 001154  MOV $NULL,-(SP)    ;;GET # OF FILLER CHARS. NEEDED
                                ;;AND THE NULL CHAR.
037746 105366 000001  7$: DECB 1(SP)        ;;DOES A NULL NEED TO BE TYPED?
037752 002770          BLT 6$           ;;BR IF NO--GO POP THE NULL OFF OF STACK
037754 004737 040012  JSR PC,$TYPEC      ;;GO TYPE A NULL
037760 105337 040140  DECB $CHARCNT      ;;DO NOT COUNT AS A COUNT
037764 000770          BR 7$           ;;LOOP
*HORIZONTAL TAB PROCESSOR
037766 112716 000040  8$: MOVB #' ,(SP)    ;;REPLACE TAB WITH SPACE
```

```

03772 004737 040012 98: JSR PC,$TYPEC ::TYPE A SPACE
03776 0032737 000007 040140 BITB #7,$CHARCNT ::BRANCH IF NOT AT
040004 001372 BNE 98 ::TAB STOP
040006 005726 TST (SP)+ ::POP SPACE OFF STACK
040010 000724 BR 28 ::GET NEXT CHARACTER
040012 $TYPEC:
040012 105777 141126 TSTB @STKS ::CHAR IN KYBD BUFFER? :MJD001
040016 000022 BPL 10$ ::BR IF NOT :MJD001
040020 000746 141122 MOV @STKB,-(SP) ::GET CHAR :MJD001
040024 002716 177600 BIC #177600,(SP) ::STRIP EXTRANEIOUS BITS :MJD001
040030 122716 000023 CMPB #$XOFF,(SP) ::WAS CHAR XOFF :MJD001
040034 001012 BNE 102$ ::BR IF NOT :MJD001
040036 105777 141102 101$: TSTB @STKS ::WAIT FOR CHAR :MJD001
040042 100375 BPL 101$ :MJD001
040044 107716 141076 MOVB @STKB,(SP) ::GET CHAR :MJD001
040050 042716 177600 BIC #177600,(SP) ::STRIP IT :MJD001
040054 122716 000021 CMPB #$XON,(SP) ::WAS IT XON? :MJD001
040060 001366 BNE 101$ ::BR IF NOT :MJD001
040062 102$: TST (SP)+ ::FIX STACK :MJD001
040064 105777 141060 10$: TSTB @STPS ::WAIT UNTIL PRINTER IS READY :MJD001
040070 100375 BPL 10$ :MJD001
040072 126627 000002 000021 CMPB 2(SP),#$XON ::IS CHARACTER A RANDOM XON? :RAN001
040100 001420 BEQ $TYPEX ::BRANCH IF YES :RAN001
040102 106677 000002 141042 MOVB 2(SP),@STPB ::LOAD CHAR TO BE TYPED INTO DATA REG.
040110 122766 000015 000002 CMPB #CR,2(SP) ::IS CHARACTER A CARRIAGE RETURN?
040116 001003 BNE 1$ ::BRANCH IF NO
040120 105037 040140 CLRB $CHARCNT ::YES--CLEAR CHARACTER COUNT
040124 000406 BR $TYPEX ::EXIT
040126 122766 000012 000002 1$: CMPB #LF,2(SP) ::IS CHARACTER A LINE FEED?
040134 001402 BEQ $TYPEX ::BRANCH IF YES
040136 105227 INCB (PC)+ ::COUNT THE CHARACTER
040140 000000 $CHARCNT: .WORD 0 ::CHARACTER COUNT STORAGE
040142 000207 $TYPEX: RTS PC

```

.SBTTL BINARY TO OCTAL (ASCII) AND TYPE

```

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

```

```

*$TYPON---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
*$TYPOS OR $TYPOC

```

```

*CALL:
*      MOV      NUM,-(SP)      ;;NUMBER TO BE TYPED
*      TYPON    ;;CALL FOR TYPEOUT

```

```

*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER

```

```

*CALL:
*      MOV      NUM,-(SP)      ;;NUMBER TO BE TYPED
*      TYPOC    ;;CALL FOR TYPEOUT

```

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

```

040310 052703 000060          BIS      #'0,R3      ::MAKE THIS DIGIT ASCII
040314 052703 000040          BIS      #' ,R3      ::MAKE ASCII IF NOT ALREADY
040320 122703 000040          CMPB    #' ,R3      ::IS THIS A SPACE CHARACTER
040324 001404          BEQ      7$          ::BRANCH IF SO - DON'T TYPE
040326 110337 040372          MOVB   R3,8$        ::SAVE FOR TYPING
040332 104401 040372          TYPE   ,8$        ::GO TYPE THIS DIGIT
040336 105337 040374          7$:    DECB    $OCNT  ::COUNT BY 1
040342 003344          BGT     2$          ::BR IF MORE TO DO
040344 002402          BLT     6$          ::BR IF DONE
040346 015204          INC     R4          ::INSURE LAST DIGIT ISN'T A BLANK
040350 000741          BR      2$          ::GO DO THE LAST DIGIT
040352 012605          6$:    MOV     (SP)+,R5  ::RESTORE R5
040354 012604          MOV     (SP)+,R4  ::RESTORE R4
040356 012603          MOV     (SP)+,R3  ::RESTORE R3
040360 016666 000002 000004          MOV     2(SP),4(SP) ::SET THE STACK FOR RETURNING
040366 012616          MOV     (SP)+,(SP)
040370 000002          RTI
040372      000          8$:    .BYTE  0      ::RETURN
040373      000          .BYTE  0      ::STORAGE FOR ASCII DIGIT
040374      000          $OCNT: .BYTE  0      ::TERMINATOR FOR TYPE ROUTINE
040375      000          $OFILL: .BYTE  0     ::OCTAL DIGIT COUNTER
040376 000000          $OMODE: .WORD  0     ::ZERO FILL SWITCH
                                ::NUMBER OF DIGITS TO TYPE

```

:DPM002
 :DPM002

```

.SBTL: 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
$TYPDS:
MOV R0,-(SP) ;;PUSH R0 ON STACK
MOV R1,-(SP) ;;PUSH R1 ON STACK
MOV R2,-(SP) ;;PUSH R2 ON STACK
MOV R3,-(SP) ;;PUSH R3 ON STACK
MOV R5,-(SP) ;;PUSH R5 ON STACK
MOV #20200,-(SP) ;;SET BLANK SWITCH AND SIGN
MOV 20(SP),R5 ;;GET THE INPUT NUMBER
BPL 1$ ;;BR IF INPUT IS POS.
NEG R5 ;;MAKE THE BINARY NUMBER POS.
MOVB #'-,1(SP) ;;MAKE THE ASCII NUMBER NEG.
1$: CLR RC ;;ZERO THE CONSTANTS INDEX
MOV #SDBLK,R3 ;;SETUP THE OUTPUT POINTER
MOVB #' ,(R3)+ ;;SET THE FIRST CHARACTER TO A BLANK
2$: CLR R2 ;;CLEAR THE BCD NUMBER
MOV $DTBL(R0),R1 ;;GET THE CONSTANT
3$: SUB R1,R5 ;;FORM THIS BCD DIGIT
BLT 4$ ;;BR IF DONE
INC R2 ;;INCREASE THE BCD DIGIT BY 1
BR 3$
4$: ADD R1,R5 ;;ADD BACK THE CONSTANT
TST R2 ;;CHECK IF BCD DIGIT=0
BNE 5$ ;;FALL THROUGH IF 0
TSTB (SP) ;;STILL DOING LEADING 0'S?
BMI 7$ ;;BR IF YES
5$: ASLB (SP) ;;MSD?
BCC 6$ ;;BR IF NO
MOVB 1(SP),-1(R3) ;;YES--SET THE SIGN
6$: BIS #'0,R2 ;;MAKE THE BCD DIGIT ASCII
7$: BIS #' ,R2 ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
MOVB R2,(R3)+ ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
TST (R0)+ ;;JUST INCREMENTING
CMF R0,#10 ;;CHECK THE TABLE INDEX
BLT 2$ ;;GO DO THE NEXT DIGIT
BGT 8$ ;;GO TO EXIT
MOV R5,R2 ;;GET THE LSD
BR 6$ ;;GO CHANGE TO ASCII
8$: TSTB (SP)+ ;;WAS THE LSD THE FIRST NON-ZERO?
BPL 9$ ;;BR IF NO
MOVB -1(SP),-2(R3) ;;YES--SET THE SIGN FOR TYPING
9$: CLRB (R3) ;;SET THE TERMINATOR
MOV (SP)+,R5 ;;POP STACK INTO R5
MOV (SP)+,R3 ;;POP STACK INTO R3
MOV (SP)+,R2 ;;POP STACK INTO R2
MOV (SP)+,R1 ;;POP STACK INTO R1
MOV (SP)+,R0 ;;POP STACK INTO R0
TYPE ,SDBLK ;;NOW TYPE THE NUMBER

```

```

040400
040400 010046
040402 010146
040404 010246
040406 010346
040410 010546
040412 012746 020200
040416 016605 000020
040422 100004
040424 005405
040426 112766 000055 000001
040434 005000 1$:
040436 012703 040614
040442 112723 000040
040446 005002 2$:
040450 016001 040604
040454 160105 3$:
040456 002402
040460 005202
040462 000774
040464 060105 4$:
040466 005702
040470 001002
040472 105716
040474 100407
040476 106316 5$:
040500 103003
040502 116663 000001 177777
040510 052702 000060 6$:
040514 052702 000040 7$:
040520 110223
040522 005720
040524 020027 000010
040530 002746
040532 003002
040534 010502
040536 000764
040540 105726 8$:
040542 100003
040544 116663 177777 177776
040552 105013 9$:
040554 012605
040556 012603
040560 012602
040562 012601
040564 012600
040566 104401 040614

```

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

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.SBTTL APT COMMUNICATIONS ROUTINE

```

040624 112737 000001 041070 $ATY1: MOVB #1,$FFLG ;;TO REPORT FATAL ERROR
040632 112737 000001 041066 $ATY3: MOVB #1,$MFLG ;;TO TYPE A MESSAGE
040640 000403
040642 112737 000001 041070 $ATY4: MOVB #1,$FFLG ;;TO ONLY REPORT FATAL ERROR
040650 $ATYC:
040650 010046 MOV R0,-(SP) ;;PUSH R0 ON STACK
040652 010146 MOV R1,-(SP) ;;PUSH R1 ON STACK
040654 115737 041066 TSTB $MFLG ;;SHOULD TYPE A MESSAGE?
040660 001450 BEQ 5$ ;;IF NOT: BR
040662 122737 000001 001336 CMPB #APTENV,$ENV ;;OPERATING UNDER APT?
040670 001031 BNE 3$ ;;IF NOT: BR
040672 132737 000100 001337 BITB #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
040700 001425 BEQ 3$ ;;IF NOT: BR
040702 017600 000004 MOV @4(SP),R0 ;;GET MESSAGE ADDR.
040706 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDR.
040714 005737 001316 1$: TST $MSGTYPE ;;SEE IF DONE W/ LAST XMISSION?
040720 001375 BNE 1$ ;;IF NOT: WAIT
040722 010037 001332 MOV R0,$MSGAD ;;PUT ADDR IN MAILBOX
040726 105720 2$: TSTB (R0)+ ;;FIND END OF MESSAGE
040730 001376 BNE 2$
040732 163700 001332 SUB $MSGAD,R0 ;;SUB START OF MESSAGE
040736 006700 ASR R0 ;;GET MESSAGE LNTH IN WORDS
040740 010037 001334 MOV R0,$MSGLEN ;;PUT LENGTH IN MAILBOX
040744 012737 000004 001316 MOV #4,$MSGTYPE ;;TELL APT TO TAKE MSG.
040752 000413 BR 5$
040754 017637 000004 041000 3$: MOV @4(SP),4$ ;;PUT MSG ADDR IN JSR LINKAGE
040762 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDRESS
040770 013746 177776 MOV 177776,-(SP) ;;PUSH 177776 ON STACK
040774 004737 037600 JSR PC,$TYPE ;;CALL TYPE MACRO
041000 000000 4$: .WORD 0
041002 5$:
041002 105737 041070 10$: TSTB $FFLG ;;SHOULD REPORT FATAL ERROR?
041006 001416 BEQ 12$ ;;IF NOT: BR
041010 005737 001336 TST $ENV ;;RUNNING UNDER APT?
041014 001413 BEQ 12$ ;;IF NOT: BR
041016 005737 001316 11$: TST $MSGTYPE ;;FINISHED LAST MESSAGE?
041022 001375 BNE 11$ ;;IF NOT: WAIT
041024 017637 000004 001320 MOV @4(SP),$FATAL ;;GET ERROR #
041032 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDR.
041040 005237 001316 INC $MSGTYPE ;;TELL APT TO TAKE ERROR
041044 105037 041070 12$: CLFB $FFLG ;;CLEAR FATAL FLAG
041050 105037 041067 CLFB $LFLG ;;CLEAR LOG FLAG
041054 105037 041066 CLRB $MFLG ;;CLEAR MESSAGE FLAG
041060 012601 MOV (SP)+,R1 ;;POP STACK INTO R1
041062 012600 MOV (SP)+,R0 ;;POP STACK INTO R0
041064 000207 RTS PC ;;RETURN
041066 000 $MFLG: .BYTE 0 ;;MESSG. FLAG
041067 000 $LFLG: .BYTE 0 ;;LOG FLAG
041070 000 $FFLG: .BYTE 0 ;;FATAL FLAG
        .EVEN
000200 APTSIZE=200
000001 APTENV=001
000100 APTSPOOL=100
000040 APTCSUP=040
  
```


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```
.SBTTL TTY INPUT ROUTINE
:*****
:ENABL LSB
:*****
:SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
:ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
:SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
:WHEN OPERATING IN TTY FLAG MODE.

041072 022737 000176 001140 $CKSWR: CMP #SWREG,SWR ;;IS THE SOFT-SWR SELECTED?
041100 031074 BNE 15$ ;;BRANCH IF NO
041102 105777 140036 TSTB @STKS ;;CHAR THERE?
041106 100071 BPL 15$ ;;IF NO, DON'T WAIT AROUND
041110 117746 140032 MOVB @STKB,-(SP) ;;SAVE THE CHAR
041114 042716 177600 BIC #^C177,(SP) ;;STRIP-OFF THE ASCII
041120 022726 000007 CMP #7,(SP)+ ;;IS IT A CONTROL G?
041124 001062 BNE 15$ ;;NO, RETURN TO USER
041126 123727 001134 000001 CMPB $AUTOB,#1 ;;ARE WE RUNNING IN AUTO-MODE?
041134 001456 BEQ 15$ ;;BRANCH IF YES
041136 104401 041511 TYPE ,SCNTLG ;;ECHO THE CONTROL-G (^G)
041142 104401 041516 $GTSWR: TYPE ,SMSWR ;;TYPE CURRENT CONTENTS
041146 013746 000176 MOV SWREG,-(SP) ;;SAVE SWREG FOR TYPEOUT
041152 104402 TYPOC ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
041154 104401 041527 TYPE ,SMNEW ;;PROMPT FOR NEW SWR
041160 005046 19$: CLR -(SP) ;;CLEAR COUNTER
041162 005046 CLR -(SP) ;;THE NEW SWR
041164 105777 137754 7$: TSTB @STKS ;;CHAR THERE?
041170 100375 BPL 7$ ;;IF NOT TRY AGAIN
041172 117746 137750 MOVB @STKB,-(SP) ;;PICK UP CHAR
041176 042716 177600 BIC #^C177,(SP) ;;MAKE IT 7-BIT ASCII
041202 021627 000025 9$: CMP (SP),#25 ;;IS IT A CONTROL-U?
041206 001005 BNE 10$ ;;BRANCH IF NOT
041210 104401 041504 TYPE ,SCNTLU ;;YES, ECHO CONTROL-U (^U)
041214 062706 000006 20$: ADD #6,SP ;;IGNORE PREVIOUS INPUT
041220 000757 BR 19$ ;;LET'S TRY IT AGAIN
041222 021627 000015 10$: CMP (SP),#15 ;;IS IT A <CR>?
041226 001022 BNE 16$ ;;BRANCH IF NO
041230 005766 000004 TST 4(SP) ;;YES, IS IT THE FIRST CHAR?
041234 001403 BEQ 11$ ;;BRANCH IF YES
041236 016677 000002 137674 MOV 2(SP),@SWR ;;SAVE NEW SWR
041244 062706 000006 11$: ADD #6,SP ;;CLEAR UP STACK
041250 104401 001313 14$: TYPE ,SCRLF ;;ECHO <CR> AND <LF>
041254 123727 001135 000001 CMPB $INTAG,#1 ;;RE-ENABLE TTY KBD INTERRUPTS?
041262 001003 BNE 15$ ;;BRANCH IF NOT
041264 012777 000100 137652 MOV #100,@STKS ;;RE-ENABLE TTY KBD INTERRUPTS
041272 000002 15$: RTI ;;RETURN
041274 004737 040012 16$: JSR PC,$TYPEC ;;ECHO CHAR
041300 021627 000060 CMP (SP),#60 ;;CHAR < 0?
041304 002420 BLT 18$ ;;BRANCH IF YES
041306 021627 000067 CMP (SP),#67 ;;CHAR > 7?
041312 003015 BGT 18$ ;;BRANCH IF YES
041314 042726 000060 BIC #60,(SP)+ ;;STRIP-OFF ASCII
041320 005766 000002 TST 2(SP) ;;IS THIS THE FIRST CHAR
041324 001403 BEQ 17$ ;;BRANCH IF YES
041326 006316 ASL (SP) ;;NO, SHIFT PRESENT
041330 006316 ASL (SP) ;; CHAR OVER TO MAKE
041332 006316 ASL (SP) ;; ROOM FOR NEW ONE.
041334 005266 000002 17$: INC 2(SP) ;;KEEP COUNT OF CHAR
```

041340 056616 177776
041344 000707
041346 104401 001312
041352 000720

BIS -2(SP), (SP) :: SET IN NEW CHAR
BR 7\$:: GET THE NEXT ONE
18\$: TYPE \$QUES :: TYPE ?<CR><LF>
BR 20\$:: SIMULATE CONTROL-U
.DSABL LSB

: THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
: CALL:

* RDCHR :: INPUT A SINGLE CHARACTER FROM THE TTY
* RETURN HERE :: CHARACTER IS ON THE STACK
* :: WITH PARITY BIT STRIPPED OFF

041354 011646
041356 016666 000004 000002
041364 105777 137554
041370 100375
041372 117766 137550 000004
041400 042766 177600 000004
041406 026627 000004 000023
041414 001013
041416 105777 137522
041422 100375
041424 117746 137516
041430 042716 177600
041434 022627 000021
041440 001366
041442 000750
041444 026627 000004 000021
041452 001744
041454 026627 000004 000140
041462 002407
041464 026627 000004 000175
041472 003003
041474 042766 000040 000004
041502 000002
041504 136 125 015
041511 136 107 015
041516 015 012 123
041527 040 040 116

\$RDCHR: MOV (SP), -(SP) :: PUSH DOWN THE PC
MOV 4(SP), 2(SP) :: SAVE THE PS
1\$: TSTB @STKS :: WAIT FOR
BPL 1\$:: A CHARACTER
MOVB @STKB, 4(SP) :: READ THE TTY
BIC #^C<177>, 4(SP) :: GET RID OF JUNK IF ANY
CMP 4(SP), #2\$:: IS IT A CONTROL-S?
BNE 3\$:: BRANCH IF NO
2\$: TSTB @STKS :: WAIT FOR A CHARACTER
BPL 2\$:: LOOP UNTIL ITS THERE
MOVB @STKB, -(SP) :: GET CHARACTER
BIC #^C<177>, (SP) :: MAKE IT 7-BIT ASCII
CMP (SP)+, #21 :: IS IT A CONTROL-Q?
BNE 2\$:: IF NOT DISCARD IT
BR 1\$:: YES, RESUME
3\$: CMP 4(SP), #XON :: IS IT A RANDOM XON?
BEQ 1\$:: BRANCH IF YES
CMP 4(SP), #140 :: IS IT UPPER CASE?
BLT 4\$:: BRANCH IF YES
CMP 4(SP), #175 :: IS IT A SPECIAL CHAR?
BGT 4\$:: BRANCH IF YES
BIC #40, 4(SP) :: MAKE IT UPPER CASE
4\$: RTI :: GO BACK TO USER
\$CNTLU: .ASCIZ /^U/<15><12> :: CONTROL 'U'
\$CNTLG: .ASCIZ /^G/<15><12> :: CONTROL 'G'
\$MSWR: .ASCIZ <15><12>/SWR = /
\$MNEW: .ASCIZ / NEW = /

:RAN001
:RAN001

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041540 010046
 041542 016600 000002
 041546 005740
 041550 111000
 041552 006300
 041554 016000 041574
 041560 000200

041562 011646
 041564 016666 000004 000002
 041572 000002

```
.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.
```

```
$TRAP: MOV R0,-(SP)          ;;SAVE R0
        MOV 2(SP),R0        ;;GET TRAP ADDRESS
        TST -(R0)          ;;BACKUP BY 2
        MOVB (R0),R0       ;;GET RIGHT BYTE OF TRAP
        ASL R0              ;;POSITION FOR INDEXING
        MOV $TRPAD(R0),R0  ;;INDEX TO TABLE
        RTS R0             ;;GO TO ROUTINE
```

```
;;THIS IS USE TO HANDLE THE 'GETPRI' MACRO
$TRAP2: MOV (SP),-(SP)     ;;MOVE THE PC DOWN
        MOV 4(SP),2(SP)   ;;MOVE THE PSW DOWN
        RTI              ;;RESTORE THE PSW
```

```
.SBTTL TRAP TABLE
*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
*BY THE 'TRAP' INSTRUCTION.
ROUTINE
```

041574 041562
 041576 037600
 041600 040170
 041602 040144
 041604 040204
 041606 040400
 041610 041142
 041612 041072
 041614 041354
 041616 037504
 041620 037542
 6288 041722 042622
 6289 000030

```
$TRPAD: .WORD $TRAP2
        $TYPE ;;CALL=TYPE TRAP+1(104401) TTY TYPEOUT ROUTINE
        $TYPOC ;;CALL=TYPOC TRAP+2(104402) TYPE OCTAL NUMBER (WITH LEADING ZEROS)
        $TYPOS ;;CALL=TYPOS TRAP+3(104403) TYPE OCTAL NUMBER (NO LEADING ZEROS)
        $TYPON ;;CALL=TYPON TRAP+4(104404) TYPE OCTAL NUMBER (AS PER LAST CALL)
        $TYPDS ;;CALL=TYPDS TRAP+5(104405) TYPE DECIMAL NUMBER (WITH SIGN)
        $GTSWR ;;CALL=GTSWR TRAP+6(104406) GET SOFT-SWR SETTING
        $CKSWR ;;CALL=CKSWR TRAP+7(104407) TEST FOR CHANGE IN SOFT-SWR
        $RDCHR ;;CALL=RDCHR TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
        $SAVREG ;;CALL=SAVREG TRAP+11(104411) SAVE R0-R5 ROUTINE
        $RESREG ;;CALL=RESREG TRAP+12(104412) RESTORE R0-R5 ROUTINE
        .RSET ;;CALL=RSETUP TRAP+13(104413) ROUTINE TO RESET STACK AND FPS
$TERM=-$TRPAD
```

529'

.SBTTL POWER DOWN AND UP ROUTINES

```

*****
:POWER DOWN ROUTINE
041624 012737 042002 000024 $PWRDN: MOV $ILLUP,@#PWRVEC ;;SET FOR FAST UP
041632 012737 000340 000026 MOV #340,@#PWRVEC+2 ;;PRIO:7
041640 010046 MOV R0,-(SP) ;;PUSH R0 ON STACK
041642 010146 MOV R1,-(SP) ;;PUSH R1 ON STACK
041644 010246 MOV R2,-(SP) ;;PUSH R2 ON STACK
041646 010346 MOV R3,-(SP) ;;PUSH R3 ON STACK
041650 010446 MOV R4,-(SP) ;;PUSH R4 ON STACK
041652 010546 MOV R5,-(SP) ;;PUSH R5 ON STACK
041654 017746 137260 MOV @SWR,-(SP) ;;PUSH @SWR ON STACK
041660 010637 042006 MOV SP,$SAVR6 ;;SAVE SP
041664 012737 041676 000024 MOV #SPWRUP,@#PWRVEC ;;SET UP VECTOR
041672 000000 HALT
041674 000776 BR -2 ;;HANG UP
*****
:POWER UP ROUTINE
041676 012737 042002 000024 $PWRUP: MOV $ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
041704 013706 042006 MOV $SAVR6,SP ;;GET SP
041710 005037 042006 CLR $SAVR6 ;;WAIT LOOP FOR THE TTY
041714 005237 042006 1$: INC $SAVR6 ;;WAIT FOR THE INC
041720 001375 BNE 1$ ;;OF WORD
041722 012677 137212 MOV (SP)+,@SWR ;;POP STACK INTO @SWR
041726 012605 MOV (SP)+,R5 ;;POP STACK INTO R5
041730 012604 MOV (SP)+,R4 ;;POP STACK INTO R4
041732 012603 MOV (SP)+,R3 ;;POP STACK INTO R3
041734 012602 MOV (SP)+,R2 ;;POP STACK INTO R2
041736 012601 MOV (SP)+,R1 ;;POP STACK INTO R1
041740 012600 MOV (SP)+,R0 ;;POP STACK INTO R0
041742 012737 041624 000024 MOV #SPWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
041750 012737 000340 000026 MOV #340,@#PWRVEC+2 ;;PRIO:7
041756 104401 TYPE ;;REPORT THE POWER FAILURE
041760 042672 $PWRMG: .WORD POWERM ;;POWER FAIL MESSAGE POINTER
041762 012716 MOV (PC)+,(SP) ;;RESTART AT START
041764 003616 $PWRAD: .WORD START ;;RESTART ADDRESS
041766 042766 000020 000002 BIC #20,2(SP) ;;CLEAR 'T' BIT
041774 005037 036504 CLR $TBIT ;;CLEAR THE 'T' BIT FLAG
042000 000002 RTI
042002 000000 $ILLUP: HALT ;;THE POWER UP SEQUENCE WAS STARTED
042004 000776 BR -2 ;; BEFORE THE POWER DOWN WAS COMPLETE
042006 000000 $SAVR6: 0 ;;PUT THE SP HERE
    
```

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6300

6301 042010 134401 001313
 6302 042014 113737 001102 001232
 6303 042022 042737 177400 001232
 6304 042030 013737 001116 001234
 6305 042036 010046

6306

6307 042040 113700 001114
 6308 042044 042700 177400
 6309 042050 001005

6310

6311 042052 013746 001116
 6312 042056 104402
 6313 042060 000137 042406

6314

6315 042064 022700 000377
 6316 042070 001005
 6317 042072 016600 000004

6318

6319 042100 062700 000400
 6320 042104 010037 001320

6321

6322 042112 006300
 6323 042114 006300
 6324 042116 006300
 6325 042120 062700 001442

6326

6327 042124 012037 042134
 6328 042130 001404
 6329 042132 104401

6330

6331 042134 000000
 6332 042136 104401
 6333 042140 001313

6334

6335 042142 012037 042152
 6336 042146 001404
 6337 042150 104401

6338

6339 042152 000000
 6340 042154 104401
 6341 042156 001313

6341

6342 042160 010146
 6343 042162 010246
 6344 042164 010346

6345

6346 042166 012001
 6347 042170 001501
 6348 042172 011000

```

.SBTTL ERROR TYPE OUT ROUTINE
*****
*THIS ROUTINE IS CALLED TO TYPE AN ERROR MESSAGE WHICH IS INCLUDED
*IN THE ERROR MESSAGE DATA TABLE. IT IS CALLED BY THE $EPROR ROUTINE
*OR BY FIRST SETTING $ITEMB EQUAL TO THE ERROR TABLE ITEM TO BE PRINTED
*OUT AND THEN EXECUTING A:
*
*      JSR      PC,ERTYPE
*
ERTYPE: TYPE      , $CRLF      ;TYPE A CRLF
        MOV      $TSTNM,$TMP0
        BIC      #177400,$TMP0
        MOV      $ERRPC,$TMP1      ;GET PC OF CALL
        MOV      RO,-(SP)          ;SAVE RO

        MOV      $ITEMB,RO          ;GET THE ITEM NUMBER.
        BIC      #177400,RO        ;CLEAR UPPER BYTE EXPOSING OFFSET
        BNE      1$                ;BRANCH IF OFFSET EXISTS

        MOV      $ERRPC,-(SP)      ;IF ZERO THEN JUST
        TYPOC   ERT5              ;PRINT THE PC
        JMP      ERT5

1$:     CMP      #377,RO
        BNE      20$
        MOV      4(SP),RO
        MOV      (RO),RO
        ADD      #400,RO
20$:   MOV      RO,$FATAL          ;MOVE ITEM NUMBER TO $FATAL FOR APT      ;DPM001
        DEC      RO
        ASL      RO
        ASL      RO
        ASL      RO
        ADD      #$ERRTB,RO

110$:  MOV      (RO)+,2$
        BEQ      3$                ;PICK UP THE ADDRESS OF THE EM, ERROR MESSAGE
        TYPE
        .WORD   0
2$:    .WORD   $CRLF
        .WORD
3$:    MOV      (RO)+,4$
        BEQ      5$                ;GET THE DH,DATA HEADER
        TYPE
        .WORD   0
4$:    .WORD   $CRLF
        .WORD
5$:    MOV      R1,-(SP)
        MOV      R2,-(SP)
        MOV      R3,-(SP)          ;SAVE R1,R2 AND R3

        MOV      (RO)+,R1
        BEQ      ERT4              ;GET THE ADDRESS OF THE DATA TABLE
        .WORD   ERT4              ;RETURN IF NO DATA.

        MOV      (RO),RO          ;GET A POINTER TO THE DATA FORMAT TABLE

```

ADDRESS	PC	INSTR	ROUTINE	PR	A	MACRO	COMMENT
6349	042174	105710				ERT1:	TSTB (R0)
6350	042176	001003					BNE 8\$;FORMAT ZERO? ;BRANCH IF NOT
6351							
6352	042200	013146					MOV @ (R1)+, -(SP) ;FORMAT ZERO SO TYPE
6353	042202	104402					TYPOC ;AN OCTAL NUMBER.
6354	042204	000465					BR ERT2
6355							
6356	042206	122710	000002			8\$:	CMPB #2, (R0) ;FORMAT TWO?
6357	042212	001006					BNE 9\$
6358							
6359	042214	013102					MOV @ (R1)+, R2 ;FORMAT TWO SO TYPE TWO OCTAL NUMBERS
6360	042216	004737	042522				JSR PC, TOCTNM ;TYPE 1 NUMBER
6361	042222	004737	042522				JSR PC, TOCTNM ;TYPE 2ND NUMBER
6362	042226	000454					BR ERT2
6363							
6364	042230	122710	000003			9\$:	CMPB #3, (R0) ;FORMAT THREE?
6365	042234	001007					BNE 10\$;BRANCH IF NOT
6366							
6367	042236	013102					MOV @ (R1)+, R2 ;FORMAT THREE SO TYPE FOUR OCTAL NUMBERS.
6368	042240	012703	000004				MOV #4, R3 ;TYPE 4 NUMBERS
6369	042244	004737	042522			90\$:	JSR PC, TOCTNM ;TYPE AN OCTAL NUMBER
6370	042250	077303					SOB R3, 90\$;SUBTRACT 1 AND BRANCH IF NOT DONE
6371	042252	000442					BR ERT2
6372							
6373	042254	122710	000004			10\$:	CMPB #4, (R0) ;FORMAT FOUR?
6374	042260	001004					BNE 11\$;BRANCH IF NOT
6375							
6376	042262	013146					MOV @ (R1)+, -(SP) ;FORMAT FOUR SO TYPE
6377	042264	104403					TYPOS ;AN OCTAL NUMBER
6378	042266	016					.BYTE 16 ;SUPPRESSING LEADING ZEROES.
6379	042267	000					.BYTE 0
6380	042270	000433					BR ERT2
6381							
6382	042272	122710	000005			11\$:	CMPB #5, (R0) ;FORMAT FIVE?
6383	042276	001005					BNE 12\$
6384							
6385	042300	012137	042306				MOV (R1)+, 12\$;FORMAT FIVE SO TYPE AN
6386	042304	104401					TYPE ;ASCIZ STRING.
6387	042306	000000				12\$:	.WORD 0
6388	042310	000425					BR ERT3
6389							
6390	042312	122710	000011			13\$:	CMPB #11, (R0) ;FORMAT ELEVEN?
6391	042316	001005					BNE 14\$;BRANCH IF NOT
6392	042320	013137	042326				MOV @ (R1)+, 14\$;FORMAT ELEVEN SO PICK
6393	042324	104401					TYPE ;A POINTER TO AN ASCIZ
6394	042326	000000				14\$:	.WORD 0 ;STRING.
6395	042330	000415					BR ERT3
6396							
6397	042332	122710	000012			15\$:	CMPB #12, (R0) ;FORMAT TWELVE?
6398	042336	001007					BNE 16\$;BRANCH IF NOT
6399							
6400	042340	013102					MOV @ (R1)+, R2 ;FORMAT TWELVE SO TYPE
6401	042342	012703	000006				MOV #6, R3 ;TYPE SIX OCTAL NUMBERS
6402	042346	004737	042522			16\$:	JSR PC, TOCTNM ;TYPE AN OCTAL NUMBER
6403	042352	077303					SOB R3, 16\$;SUBTRACT 1 AND BRANCH IF NOT DONE YET
6404	042354	000401					BR ERT2
6405							

```

6406 042356 000000      17S:  HALT                ;UNDEFINED FORMAT FOR DATA?????
6407
6408 042360 104401      ERT2:  TYPE                ;PRINT A TAB AFTER TYPING
6409 042362 042740      .WORD  STAB              ;AN DATA TABLE ENTRY
6410                                ;OF ALL FORMATS EXCEPT
6411                                ;ASCIZ, FORMATS 5 OR '1
6412
6413 042364 005200      ERT3:  INC      R0        ;POINT TO THE NEXT FORMAT
6414 042366 005711      TST      (R1)          ;END OF DATA TABLE.
6415 042370 001401      BEQ      ERT4
6416 042372 000700      BR       ERT1
6417
6418 042374 104401      ERT4:  TYPE                ;DONE.
6419 042376 001313      .WORD  $CRLF
6420 042400 012603      MOV      (SP)+,R3      ;RESTORE R1,R2 AND R3
6421 042402 012602      MOV      (SP)+,R2
6422 042404 012601      MOV      (SP)+,R1
6423 042406 012600      ERT5:  MOV      (SP)+,R0 ;RESTORE R0.
6424 042410 000207      RTS      PC           ;AND RETURN.
6425
6426
6427 042412 042422 042456 042506 PFECWS: .WORD  PFECM,PFECDH,PFECAD,PFECFT ;ADRSES OF DATA/ASCII BELOW ;DPM001
6428 042422      120      117      127 PFECM: .ASCIZ ?POWER MONITOR BIT FOUND SET? ;ERROR MESSAGE ;DPM001
6429 042456      124      105      123 PFECDH: .ASCIZ ?TESTNO ERR PC (PUERR? ;ERROR DATA HEADER ;DPM001
6430                                .EVEN
6431 042506 001322 001116 037142 PFECAD: .WORD  $TESTN,$ERRPC,CPSAVE,0 ;ADDRESSES OF DATA ;DPM001
6432 042516      000      000      000 PFECFT: .BYTE  0,0,0,0 ;FORMAT TABLE ;DPM001
6433
6434 042522 012246      TOCTNM: MOV      (R2)+,-(SP) ;MOVE THE NUMBER TO THE STACK FOR PRINTING
6435 042524 104402      TYPOC ;TYPE AN OCTAL NUMBER
6436 042526 104401 042742      TYPE  ,SPACE ;TYPE A SPACE CHARACTER
6437 042532 000207      RTS      PC           ;EXIT BACK
  
```

TRAP TO 244 HANDLER

```

.SBTTL FPP SPURIOUS TRAP TO 244 HANDLER
.....
*THIS ROUTINE HANDLES UNEXPECTED TRAPS TO THE FPP TRAP VECTOR AT 244.
*THE LAST FPP INSTRUCTION EXECUTED AND ITS ADDRESS HAS BEEN RECORDED
*THESE ALONG WITH THE FEC, FPS AND PC OF TRAP ARE REPORTED.

```

```

6444 042534 011637 001236
6445 042540 011626
6446 042542 110200
6447 042544 010037 001240
6448 042550 110300
6449 042552 010037 001242
6450 042556 104211
6451 042560 104413

```

```

FPPSPUR: MOV (SP), $TMP2 ;SAVE PC OF TRAP.
          CMP (SP)+, (SP)+ ;RESTORE SP.
          STFPS R0 ;GET FPS
          MOV R0, $TMP3
          STST R0 ;GET FEC
          MOV R0, $TMP4
1$: ERROR +211
          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?).

```

```

6452 042562 000137 036060          JMP $EOP

```


6453
 6454

6455
 6456
 6457 042566 011637 001236
 6458 042572 022626
 6459 042574 104212
 6460 042576 104613

```

        .SBTTL CPU SPURIOUS TRAP TO 4 HANDLER
        .....
        : THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 4.
        :
        CPSPUR: MOV      (SP), $TMP2          ; SAVE PC OF TRAP.
                CMP      (SP)+, (SP)+
1$:      ERROR  +212
                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?).

        JMP      $EOP
    
```

6461: 042600 000137 036060

6462
6463

.SBTTL CPU SPURIOUS TRAP TO 10 HANDLER
:*****
:*****

6464
6465
6466 042604 011637 001236
6467 042610 022626
6468 042612 104213
6469 042614 104413

: THIS ROUTINE REPORTS UNEXPECTED CPU TRAPS TO VECTOR 10.
:
:PTW0: MOV (SP), \$TMP2 ;SAVE PC OF TRAP.
: CMP (SP)+, (SP)+
1\$: ERROR +213
: 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?).

6470 042616 000137 036060 JMP \$EOP

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042622 023727 001140 177570
042630 001001
042632 104407
042634 012737 042534 000244
042642 012737 042566 000004
042650 012737 042604 000010
042656 011600
042660 012706 001100
042664 005004
042666 170104
042670 000110

```

.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.
:
:RSET:  CMP      SWR,#177570      ;SEE IF THERE IS A PHYSICAL
:                               ;CONSOLE SWITCH REGISTER.
:                               ;BRANCH IF NO.
:                               ;OTHERWISE TYPE THE CONTENTS
:                               ;OF THE PROGRAM VIRTUAL SWITCH REGISTER
:                               ;AND GIVE THE USER A CHANCE TO
:                               ;MODIFY IT.
:
1$:  MOV      #FPSPUR,FPVECT
:      MOV      #CPSPUR,ERRVECT
:      MOV      #CPTWO,10
:      MOV      (SP),R0          ;SAVE RETURN ADDRESS.
:      MOV      #STACK,SP      ;RESET THE STACK POINTER.
:      CLR      R4              ;CLEAR THE FPS.
:      LDFPS   R4
:      JMP     (R0)            ;RETURN.

```

6495						.SBTTL	SPECIAL MESSAGES
6496	042672	200	120	17	POWERM:	.ASCIZ	<CRLF>'POWER FAILURE. PROGRAM RESTARTING.'<CRLF>
6497	042737	300			NULL:	.BYTE	0
6498	042740	011	000		\$TAB:	.ASCIZ	<TAB>
6499	042742	040	040	000	SPACE:	.ASCIZ	' '
6500	042745	200	120	103	LFIEA1:	.ASCIZ	<CRLF>'PC OF LAST FPP INSTRUCTION EXECUTED: '<TAB>
6501	043015	200	114	101	LFIEA2:	.ASCIZ	<CRLF>'LAST FPP INSTRUCTION EXECUTED: '<TAB>
6502	043057	200	106	114	FPSMS:	.ASCIZ	<CRLF>'FLOATING POINT STATUS REGISTER: '
6503	043123	200	106	105	FECMS:	.ASCIZ	<CRLF>'FEC: '
6504	043134	124	110	105	\$THE:	.ASCIZ	'THE '
6505	043141	011	040	111	NOOP1:	.ASCIZ	<TAB>' INSTRUCTION FAILED.'<CRLF>
6506	043170	105	111	124	NOOP15:	.ASCII	'EITHER A BAD CONSTANT WAS GENERATED OR MICROPROGRAM FLOW WENT'
6507	043265	200	106	122	NOOP2:	.ASCIZ	<CRLF>'FROM STATE '
6508	043307	124	117	040	NOOP3:	.ASCIZ	'TO STATE '
6509	043314	200	111	116	NOOP4:	.ASCIZ	<CRLF>'INSTEAD OF '
6510	043331	200	124	110	NOOP5:	.ASCIZ	<CRLF>'THEREBY EXECUTING A '
6511	043357	011	040	111	NOOP6:	.ASCIZ	<TAB>' INSTEAD OF A '
6512	043377	011	040	111	NOOP7:	.ASCIZ	<TAB>' INSTRUCTION.'<CRLF>
6513	043417	040	040	124	NOOP10:	.ASCII	' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
6514	043460	107	117	124		.ASCIZ	'GOT FPS. EXPECTED FPS.'<CRLF>
6515	043510	101	040	102	NOOP11:	.ASCIZ	'A BAD CONSTANT MAY HAVE BEEN USED.'<CRLF>
6516	043554	011	114	104	LFPS1:	.ASCIZ	<TAB>'LDFPS'<TAB>'REG'
6517	043567	011	114	104	LD1:	.ASCIZ	<TAB>'LDD'<TAB>'(REG),A'<TAB>'//FSRC#0//'
6518	043617	011	114	104	LD2:	.ASCIZ	<TAB>'LDD'<TAB>'A,A'
6519	043630	011	123	124	STFS1:	.ASCIZ	<TAB>'STFPS'<TAB>'REG'
6520	043643	011	123	124	ST1:	.ASCIZ	<TAB>'STD'<TAB>'A,(REG)'
6521	043660	011	123	124	ST2:	.ASCIZ	<TAB>'STD'<TAB>'A,A'
6522	043671	011	103	106	CFCC1:	.ASCIZ	<TAB>'CFCC'
6523	043677	011	123	105	SETF1:	.ASCIZ	<TAB>'SETF'
6524	043705	011	123	105	SETD1:	.ASCIZ	<TAB>'SETD'
6525	043713	011	123	105	SETI1:	.ASCIZ	<TAB>'SETI'
6526	043721	011	123	105	SETL1:	.ASCIZ	<TAB>'SETL'
6527	043727	011	111	114	ILL1:	.ASCIZ	<TAB>'ILLEGAL FPP INSTRUCTION'
6528	043760	011	123	124	STST1:	.ASCIZ	<TAB>'STST'<TAB>'REG'
6529	043772	011	111	114	ILL2:	.ASCIZ	<TAB>'ILLEGAL FPP INSTRUCTION (FID=1)'
6530	044033	040	040	124	ILLMS:	.ASCIZ	' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FPS.'<CRLF>
6531	044101	105	130	120	MS1:	.ASCIZ	'EXPECTED '
6532	044113	107	117	124	MS2:	.ASCIZ	'GOT '
6533	044120	103	117	116	MS3:	.ASCIZ	'CONTENTS OF LOCATIONS '
6534	044147	040	124	110	MS4:	.ASCIZ	' THROUGH '
6535	044161	106	101	111	MS5:	.ASCIZ	'FAILURE IN THE MICROPROGRAM FLOW.'
6536	044223	103	117	116	MS6:	.ASCIZ	'CONTROL WENT '
6537	044241	106	122	117	MS7:	.ASCIZ	'FROM STATE '
6538	044255	040	124	117	MS10:	.ASCIZ	' TO STATE '
6539	044270	102	125	124	MS11:	.ASCIZ	'BUT SHOULD HAVE GONE'
6540	044315	103	117	116	MS12:	.ASCIZ	'CONTROL FLOW SHOULD HAVE GONE'
6541	044353	102	125	124	MS13:	.ASCIZ	'BUT DID NOT.'
6542	044370	040	040	124	MS14:	.ASCII	' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'<TAB>
6543	044431	107	117	124		.ASCIZ	'GOT PC.'<TAB>'EXPECTED PC.'
6544	044456	111	116	123	MS15:	.ASCIZ	'INSTRUCTION TESTED: '
6545	044503	040	117	122	MS16:	.ASCIZ	' OR '
6546	044510	124	105	123	MS17:	.ASCIZ	'TESTING ACCUMULATOR '
6547	044535	132	105	122	MNUM0:	.ASCIZ	'ZERO '
6548	044543	117	116	105	MNUM1:	.ASCIZ	'ONE '
6549	044550	124	127	117	MNUM2:	.ASCIZ	'TWO '
6550	044555	124	110	122	MNUM3:	.ASCIZ	'THREE '
6551	044564	106	117	125	MNUM4:	.ASCIZ	'FOUR '

6552	044572	06	11	126	MNUM5:	.ASCIZ	'FIVE '
6553	044600	040	040	124	MS20:	.ASCIZ	' TEST.<TAB>'PC OF CALL.<TAB>'PC OF ERROR.'
6554	04464	04	01	124	MS21:	.ASCIZ	'DATA (FLOATING POINT NUMBER): '
6555	044700	14	117	107	MS22:	.ASCIZ	'LOGICAL AND OF FAILING '
6556	044730	14	117	107	MS23:	.ASCIZ	'LOGICAL OR OF FAILING '
6557	044757	040	040	124	MS24:	.ASCII	' TEST.<TAB>'PC OF CALL.<TAB>'PC OF ERRORS.<TAB>
6558	045021	16	125	115		.ASCIZ	'NUMBER OF ERRORS(OCTAL).'
6559	045052	105	130	120	MS25:	.ASCIZ	'EXPECTED DATA IN '
6560	045074	107	117	124	MS26:	.ASCIZ	'GOT DATA IN '
6561	045111	200	101	103	MS27:	.ASCIZ	<CRLF>'AC0= '
6562	045120	200	101	103	MS30:	.ASCIZ	<CRLF>'AC1= '
6563	045127	200	101	103	MS31:	.ASCIZ	<CRLF>'AC2= '
6564	045136	200	101	103	MS32:	.ASCIZ	<CRLF>'AC3= '
6565	045145	200	101	103	MS33:	.ASCIZ	<CRLF>'AC4= '
6566	045154	200	101	103	MS34:	.ASCIZ	<CRLF>'AC5= '
6567	045163	123	105	124	MS35:	.ASCIZ	'SET '
6568	045170	103	14	105	MS36:	.ASCIZ	'CLEAR '
6569	045177	114	117	101	MS37:	.ASCIZ	'LOADED DATA: '
6570	045215	122	105	101	MS40:	.ASCIZ	'READ DATA: '
6571	045231	105	130	120	MS415:	.ASCIZ	'EXPECTED DATA: '
6572	045251	104	101	124	MS41:	.ASCIZ	'DATA IN (RO) FSRC. '
6573	045275	104	101	124	MS42:	.ASCIZ	'DATA IN AC0: '
6574	045313	107	117	124	MS43:	.ASCIZ	'GOT RESULT: '
6575	045330	105	130	120	MS44:	.ASCIZ	'EXPECTED RESULT: '

Address	Hex	Hex	Hex	Hex	Label	Description
6576					.SBTTL	ERROR MESSAGES
6577	045352	114	104	106	EM1:	.ASCIZ 'LDFPS AND STFPS TEST FAILED.'
6578	045407	114	04	106	EM2:	.ASCIZ 'LDFPS AND STFPS TEST ERROR SUMMARY.'
6579	045453	103	106	103	EM3:	.ASCIZ 'CFCC TRANSFERED BAD DATA TO THE PSW.'
6580	045520	103	106	103	EM4:	.ASCIZ 'CFCC MODIFIED THE FPS REGISTER.'
6581	045560	125	116	105	EM5:	.ASCIZ 'UNEXPECTED FPP TRAP TO 244.'
6582	045614	125	116	105	EM6:	.ASCIZ 'UNEXPECTED CPU TRAP TO 4.'
6583	045646	125	116	105	EM7:	.ASCIZ 'UNEXPECTED CPU TRAP TO 10.'
6584		04560			EM10=EM5	
6585	045701	125	116	101	EM11:	.ASCIZ 'UNABLE TO DECODE FPP INSTRUCTION. TRAPPED TO 10.'
6586		000000			EM12=0	
6587		000000			EM13=0	
6588	045762	114	104	106	EM14:	.ASCII 'LDFPS R0 FAILED IN THE FSRC FLOWS.'
6589	046024	040	124	122		.ASCII ' TRAPPED TO 4.'
6590	046042	200	104	111		.ASCIZ '<CRLF>'DID NOT GO FROM STATE 400 TO 670.'
6591	046105	123	124	106	EM15:	.ASCII 'STFPS R1 FAILED IN THE FDST FLOWS.'
6592	046147	040	124	122		.ASCII ' TRAPPED TO 4.'
6593	046165	200	104	111		.ASCIZ '<CRLF>'DID NOT GO FROM STATE 634 TO 710.'
6594	046230	101	116	040	EM16:	.ASCIZ 'AN ILLEGAL FPP INSTRUCTION DID NOT TRAP.'
6595	046301	101	116	040	EM17:	.ASCII 'AN ILLEGAL FPP INSTRUCTION'
6596	046333	200	124	122		.ASCII '<CRLF>'TRAPPED TO 244, BUT FAILED TO SET '
6597	046376	124	110	105		.ASCII 'THE FPS CORRECTLY.'<CRLF>'EITHER A BAD CONSTANT '
6598	046447	127	101	123		.ASCIZ 'WAS GENERATED OR THE ALU LOGICAL OR FUNCTION 'AILED.'
6599	046534	101	116	040	EM20:	.ASCII 'AN ILLEGAL FPP INSTRUCTION'
6600	046566	040	124	122		.ASCII ' TRAPPED TO 244, BUT A SUBSEQUENT '
6601	046630	040	123	124		.ASCII ' STST'<CRLF>
6602	046636	106	101	111		.ASCIZ 'FAILED TO PICK UP THE CORRECT FEC CODE = 2.'
6603	046712	123	124	123	EM21:	.ASCII 'STST R4 FAILED IN THE DESTINATION FLOWS.'
6604	046762	040	124	122		.ASCII ' TRAPPED TO 4.'<CRLF>
6605	047001	104	111	104		.ASCIZ 'DID NOT GO FROM STATE 636 TO 710.'
6606	047043	101	116	040	EM22:	.ASCII 'AN ILLEGAL FPP INSTRUCTION.'
6607	047076	127	111	124		.ASCIZ 'WITH INTERRUPTS DISABLED.'
6608		047043			EM23=EM22	
6609		047043			EM24=EM22	
6610	047130	123	117	125	EM25:	.ASCII 'SOURCE LOCATIONS MODIFIED BY, LDD.'
6611	047172	200	101	040		.ASCIZ '<CRLF>'A DATO WAS PERFORMED INSTEAD OF A DATI.'
6612	047243	114	104	104	EM26:	.ASCII 'LDD (R0),ACO FAILED.'<CRLF>
6613	047270	122	060	040		.ASCIZ 'R0 WAS MODIFIED.'
6614		047243			EM27=EM26	
6615	047311	124	110	105	EM30:	.ASCII 'THE PC WAS BAD AFTER '
6616	047337	101	116	040		.ASCIZ 'AN FPP INSTRUCTION.'
6617	047363	123	124	104	EM31:	.ASCII 'STD ACO, (R0) FAILED.'<CRLF>
6618	047410	122	060	040		.ASCIZ 'R0 WAS MODIFIED.'
6619		047363			EM32=EM31	
6620	047431	123	124	104	EM33:	.ASCII 'STD ACO, (R0) FAILED.'<CRLF>
6621	047456	117	125	124		.ASCIZ 'OUTPUT BAD.'
6622	047472	123	124	104	EM34:	.ASCII 'STD ACO, (R0) FAILED IN THE FDST FLOWS.'
6623	047540	200	124	110		.ASCIZ '<CRLF>'THE (BUT GR7) FORK FAILED.'
6624	047574	114	104	104	EM35:	.ASCII 'LDD (R0),ACO FAILED IN THE FSRC FLOWS.'
6625	047642	200	124	110		.ASCIZ '<CRLF>'THE (BUT GR7) FORK FAILED.'
6626	047676	123	124	104	EM36:	.ASCII 'STD ACO, (R0) FAILED IN THE FDST FLOWS.'
6627	047744	200	124	110		.ASCIZ '<CRLF>'THE (BUT FD) FORK FAILED.'
6628	047777	114	104	104	EM37:	.ASCII 'LDD (R0),ACO FAILED IN THE FSRC FLOWS.'
6629	050045	200	124	110		.ASCIZ '<CRLF>'THE (BUT FD) FORK FAILED.'
6630	050100	114	104	104	EM40:	.ASCII 'LDD (R0),ACO OR THE STD ACO, (R0) FAILED.'
6631	050150	200	102	101		.ASCIZ '<CRLF>'BAD DATA WAS DETECTED AFTER A SEQUENCE OF THE TWO INSTRUCTIONS.'
6632	050251	106	120	123	EM41:	.ASCIZ 'FPS BAD AFTER EXECUTION OF:

6637	050306				EM42:	
	050306	114	104	104	.ASCII	/LDD (RO),ACO FAILED IN THE FSRC FLOWS./<CRLF>
	050355	124	110	105	.ASCIZ	/THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'
6638	050427				EM43:	
	050427	123	124	104	.ASCII	/STD ACO,(RO) FAILED IN THE FDST FLOWS./<CRLF>
	050476	124	110	105	.ASCIZ	/THE (BUT FDST) FORK FAILED. TRAPPED TO 4./
6639	050550	106	120	120	EM44:	'FPP ACCUMULATORS DATA TEST FAILED.'
6640		050550			EM45=EM44	
6641	050613	106	120	120	EM46:	'FPP ACCUMULATORS DUAL ADDRESSING TEST FAILED.'
6646	050671				EM47:	
	050671	114	104	040	.ASCII	/LD AC1,ACO FAILED IN THE FSRC FLOWS./
	050735	124	110	105	.ASCIZ	/THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6647	051007	114	104	040	EM50:	'LD AC1,ACO FAILED IN THE FSRC FLOWS.'
6648	051053	124	110	105	.ASCIZ	'THE (BUT FD) FORK FAILED.'
6649	051105	114	104	040	EM51:	'LD AC1,ACO TRANSFERRED BAD DATA.'
6659	051146				EM52:	
	051146	114	104	104	.ASCII	/LDD (RO)+,ACO FAILED IN THE FSRC FLOWS./
	051215	124	110	105	.ASCIZ	/THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6660	051267				EM53:	
	051267	114	104	104	.ASCII	/LDD (RO)+,ACO FAILED IN THE FSRC FLOWS./
	051336	200	122	060	.ASCII	<CRLF>'RO WAS BAD.'<CRLF>
	051353	105	111	124	.ASCII	'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
	051422	104	111	104	.ASCIZ	\DID NOT GO FROM STATE 627 TO 322.\
6661	051464				EM54:	
	051464	114	104	104	.ASCIZ	/LDD (RO)+,ACO TRANSFERRED BAD DATA./
6662	051530				EM55:	
	051530	114	104	104	.ASCII	/LDD -(RO),ACO FAILED IN THE FSRC FLOWS./
	051577	124	110	105	.ASCIZ	/THE (BUT FSRC) FORK FAILED. TRAPPED TO 4./
6663	051651				EM56:	
	051651	114	104	104	.ASCII	/LDD -(RO),ACO FAILED IN THE FSRC FLOWS./
	051720	200	122	060	.ASCII	<CRLF>'RO WAS BAD.'<CRLF>
	051735	105	111	124	.ASCII	'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
	052004	104	111	104	.ASCIZ	\DID NOT GO FROM STATE 627 TO 324.\
6664	052046				EM57:	
	052046	114	104	104	.ASCIZ	/LDD -(RO),ACO TRANSFERRED BAD DATA./
6665	052112				EM60:	
	052112	114	104	106	.ASCII	/LDF (RO)+,ACO FAILED IN THE FSRC FLOWS./
	052161	200	122	060	.ASCII	<CRLF>'RO WAS BAD.'<CRLF>
	052176	105	111	124	.ASCII	'EITHER A BAD CONSTANT WAS GENERATED OR'<CRLF>
	052245	104	111	104	.ASCIZ	\DID NOT GO FROM STATE 627 TO 322.\
6666	052307				EM61:	
	052307	114	104	106	.ASCIZ	/LDF (RO)+,ACO TRANSFERRED BAD DATA./
6667	052353	114	104	106	EM62:	'LDF (RO)+,ACO FAILED IN THE FSRC FLOWS.'
6668	052422	200	124	110	.ASCII	<CRLF>'THE (BUT FD) FORK FAILED.'<CRLF>
6669	052455	127	105	116	.ASCII	'WENT FROM STATE 441 TO 077.'<CRLF>
6670	052511	111	116	123	.ASCIZ	'INSTEAD OF FROM 441 TO 076.'
6671	052545	114	104	104	EM63:	'LDD #NUM,ACO FAILED IN THE FSRC FLOWS.'
6672	052613	200	124	110	.ASCII	<CRLF>'THE (BUT GR7) FORK FAILED.'<CRLF>
6673	052647	127	105	116	.ASCII	'WENT FROM STATE 207 TO 174.'<CRLF>
6674	052703	111	116	123	.ASCIZ	'INSTEAD OF FROM 207 TO 176.'
6675	052737	114	104	104	EM64:	'LDD #NUM,ACO FAILED IN THE FSRC FLOWS.'
6676	053005	200	101	040	.ASCIZ	<CRLF>'A BAD CONSTANT WAS USED WHEN THE PC WAS INCREMENTED.'
6677		052737			EM65=EM64	
6678	053073				EM66:	
	053073	114	104	104	.ASCIZ	/LDD #NUM,ACO TRANSFERRED BAD DATA./
6700	053136				EM67:	
	053136	114	104	104	.ASCII	'LDD @ (RO)+,ACO FAILED IN THE FSRC FLOWS.'

Line	Address	Mode	Op	Op2	Op3	Op4	Op5	Op6	Op7
	053206	200	124	110	.ASCII	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
	053260	200	127	105	.ASCII	<CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326,\			
	053332	200	111	116	.ASCIIZ	<CRLF>\INSTEAD OF FROM 627 TO 323.\			
6701	053367				EM70:				
	053367	114	104	104	.ASCII	'LDD @ (RO)+,ACO FAILED IN THE FSRC FLOWS.'			
	053437	200	124	110	.ASCIIZ	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
6702	053512				EM71:				
	053512	114	104	104	.ASCII	'LDD @ (RO)+,ACO FAILED IN THE FSRC FLOWS.'			
	053562	124	110	105	.ASCIIZ	'THE (BUT FD) FORK FAILED.'			
6703	053614				EM72:				
	053614	114	104	104	.ASCII	'LDD @ (RO)+,ACO'<CRLF>			
	053633	106	101	111	.ASCIIZ	'FAILED TO INCREMENT RO BY 2.'			
6704	053670				EM73:				
	053670	114	104	104	.ASCIIZ	'LDD @ (RO)+,ACO LOADED BAD DATA.'			
6705	053730				EM74:				
	053730	114	104	104	.ASCII	'LDD @-(RO),ACO FAILED IN THE FSRC FLOWS.'			
	054000	200	124	110	.ASCII	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
	054052	200	127	105	.ASCII	<CRLF>\WENT FROM STATE 627 TO EITHER 326 OR 326,\			
	054124	200	111	116	.ASCIIZ	<CRLF>\INSTEAD OF FROM 627 TO 325.\			
6706	054161				EM75:				
	054161	114	104	104	.ASCII	'LDD @-(RO),ACO FAILED IN THE FSRC FLOWS.'			
	054231	200	124	110	.ASCIIZ	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
6707	054304				EM76:				
	054304	114	104	104	.ASCII	'LDD @-(RO),ACO FAILED IN THE FSRC FLOWS.'			
	054354	124	110	105	.ASCIIZ	'THE (BUT FD) FORK FAILED.'			
6708	054406				EM77:				
	054406	114	104	104	.ASCII	'LDD @-(RO),ACO'<CRLF>			
	054425	106	101	111	.ASCIIZ	'FAILED TO DECREMENT RO BY 2.'			
6709	054462				EM100:				
	054462	114	104	104	.ASCIIZ	'LDD @-(RO),ACO LOADED BAD DATA.'			
6710	054522				EM101:				
	054522	114	104	104	.ASCII	'LDD NUM(RO),ACO FAILED IN THE FSRC FLOWS.'			
	054573	200	124	110	.ASCIIZ	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
6711	054646				EM102:				
	054646	114	104	104	.ASCII	'LDD NUM(RO),ACO'<CRLF>			
	054666	106	101	111	.ASCIIZ	'FAILED TO AFFECT RO BY 2.'			
6712	054720				EM103:				
	054720	114	104	104	.ASCII	'LDD NUM(RO),ACO FAILED IN THE FSRC FLOWS.'			
	054771	124	110	105	.ASCIIZ	'THE (BUT FD) FORK FAILED.'			
6713	055023				EM104:				
	055023	114	104	104	.ASCIIZ	'LDD NUM(RO),ACO LOADED BAD DATA.'			
6714	055064				EM105:				
	055064	114	104	104	.ASCII	'LDD @NUM(RO),ACO FAILED IN THE FSRC FLOWS.'			
	055136	200	124	110	.ASCIIZ	<CRLF>'THE (BUT FSRC) FORK FAILED. TRAPPED TO 4.'			
6715	055211				EM106:				
	055211	114	104	104	.ASCII	'LDD @NUM(RO),ACO'<CRLF>			
	055232	106	101	111	.ASCIIZ	'FAILED TO AFFECT RO BY 2.'			
6716	055264				EM107:				
	055264	114	104	104	.ASCII	'LDD @NUM(RO),ACO FAILED IN THE FSRC FLOWS.'			
	055336	124	110	105	.ASCIIZ	'THE (BUT FD) FORK FAILED.'			
6717	055370				EM110:				
	055370	114	104	104	.ASCIIZ	'LDD @NUM(RO),ACO LOADED BAD DATA.'			
6733	055432				EM111:				
	055432	114	104	104	.ASCII	/LDD AC7,ACO FAILED TO TRAP TO 244./			
	055474	200	101	103	.ASCIIZ	<CRLF>/AC7 IS AN ILLEGAL ACCUMULATOR./			
6734	055534	055432			EM112=EM111				
6735	055534				EM113:				

Line	Address	Offset	Code	Label	Description
	055534	114	104		.ASCII /LDD AC6,ACO FAILED TO TRAP TO 244./
	055576	200	101		.ASCIIZ <CRLF>/AC6 IS AN ILLEGAL ACCUMULATOR./
6736				EM114=EM113	
6737	055534			EM115=EM111	
6738	055534			EM116=EM113	
6739	055636			EM117:	
	055636	125	123		.ASCII 'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO.'
	055720	200	124		.ASCIIZ <CRLF>'TRAPPED BUT FAILED TO SET FPS CORRECTLY.'
6740	055772			EM120:	
	055772	125	123		.ASCII 'USE OF AN ILLEGAL ACCUMULATOR WITH FSRC MODE ZERO.'
	056054	200	124		.ASCIIZ <CRLF>'TRAPPED BUT FAILED TO SET FEC CORRECTLY.'
6741	056126	123	124		EM121: .ASCII 'ST ACO,AC1 FAILED IN THE FDST FLOWS.'
6742	056172	200	124		.ASCIIZ <CRLF>'THE (BUT FDST) FORK FAILED. TRAPPED TO 4.'
6743	056245	123	124		EM122: .ASCII 'ST ACO,AC1 FAILED IN THE FDST FLOWS.'
6744	056311	200	124		.ASCIIZ <CRLF>'THE (BUT FD) FORK FAILED.'
6745	056344	123	124		EM123: .ASCIIZ 'ST ACO,AC1 TRANSFERRED BAD DATA.'
6746	056405			EM124:	
	056405	106	120		.ASCII 'FPS BAD AFTER LDD (RO),ACO.'
	056440	200	124		.ASCIIZ <CRLF>\THE (BUT EZBT Y8) FORK FAILED.\
6747	056500			EM125:	
	056500	106	120		.ASCII 'FPS BAD AFTER LDD (RO),ACO.'
	056533	200	124		.ASCIIZ <CRLF>\THE (BUT ENBT) FORK FAILED.\
6748	056570	114	104		EM126: .ASCII 'LDD (RO),ACO TRAPPED TO 244.'
6749	056624	040	106		.ASCII ' FSRC= -0 AND FIUV= 0.'<CRLF>
6750	056653	124	110		.ASCII 'THE (BUT FIUV) FORK FAILED.'
6751	056706	200	127		.ASCII <CRLF>'WENT FROM STATE 256 TO 354.'
6752	056742	200	111		.ASCIIZ <CRLF>'INSTEAD OF FROM 256 TO 254.'
6753	056777	114	104		EM127: .ASCII 'LDD (RO),ACO FAILED TO TRAP TO 244.'
6754	057042	040	106		.ASCII ' FSRC= -0, FIUV= 1.'
6755	057065	200	124		.ASCII <CRLF>'THE (BUT FIUV) FOR FAILED.'<CRLF>
6756	057121	127	105		.ASCII 'WENT FROM STATE 256 TO 254.'
6757	057154	200	111		.ASCIIZ <CRLF>'INSTEAD OF FROM 256 THE 354.'
6758	057212	114	104		EM130: .ASCII 'LDD (RO),ACO TRAPPED TO 244.'
6759	057246	106	123		.ASCII 'FSRC= -0, FIUV= 1.'<CRLF>
6760	057271	102	125		.ASCIIZ 'BUT FEC WAS BAD.'
6761	057312			EM131:	
	057312	114	104		.ASCIIZ /LDCFD (RO),ACO LOADED BAD DATA./
6762	057352			EM132:	
	057352	114	104		.ASCIIZ /LDCDF (RO),ACO LOADED BAD DATA./
6803	057412			EM133:	
	057412	101	104		.ASCIIZ /ADDD (RO),ACO WITH (RO)=ACO=0 /
6804	057451			EM134:	
	057451	101	104		.ASCIIZ /ADDF (RO),ACO WITH (RO)=ACO=0 /
6805	057510			EM135:	
	057510	123	125		.ASCIIZ /SUBD (RO),ACO WITH (RO)=ACO=0 /
6806	057547			EM136:	
	057547	123	125		.ASCIIZ /SUBF (RO),ACO WITH (RO)=ACO=0 /
6807				EM137=EM133	
6808	057412			EM140=EM134	
6809	057451			EM141=EM135	
6810	057510			EM142=EM136	
6811	057606			EM143:	
	057606	101	104		.ASCIIZ /ADDD (RO),ACO WITH (RO)=0 /
6812	057641			EM144:	
	057641	123	125		.ASCIIZ /SUBD (RO),ACO WITH (RO)=0 /
6813				EM145=EM143	
6814	057606			EM146=EM144	

Line	Address	FLTG	FNT	PR:	MACRO	Text
6815	057674				EM147:	
	057674	123	125	102		.ASCIZ /SUBD (R0),ACO WITH ACO=0 /
6816		057674			EM150=EM147	
6817		057674			EM151=EM147	
6818	057726				EM152:	
	057726	101	104	104		.ASCIZ /ADDD (R0),ACO WITH ACO=0 /
6819		057726			EM153=EM152	
6820	057760				EM154:	
	057760	101	116	040		.ASCII 'AN OVERFLOW ERROR OCCURRED ON ADD'<CRLF>
	060022	103	101	125		.ASCII 'CAUSING A TRAP TO 244.'
	060050	200	050	102		.ASCII <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
	060141	200	123	110		.ASCIZ <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
6821	060212				EM155:	
	060212	101	116	040		.ASCII 'AN UNDERFLOW ERROR OCCURRED ON ADD'<CRLF>
	060255	103	101	125		.ASCII 'CAUSING A TRAP TO 244.'
	060303	200	050	102		.ASCII <CRLF>'(BUT EZBT Y9 Y8) FORK IN STATE 420 OF OVER\UNDER FAILED.'
	060374	200	123	110		.ASCIZ <CRLF>'SHOULD HAVE GONE FROM STATE 420 TO 131.'
6822	060445				EM156:	
	060445	101	104	104		.ASCII /ADDD (R0),ACO FAILED IN THE ROUND\TRUNK FLOWS./
	060523	200	124	110		.ASCII <CRLF>'THE (BUT FD) FORK FAILED. WENT'
	060562	106	122	117		.ASCII \FROM STATE 665 TO 113.\<CRLF>
	060611	111	116	123		.ASCIZ \INSTEAD OF FROM 665 TO 313.\<CRLF>\WITH FT SET.\
6823	060662				EM157:	
	060662	101	104	104		.ASCII /ADDD (R0),ACO FAILED IN THE ROUND\TRUNK FLOWS./
	060740	200	124	110		.ASCII <CRLF>'THE (BUT FD) FORK FAILED. WENT'
	060777	106	122	117		.ASCII \FROM STATE 665 TO 313.\<CRLF>
	061026	111	116	123		.ASCIZ \INSTEAD OF FROM 665 TO 113.\<CRLF>\WITH FT CLEAR.\
6824	061101				EM160:	
	061101	101	104	104		.ASCII /ADDD (R0),ACO FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
	061160	124	110	105		.ASCII 'THE FLOATING CONSTANT WAS USED INSTEAD OF THE DOUBLE CONSTANT'<CRLF>
	061256	111	116	040		.ASCIZ 'IN THE ROUND ALGORITHM.'
6825	061306				EM161:	
	061306	101	104	104		.ASCII /ADDF (R0),ACO FAILED IN THE ROUND\TRUNK FLOWS./<CRLF>
	061365	124	110	105		.ASCII 'THE DOUBLE CONSTANT WAS USED INSTEAD OF THE FLOATING CONSTANT'<CRLF>
	061463	111	116	040		.ASCIZ 'IN THE ROUND ALGORITHM.'
6826	061513				EM162:	
	061513	101	104	104		.ASCIZ /ADDD (R0),ACO PRODUCED A BAD RESULT./
6827	061560				EM163:	
	061560	101	104	104		.ASCIZ /ADDF (R0),ACO PRODUCED A BAD RESULT./
6828	061625				EM164:	
	061625	124	110	105		.ASCIZ \THE FPS WAS BAD AFTER ADDD (R0),ACO.\
6829	061672				EM165:	
	061672	124	110	105		.ASCIZ \THE FPS WAS BAD AFTER ADDF (R0),ACO.\
6830	061737				EM166:	
	061737	101	104	104		.ASCII /ADDD (R0),ACO PRODUCED A BAD RESULT./<CRLF>
	062004	120	122	117		.ASCIZ 'PROBABLE ERROR IN THE ALIGN FLOWS.'
6831	062047				EM167:	
	062047	101	104	104		.ASCII /ADDD (R0),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	062120	106	114	117		.ASCII \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 111, TO 014.\
	062210	200	101	040		.ASCII <CRLF>\A BAD CONSTANT (NOT 57 DEC) \
	062245	127	101	123		.ASCIZ 'WAS USED IN THE ALIGN ALGORITHM.'
6832	062306				EM170:	
	062306	101	104	104		.ASCII /ADDF (R0),ACO PRODUCED A BAD RESULT./<CRLF>
	062353	120	122	117		.ASCIZ 'PROBABLE ERROR IN THE ALIGN FLOWS.'
6833	062416				EM171:	
	062416	101	104	104		.ASCII /ADDF (R0),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	062467	106	114	117		.ASCII \FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 111, TO 014.\

	062557	200	101	040	.ASCII	<CRLF>\A BAD CONSTANT (NOT 25 DEC) \
	062614	127	101	123	.ASCII	'WAS USED IN THE ALIGN ALGORITHM.'
6834	062655				EM172:	
	062655	101	104	104	.ASCII	/ADDD (RO),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	062726	106	114	117	.ASCII	\FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
	063016	200	101	040	.ASCII	<CRLF>\A BAD CONSTANT (NOT 57 DEC) \
	063053	127	101	123	.ASCII	'WAS USED IN THE ALIGN ALGORITHM.'
6835	063114				EM173:	
	063114	101	104	104	.ASCII	/ADDD (RO),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	063165	106	114	117	.ASCII	\FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
	063255	200	101	040	.ASCII	<CRLF>\A BAD CONSTANT (NOT 57 DEC) \
	063312	127	101	123	.ASCII	'WAS USED IN THE ALIGN ALGORITHM.'
6836	063353				EM174:	
	063353	101	104	104	.ASCII	/ADDF (RO),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	063424	106	114	117	.ASCII	\FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 015.\
	063514	200	101	040	.ASCII	<CRLF>\A BAD CONSTANT (NOT 25 DEC) \
	063551	127	101	123	.ASCII	'WAS USED IN THE ALIGN ALGORITHM.'
6837	063612				EM175:	
	063612	101	104	104	.ASCII	/ADDF (RO),ACO FAILED IN THE ALIGN FLOWS./<CRLF>
	063663	106	114	117	.ASCII	\FLOW DID NOT FOLLOW THE PATH: STATE 476, TO 011, TO 215.\
	063753	200	101	040	.ASCII	<CRLF>\A BAD CONSTANT (NOT 25 DEC) \
	064010	127	101	123	.ASCII	'WAS USED IN THE ALIGN ALGORITHM.'
6838	064051				EM176:	
	064051	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	064124	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 442, TO 500.\
6839	064206	120	117	127	EM177:	'POWER MONITOR BIT FOUND SET'
6840	064242				EM200:	
	064242	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	064315	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 440, TO 121.\
6841	064377				EM201:	
	064377	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	064452	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 440, TO 101.\
6842	064534				EM202:	
	064534	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	064607	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 042, TO 101.\
6843	064671				EM203:	
	064671	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	064744	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 440, TO 141.\
6844	065026				EM204:	
	065026	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'<CRLF>
	065101	104	111	104	.ASCII	\DID NOT TAKE THE PATH: STATE 216, TO 042, TO 141.\
6845	065163				EM205:	
	065163	124	110	105	.ASCII	\THE FPS WAS BAD AFTER SUBD (RO),ACO.\
6846	065230				EM206:	
	065230	123	125	102	.ASCII	/SUBD (RO),ACO PRODUCED A BAD RESULT./
6847	065275	123	125	102	EM207:	'SUBD (RO),ACO PRODUCED A BAD RESULT.'
6848	065341	200	124	110	.ASCII	<CRLF>'THE XOR OF THE SIGN BIT FAILED IN STATE 024.'
6849	065417	101	104	104	.ASCII	'ADDD (RO),ACO FAILED IN THE NORMALIZE FLOWS.'
6850		045560			EM210:	
6851		045614			EM211=EM5	
6852		045646			EM212=EM6	
					EM213=EM7	
6853	065474				EM214:	

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06547- 00 04 104 .ASCII 'ADD (RO),ACO FAILED IN THE ADD-SUB FLOWS.'

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Address	Hex	Dec	Hex	Dec	Label	Text
6914	067431				DH51=DM50	
6915	066201				DH52=DM5	
6916	067073				DH53=DM26	
6917	067503	040	124		DH54: .ASCIZ	'TEST.' <tab>'pc call.'<tab>'pc="" error.'<="" of="" td=""> </tab>'pc>
6918	066201				DH55=DM5	
6919	067073				DH56=DM26	
6920	067503				DH57=DM54	
6921	067073				DH60=DM26	
6922	067503				DH61=DM54	
6923	067503				DH62=DM54	
6924	067503				DH63=DM54	
6925	122	105	123		DH65: .ASCII	'RESULTING IN AN ODD ADDRESS TRAP TO 4.'
6926	200				.ASCII	<CRLF>
6927	040	040	124		DH64: .ASCII	'TEST.' <tab>'pc call.'<tab>'pc="" error.'<="" of="" td=""> </tab>'pc>
6928	011	107	117		.ASCIZ	<TAB>'GOT PC.' <tab>'expected pc.'<="" td=""> </tab>'expected>
6929	067503				DH66=DM54	
6930	066201				DH67=DM5	
6931	066201				DH70=DM5	
6932	067031				DH71=DM25	
6933	067073				DH72=DM26	
6934	067503				DH73=DM54	
6935	066201				DH74=DM5	
6936	066201				DH75=DM5	
6937	067031				DH76=DM25	
6938	067073				DH77=DM26	
6939	067503				DH100=DM54	
6940	066201				DH101=DM5	
6941	067073				DH102=DM26	
6942	067031				DH103=DM25	
6943	067503				DH104=DM54	
6944	066201				DH105=DM5	
6945	067073				DH106=DM26	
6946	067031				DH107=DM25	
6947	067503				DH110=DM54	
6948	067031				DH111=DM25	
6949	124	110	105		DH112: .ASCII	'THE (BUT FSRC) FORK FAILED.' <crlf>< td=""> </crlf><>
6950	103	117	116		.ASCII	'CONTROL WENT FROM STATE 762 TO STATE 627.'
6951	200	111	116		.ASCII	<CRLF>'INSTEAD OF FROM STATE 762 TO STATE 637.' <crlf>< td=""> </crlf><>
6952	040	040	124		.ASCIZ	'TEST.' <tab>'pc call.'<tab>'pc="" error.'<="" of="" td=""> </tab>'pc>
6953	067031				DH113=DM25	
6954	067701				DH114=DM112	
6955	124	110	105		DH115: .ASCII	'THE (BUT FSRC) FORK FAILED RESULTING IN AN ODD ADDRESS TRAP TO 4.'
6956	200	103	117		.ASCII	<CRLF>'CONTROL WENT FROM STATE 762 TO STATE 627.' <crlf>< td=""> </crlf><>
6957	111	116	123		.ASCII	'INSTEAD OF FROM STATE 762 TO STATE 627.' <crlf>< td=""> </crlf><>
6958	040	040	124		.ASCIZ	'TEST.' <tab>'pc call.'<tab>'pc="" of="" td="" trap.'<=""> </tab>'pc>
6959	070120				DH116=DM115	
6960	066321				DH117=DM17	
6961	040	040	124		DH120: .ASCII	'TEST.' <tab>'pc call.'<tab>'pc="" error.'<="" of="" td=""> </tab>'pc>
6962	011	107	117		.ASCIZ	<TAB>'GOT FEC.' <tab>'expected fec.'<="" td=""> </tab>'expected>
6963	066201				DH121=DM5	
6964	067431				DH122=DM50	
6965	067431				DH123=DM50	
6966	066321				DH124=DM17	
6967	066321				DH125=DM17	
6968	066201				DH126=DM5	
6969	067503				DH127=DM54	
6970	070404				DH130=DM120	

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DATA HEADERS
5966      067503      DH131=DH54
5967      067503      DH132=DH54
5968 070474      106      07      111      DH133: .ASCII 'FAILED TO PRODUCE THE CORRECT RESULTS.'<CRLF>
5969 070543      040      040      124      .ASCIZ ' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
5970      070474      DH134=DH133
5971      070474      DH135=DH133
5972      070474      DH136=DH133
5973 070604      120      122      117      DH137: .ASCII 'PRODUCED THE CORRECT RESULT BUT FAILED TO SET THE FPS CORRECTLY.'
5974 070704      040      040      124      .ASCII ' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
5975 070744      011      107      117      .ASCIZ <TAB>'GOT FPS.'<TAB>'EXPECTED FPS.'
5976      070604      DH140=DH137
5977      070604      DH141=DH137
5978      070604      DH142=DH137
5979      070474      DH143=DH133
5980      070474      DH144=DH133
5981      070604      DH145=DH137
5982      070604      DH146=DH137
5983      067503      DH147=DH54
5984 070774      130      117      122      DH150: .ASCII 'XOR OF SIGN BIT FAILED.'<CRLF>
5985 071024      040      040      124      .ASCIZ ' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF ERROR.'
5986      070604      DH151=DH137
5987      070474      DH152=DH133
5988      070604      DH153=DH137
5989 071065      040      040      124      DH154: .ASCIZ ' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'
5990      071065      DH155=DH154
5991      067503      DH156=DH54
5992      067503      DH157=DH54
5993      067503      DH160=DH54
5994      067503      DH161=DH54
5995      067503      DH162=DH54
5996      067503      DH163=DH54
5997      066321      DH164=DH17
5998      066321      DH165=DH17
5999      067503      DH166=DH54
7000      067503      DH167=DH54
7001      067503      DH170=DH54
7002      067503      DH171=DH54
7003      067503      DH172=DH54
7004      067503      DH173=DH54
7005      067503      DH174=DH54
7006      067503      DH175=DH54
7007      067503      DH176=DH54
7008 071125      040      040      124      DH177: .ASCIZ ' TEST. ERR PC CPU ERROR REGISTER'
7009      067503      DH200=DH54
7010      067503      DH201=DH54
7011      067503      DH202=DH54
7012      067503      DH203=DH54
7013      067503      DH204=DH54
7014      066321      DH205=DH17
7015      067503      DH206=DH54
7016      067503      DH207=DH54
7017      067503      DH210=DH54
7018 071171      040      040      124      DH211: .ASCIZ ' TEST.'<TAB>'PC OF CALL.'<TAB>'PC OF TRAP.'<TAB>'FEC.'
7019      066201      DH212=DH5
7020      066201      DH213=DH5
7021      067503      DH214=DH54

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Line	Code	Value	Unit	Code	Code	Label	Data Format
7022						.SBTTL	DATA FORMATS
7023	07'236	004	000	005	DF1:	.BYTE	4.0.5.0.5.0.0.0
7024	07'246	004	000	005	DF2:	.BYTE	4.0.5.4.5.0.5.0
7025	07'256	004	000	005	DF3:	.BYTE	4.0.5.0.5.0.5.0
7026		071256			DF4=DF3		
7027	07'266	004	000	005	DF5:	.BYTE	4.0.5.0.5.0.5.11.5.0.5.0
7028		071266			DF6=DF5		
7029		071266			DF7=DF5		
7030		07'266			DF10=DF5		
7031		071266			DF11=DF5		
7032	071302	005	011	005	DF12:	.BYTE	5.11.5.5.5.4.5.4.5.5.4.5.4.5.11.5.11.5.5.4.0.5.0.5.0.0
7033	071334	005	011	005	DF13:	.BYTE	5.11.5.5.5.4.0.5.0.5.0.0
7034		071266			DF14=DF6		
7035		07'266			DF15=DF6		
7036	071350	004	000	005	DF16:	.BYTE	4.0.5.0.5.0.0
7037		07'256			DF17=DF3		
7038	071357	004	000	005	DF20:	.BYTE	4.0.5.0.5.0.5.0
7039	071367	004	000	005	DF21:	.BYTE	4.0.5.0
7040	071373	005	005	004	DF22:	.BYTE	5.5.4.0.5.0.5.0.5.0
7041	071405	004	000	005	DF23:	.BYTE	4.0.5.0.5.0.5.0
7042	071415	005	004	000	DF24:	.BYTE	5.4.0.5.0.5.0
7043	071424	004	000	005	DF25:	.BYTE	4.0.5.0.5.5.5.0.5.0.5.0.5.5.5.0.5.0.5.0
7044	071450	004	000	005	DF26:	.BYTE	4.0.5.0.5.0.0.5.5.5.5.4.5.4.5.5.5.5.4.5.4
7045	071475	004	000	005	DF27:	.BYTE	4.0.5.0.5.0.0.5.5.5.5.4.5.4.5.5
7046	071515	005	011	005	DF30:	.BYTE	5.11.5.5.5.4.0.5.0.5.0.0
7047		071450			DF31=DF26		
7048		071475			DF32=DF27		
7049	071531	004	000	005	DF33:	.BYTE	4.0.5.0.5.0.5.5.5.0.5.0.5.12.5.5.5.0.5.0.5.12
7050	071557	004	000	005	DF34:	.BYTE	4.0.5.0.5.0.5.5.5.5.4.5.4.5.5.5.5.4.5.4
7051		071557			DF35=DF34		
7052		071557			DF36=DF34		
7053		071557			DF37=DF34		
7054	071603	004	000	005	DF40:	.BYTE	4.0.5.0.5.0.5.5.5.0.5.0.5.3.5.5.5.0.5.0.5.3
7055	071631	011	005	005	DF41:	.BYTE	11.5.5.5.4.0.5.0.5.0.5.0
7056	071645	004	000	005	DF42:	.BYTE	4.0.5.0.5.0.5.5.5.5.4.5.4.11.4.5.5.5.5.4.5.4
7057		071645			DF43=DF42		
7058	071673	005	011	005	DF44:	.BYTE	5.11.5.5.5.4.0.5.0.5.5.5.5.3.5.5.5.5.3
7059	071716	005	011	005	DF45:	.BYTE	5.11.5.5.5.4.0.5.0.5.4.5.5.5.5.3.5.5.5.5.3
7060	071743	004	000	005	DF46:	.BYTE	4.0.5.5.5.3.5.5.5.3.5.3.5.3.5.5.5.3.5.3.5.3.5.3
7061	071775	004	000	005	DF47:	.BYTE	4.0.5.0.5.5.5.4.5.4.5.5
7062	072012	004	000	005	DF50:	.BYTE	4.0.5.0.5.11.5.5.5.5.4.5.4.5.5.5.5.4.5.4
7063	072036	004	000	005	DF51:	.BYTE	4.0.5.0.5.11.5.5.5.3.5.5.5.3
7064		071775			DF52=DF47		
7065	072054	004	000	005	DF53:	.BYTE	4.0.5.0.5.0.0
7066	072063	004	000	005	DF54:	.BYTE	4.0.5.0.5.5.5.5.3.5.5.5.5.3
7067		071775			DF55=DF47		
7068		072054			DF56=DF53		
7069		072063			DF57=DF54		
7070		072054			DF60=DF53		
7071		072063			DF61=DF54		
7072		072063			DF62=DF54		
7073		072063			DF63=DF54		
7074	072101	004	000	005	DF64:	.BYTE	4.0.5.0.5.0.0
7075		072101			DF65=DF64		
7076		072063			DF66=DF54		
7077		071367			DF67=DF21		
7078	072110	004	000	005	DF70:	.BYTE	4.0.5.0.5.5.5.5.4.5.4.5.5.5.5.4.5.4

DATA FORMATS

7079		072110			DF71=DF70	
7080	072132	004	000	005	DF72: .BYTE	4.0.5.0.5.0.0
7081		072063			DF73=DF54	
7082		071367			DF74=DF21	
7083		072110			DF75=DF70	
7084		072110			DF76=DF70	
7085		072132			DF77=DF72	
7086		072063			DF100=DF54	
7087		071110			DF101=DF70	
7088		072132			DF102=DF72	
7089		072110			DF103=DF70	
7090		072063			DF104=DF54	
7091		072110			DF105=DF70	
7092		072132			DF106=DF72	
7093		072110			DF107=DF70	
7094		072063			DF110=DF54	
7095	072141	004	000	005	DF111: .BYTE	4.0.5.0
7096		072141			DF112=DF111	
7097		072141			DF113=DF111	
7098		072141			DF114=DF111	
7099		072141			DF115=DF111	
7100		072141			DF116=DF111	
7101		071256			DF117=DF3	
7102		071256			DF120=DF3	
7103		071775			DF121=DF47	
7104		072012			DF122=DF50	
7105		072036			DF123=DF51	
7106	072145	004	000	005	DF124: .BYTE	4.0.5.0.5.0.0.5.5.5.5.4.5.4.5.5.5.5.4.5.4.5.5.5.3
7107		072145			DF125=DF124	
7108		072141			DF126=DF111	
7109		072141			DF127=DF111	
7110		071256			DF130=DF3	
7111	072176	004	000	005	DF131: .BYTE	4.0.5.0.5.5.5.3.5.5.5.3.5.5.5.3
7112		072176			DF132=DF131	
7113	072216	004	000	005	DF133: .BYTE	4.0.5.0.5.5.5.3.5.5.5.3.5.5.5.3.5.5.5.3
7114		072216			DF134=DF133	
7115		072216			DF135=DF133	
7116		072216			DF136=DF133	
7117	072242	004	000	005	DF137: .BYTE	4.0.5.0.5.0.5.0
7118		072242			DF140=DF137	
7119		072242			DF141=DF137	
7120		072242			DF142=DF137	
7121		072216			DF143=DF137	
7122		072216			DF144=DF133	
7123		072242			DF145=DF137	
7124		072242			DF146=DF137	
7125		072216			DF147=DF133	
7126		072216			DF150=DF133	
7127		072242			DF151=DF137	
7128		072216			DF152=DF133	
7129		072242			DF153=DF137	
7130	072252	004	000	005	DF154: .BYTE	4.0.5.0
7131		072252			DF155=DF154	
7132		072216			DF156=DF133	
7133		072216			DF157=DF133	
7134		072216			DF160=DF133	
7135	072256	004	000	005	DF161: .BYTE	4.0.5.0.5.5.5.2.5.5.5.2.5.5.5.2.5.5.5.2

7136	072216			DF162=DF133	
7137	072256			DF163=DF161	
7138	071256			DF164=DF3	
7139	071256			DF165=DF3	
7140	072216			DF166=DF133	
7141	072216			DF167=DF133	
7142	072256			DF170=DF161	
7143	072256			DF171=DF161	
7144	072216			DF172=DF133	
7145	072216			DF173=DF133	
7146	072256			DF174=DF161	
7147	072256			DF175=DF161	
7148	072216			DF176=DF133	
7149	072302	000	000	DF177: .BYTE	4,0,0
7150	072216			DF200=DF133	
7151	072216			DF201=DF133	
7152	072216			DF202=DF133	
7153	072216			DF203=DF133	
7154	072216			DF204=DF133	
7155	071256			DF205=DF3	
7156	072216			DF206=DF133	
7157	072216			DF207=DF133	
7158	072216			DF210=DF133	
7159	072305	000	005	DF211: .BYTE	4,0,5,0,5,0
7160	072305			DF212=DF211	
7161	072305			DF213=DF211	
7162	072216			DF214=DF133	
7163				.EVEN	

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DATA TABLES
7164 .SRTTL DATA TABLES
7165 072314 001232 001234 042740 DT1: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7166 072330 001242 001244 000000 .WORD $TMP4,$TMP5,0
7167 072336 001232 001234 042740 DT2: .WORD $TMP0,$TMP1,$TAB,AERFLG,$TAB,$TMP2,$TAB,$TMP3,0
7168 072360 001232 001234 042740 DT3: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7169 072374 042740 001242 000000 .WORD $TAB,$TMP4,0
7170 072360 DT4=DT3
7171 072402 001232 001234 042740 DT5: .WORD $TMP0,$TMP1,$TAB,$TMP2,LF IEX1,$TMP21,LF IEX2
7172 072420 001272 043057 001240 .WORD $TMP20,FPSMS,$TMP3,FECMS,$TMP4,0
7173 072434 001232 001234 042740 DT6: .WORD $TMP0,$TMP1,$TAB,$TMP2,LF IEX1,$TMP21,LF IEX2,$TMP20,0
7174 072434 DT7=DT6
7175 072434 DT10=DT6
7176 072434 DT11=DT6
7177 072456 043134 001252 043141 DT12: .WORD $THE,$TMP10,NOOP1,NOOP15,NOOP2,$TMP5
7178 072472 043302 001246 043314 .WORD NOOP3,$TMP6,NOOP4,NOOP2,$TMP5,NOOP3,$TMP7,NOOP5,$TMP11
7179 072514 043357 001252 043377 .WORD NOOP6,$TMP10,NOOP7,NOOP10,$TMP0,$TMP1,$TAB,$TMP2
7180 072534 042740 001240 001242 .WORD $TAB,$TMP3,$TMP4,0
7181 072544 043134 001252 043141 DT13: .WORD $THE,$TMP10,NOOP1,NOOP11,NOOP10,$TMP0,$TMP1,$TAB
7182 072564 001236 042740 001240 .WORD $TMP2,$TAB,$TMP3,$TMP4,0
7183 072434 DT14=DT6
7184 072434 DT15=DT6
7185 072576 001232 001234 042740 DT16: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP5,$TMP3,0
7186 072360 DT17=DT3
7187 072616 001232 001234 042740 DT20: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7188 072632 042740 001242 000000 .WORD $TAB,$TMP4,0
7189 072640 001232 001234 042740 DT21: .WORD $TMP0,$TMP1,$TAB,$TMP2,0
7190 072652 066014 001313 DT22: .WORD DH3,$CRLF
7191 072656 001232 001234 042740 .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7192 072672 042740 001242 000000 .WORD $TAB,$TMP4,0
7193 072700 001232 001234 042740 DT23: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7194 072714 042740 001242 000000 .WORD $TAB,$TMP4,0
7195 072722 044033 DT24: .WORD ILLMS
7196 072724 001232 001234 042740 .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7197 072740 042740 001242 000000 .WORD $TAB,$TMP4,0
7198 072746 001232 001234 042740 DT25: .WORD $TMP0,$TMP1,$TAB,$CRLF,MS1,MS3,$TMP3,MS4,$TMP4,$CRLF
7199 072772 001242 001313 044113 .WORD $TMP4,$CRLF,MS2,MS3,$TMP5,MS4,$TMP6,$CRLF,$TMP5,0
7200 073016 001232 001234 042740 DT26: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3,$TMP4,$CRLF
7201 073036 044223 001313 044241 .WORD MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
7202 073054 044270 001313 044241 .WORD MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
7203 073072 001232 001234 042740 DT27: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7204 073106 001242 001313 044315 .WORD $TMP4,$CRLF,MS12,$CRLF,MS7,$TMP5,MS10,$TMP7,$CRLF,MS13,0
7205 073134 044456 001272 001313 DT30: .WORD MS15,$TMP20,$CRLF,MS14,$CRLF
7206 073146 001232 001234 042740 .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7207 073162 001242 000000 .WORD $TMP4,0
7208 073016 DT31=DT26
7209 073072 DT32=DT27
7210 073166 001232 001234 042740 DT33: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7211 073202 001313 044101 044120 .WORD $CRLF,MS1,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP6,$CRLF
7212 073224 044113 044120 001242 .WORD MS2,MS3,$TMP4,MS4,$TMP5,$CRLF,$TMP4,0
7213 073244 001232 001234 042740 DT34: .WORD $TMP0,$TMP1,$TAB,$TMP2,$TAB,$TMP3
7214 073260 001313 044223 001313 .WORD $CRLF,MS6,$CRLF,MS7,$TMP5,MS10,$TMP6,$CRLF
7215 073300 044270 001313 044241 .WORD MS11,$CRLF,MS7,$TMP5,MS10,$TMP7,0
7216 073244 DT35=DT34
7217 073244 DT36=DT34
7218 073244 DT37=DT34
7219 073166 DT40=DT33
7220 073316 001272 001313 066014 DT41: .WORD $TMP20,$CRLF,DH3,$CRLF

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7221	073326	001232	001234	042740		.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3
7222	073342	042740	001242	000000		.WORD	\$TAB,\$TMP4,0
7223	073350	001232	001234	042740	DT42:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3
7224	073364	001313	044223	001313		.WORD	\$CRLF,MS6,\$CRLF,MS7,\$TMP5,MS10,\$TMP6,\$TMP15,\$TMP10
7225	073406	001313	044270	001313		.WORD	\$CRLF,MS11,\$CRLF,MS7,\$TMP5,MS10,\$TMP7,0
7226		073350			DT43-DT42		
7227	073426	044510	001244	001313	DT44:	.WORD	MS17,\$TMP5,\$CRLF,MS20,\$CRLF,\$TMP0,\$TMP1,\$TAB,\$TMP2
7228	073450	001313	044101	044641		.WORD	\$CRLF,MS1,MS21,\$CRLF,\$TMP3,\$CRLF,MS2,MS21,\$CRLF,\$TMP4,0
7229	073476	044510	001244	001313	DT45:	.WORD	MS17,\$TMP5,\$CRLF,MS24,\$CRLF,\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB
7230	073522	011246	001313	044700		.WORD	\$TMP6,\$CRLF,MS22,MS21,\$CRLF,\$TMP3,\$CRLF
7231	073540	044730	044641	001313		.WORD	MS23,MS21,\$CRLF,\$TMP4,0
7232	073552	001232	001234	001313	DT46:	.WORD	\$TMP0,\$TMP1,\$CRLF,MS25,MS30,\$TMP2,MS31,\$TMP3
7233	073572	045136	001242	045145		.WORD	MS32,\$TMP4,MS33,\$TMP5,MS34,\$TMP6,\$CRLF,MS26
7234	073612	045120	001250	045127		.WORD	MS30,\$TMP7,MS31,\$TMP10
7235	073622	045136	001254	045145		.WORD	MS32,\$TMP11,MS33,\$TMP12,MS34,\$TMP13,0
7236	073640	001232	001234	042740	DT47:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$CRLF,MS12,MS7,\$TMP3,MS10
7237	073662	001242	001313	044353		.WORD	\$TMP4,\$CRLF,MS13,0
7238		073244			DT50=DT34		
7239	073672	001232	001234	042740	DT51:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3
7240	073706	001313	045052	045111		.WORD	\$CRLF,MS25,MS27,\$TMP4,\$CRLF,MS26,MS27,\$TMP5,0
7241		073640			DT52=DT47		
7242	073730	001232	001234	042740	DT53:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3
7243	073744	001242	000000			.WORD	\$TMP4,0
7244	073750	001232	001234	042740	DT54:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$CRLF,MS1,MS21,\$CRLF,\$TMP3
7245	073772	001313	044113	044641		.WORD	\$CRLF,MS2,MS21,\$CRLF,\$TMP3,0
7246		073640			DT55=DT47		
7247		073730			DT56=DT53		
7248		073750			DT57=DT54		
7249		073730			DT60=DT53		
7250		073750			DT61=DT54		
7251		073750			DT62=DT54		
7252		073750			DT63=DT54		
7253	074006	001232	001234	042740	DT64:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3
7254	074022	001242	000000			.WORD	\$TMP4,0
7255		074006			DT65=DT64		
7256		073750			DT66=DT54		
7257		072640			DT67=DT21		
7258	074026	001232	001234	042740	DT70:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$CRLF,MS6,\$CRLF,MS7,\$TMP5
7259	074050	044255	001246	001313		.WORD	MS10,\$TMP6,\$CRLF,MS11,\$CRLF,MS7,\$TMP5,MS10,\$TMP7,0
7260		074026			DT71=DT70		
7261	074074	001232	001234	042740	DT72:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3,\$TMP4,0
7262		073750			DT73=DT54		
7263		072640			DT74=DT21		
7264		074026			DT75=DT70		
7265		074026			DT76=DT70		
7266		074074			DT77=DT72		
7267		073750			DT100=DT54		
7268		074026			DT101=DT70		
7269		074026			DT102=DT71		
7270		074026			DT103=DT70		
7271		073750			DT104=DT54		
7272		074026			DT105=DT70		
7273		074074			DT106=DT72		
7274		074026			DT107=DT70		
7275		073750			DT110=DT54		
7276	074114	001232	001234	042740	DT111:	.WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,0
7277		074114			DT112=DT111		

7278		074114			DT113=DT111	
7279		074114			DT114=DT111	
7280		074114			DT115=DT111	
7281		074114			DT116=DT111	
7282		072360			DT117=DT3	
7283		072360			DT120=DT3	
7284		073640			DT121=DT47	
7285		073244			DT122=DT34	
7286		073672			DT123=DT51	
7287	074126	001232	001234	042740	DT124: .WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TAB,\$TMP3,\$TMP4,\$CRLF
7288	074146	044223	001313	044241	.WORD	MS6,\$CRLF,MS7,\$TMP5,MS10,\$TMP6,\$CRLF
7289	074164	044270	001313	044241	.WORD	MS11,\$CRLF,MS7,\$TMP5,MS10,\$TMP7,\$CRLF,MS37,\$CRLF,\$TMP10,0
7290		074126			DT125=DT124	
7291		074114			DT126=DT111	
7292		074114			DT127=DT111	
7293		072360			DT130=DT3	
7294	074212	001232	001234	042740	DT131: .WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$CRLF,MS37,\$CRLF,\$TMP3
7295	074232	001313	045215	001313	.WORD	\$CRLF,MS40,\$CRLF,\$TMP4,\$CRLF,MS415,\$CRLF,\$TMP5,0
7296		074212			DT132=DT131	
7297	074254	001232	001234	042740	DT133: .WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$CRLF,MS41,\$CRLF,\$TMP3
7298	074274	001313	045275	001313	.WORD	\$CRLF,MS42,\$CRLF,\$TMP4,\$CRLF,MS43,\$CRLF,\$TMP5
7299	074314	001313	045330	001313	.WORD	\$CRLF,MS44,\$CRLF,\$TMP6,0
7300		074254			DT134=DT133	
7301		074254			DT135=DT133	
7302		074254			DT136=DT133	
7303	074326	001232	001234	042740	DT137: .WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,\$TMP10,\$TAB,\$TMP11,0
7304		074326			DT140=DT137	
7305		074326			DT141=DT137	
7306		074326			DT142=DT137	
7307		074254			DT143=DT133	
7308		074254			DT144=DT133	
7309		074326			DT145=DT137	
7310		074326			DT146=DT137	
7311		074254			DT147=DT133	
7312		074254			DT150=DT133	
7313		074326			DT151=DT137	
7314		074254			DT152=DT133	
7315		074326			DT153=DT137	
7316	074346	001232	001234	042740	DT154: .WORD	\$TMP0,\$TMP1,\$TAB,\$TMP2,0
7317		074346			DT155=DT154	
7318		074254			DT156=DT133	
7319		074254			DT157=DT133	
7320		074254			DT160=DT137	
7321		074254			DT161=DT133	
7322		074254			DT162=DT133	
7323		074254			DT163=DT133	
7324		072360			DT164=DT3	
7325		072360			DT165=DT3	
7326		074254			DT166=DT133	
7327		074254			DT167=DT133	
7328		074254			DT170=DT133	
7329		074254			DT171=DT133	
7330		074254			DT172=DT133	
7331		074254			DT173=DT133	
7332		074254			DT174=DT133	
7333		074254			DT175=DT133	
7334		074254			DT176=DT133	

DATA TABLES

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

SYMBOL TABLE

AADATO	027404	ADDW12=	000000	A6	004704	BERR1	005140	CCP2	031212
AADONE	027504	ADDW13=	000000	A7	004730	BITSTS	014250	CCP3	031222
AAERRO	027036	ADDW14=	000000	BBDATO	032526	BIT0 =	000001	CCP4	031232
AAERR1	027124	ADDW15=	000000	BBDONE	032656	BIT00 =	000001	CCP5	031242
AAERR2	027160	ADDW2 =	000000	BBERO	032214	BIT01 =	000002	CCP6	031252
AAERR3	027214	ADDW3 =	000000	BBER1	032254	BIT02 =	000004	CCP7	031262
AAERR4	027224	ADDW4 =	000000	BBER10	032234	BIT03 =	000010	CC1	027510
AAERR5	027260	ADDW5 =	000000	BBER11	032270	BIT04 =	000020	CC10	027734
AAERR6	027314	ADDW6 =	000000	BBER2	032312	BIT05 =	000040	CC11	027744
AAERR7	027350	ADDW7 =	000000	BBER3	032330	BIT06 =	000100	CC12	027752
AAER10	027132	ADDW8 =	000000	BBER4	032364	BIT07 =	000200	CC13	027764
AAPATO	027414	ADDW9 =	000000	BBER40	032400	BIT08 =	000400	CC14	030020
AAPAT1	027424	ADEVCT=	000000	BBER5	032420	BIT09 =	001000	CC15	030044
AAPAT2	027434	ADEVM =	000000	BBER6	032436	BIT1 =	000002	CC16	030064
AAPAT3	027444	ADONE =	005046	BBER7	032472	BIT10 =	002000	CC17	030074
AAPAT4	027454	AENV =	000000	BBER8	032510	BIT11 =	004000	CC18	030102
AAPAT5	027464	AENVM =	000000	BBPAT0	032536	BIT12 =	010000	CC19	030114
AAPAT6	027474	AERFLG	004736	BBPAT1	032546	BIT13 =	020000	CC2	027544
AA1	026442	AERR1	004740	BBPAT2	032556	BIT14 =	040000	CC20	030150
AA10	026562	AERR2	004752	BBPAT3	032566	BIT15 =	100000	CC21	030174
AA11	026616	AERR3	005004	BBPAT4	032576	BIT2 =	000004	CC22	030214
AA12	026620	AFATAL=	000000	BBPAT5	032606	BIT3 =	000010	CC23	030224
AA13	026636	AMADR1=	000000	BBPAT6	032616	BIT4 =	000020	CC24	030232
AA14	026656	AMADR2=	000000	BBP10	032636	BIT5 =	000040	CC25	030244
AA15	026676	AMADR3=	000000	BBP11	032646	BIT6 =	000100	CC26	030300
AA16	026704	AMADR4=	000000	BBP7	032626	BIT7 =	000200	CC27	030322
AA17	026710	AMAMS1=	000000	BB1	031326	BIT8 =	000400	CC28	030342
AA2	026504	AMAMS2=	000000	BB10	031512	BIT9 =	001000	CC29	030352
AA20	026714	AMAMS3=	000000	BB11	031532	BPTVEC=	000014	CC3	027566
AA21	026716	AMAMS4=	000000	BB12	031542	B1	005064	CC30	030360
AA22	026754	AMSGAD=	000000	BB13	031550	B2	005066	CC31	030372
AA23	026756	AMSGLG=	000000	BB14	031562	B3	005104	CC32	030426
AA24	026776	AMSGTY=	000000	BB15	031616	CCDATO	031162	CC33	030450
AA25	027016	AMTYP1=	000000	BB16	031642	CCDONE	031322	CC34	030470
AA26	027024	AMTYP2=	000000	BB17	031652	CCERO	030524	CC35	030500
AA27	027030	AMTYP3=	000000	BB2	031370	CCER1	030560	CC36	030506
AA3	026506	AMTYP4=	000000	BB20	031664	CCER10	031072	CC37	030520
AA4	026524	APASS =	000000	BB21	031720	CCER11	031110	CC4	027606
AA5	026544	APRIOR=	000000	BB22	031744	CCER12	031126	CC5	027616
AA6	026552	APTCSU=	000040	BB23	031764	CCER13	031144	CC6	027624
AA7	026560	APTENV=	000001	BB24	031774	CCER2	030616	CC7	027636
ABASE =	000000	APTSIZ=	000200	BB25	032002	CCER22	030632	CC8	027672
ACDW1 =	000000	APTSPO=	000100	BB26	032014	CCER3	030654	CC9	027714
ACDW2 =	000000	ASWREG=	000000	BB27	032050	CCER4	030672	CDONE	006120
ACPUOP=	000000	ATESTN=	000000	BB3	031374	CCER44	030706	CERR1	005654
AC0 =	%000000	AUNIT =	000000	BB30	032072	CCER5	030730	CERR2	005752
AC1 =	%000001	AUSWR =	000000	BB31	032102	CCER50	030574	CERR3	006052
AC2 =	%000002	AVECT1=	000000	BB32	032114	CCER55	030744	CERR4	006074
AC3 =	%000003	AVECT2=	000000	BB33	032150	CCER6	030764	CFCC1	043671
AC4 =	%000004	A05	004654	BB34	032172	CCER7	031020	CHPNUM	014150
AC5 =	%000005	A1	004526	BB35	032202	CCER8	031036	CKSWR =	104407
AC6 =	%000006	A11	004526	BB4	031412	CCER90	030542	CNT =	000214
AC7 =	%000007	A12	004542	BB5	031422	CCP0	031172	CPC	006116
ADDW0 =	000000	A2	004600	BB6	031434	CCP1	031202	CPSAVE	037142
ADDW1 =	000000	A3	004604	BB7	031470	CCP10	031272	CPSPUR	042566
ADDW10=	000000	A4	004652	BDONE	005154	CCP11	031302	CPTWO	042604
ADDW11=	000000	A5	004656	BERR	005110	CCP12	031312	CR =	000015

CRLF = 0002C0	DD21 033340	DF130 = 071256	DF212 = 072305	DH101 = 066201
C1 005174	DD22 033352	DF131 = 072176	DF213 = 072305	DH102 = 067073
C15 005222	DD23 033406	DF132 = 072176	DF214 = 072216	DH103 = 067031
C2 005246	DD24 033430	DF133 072216	DF22 071373	DH104 = 067503
C25 005262	DD25 033450	DF134 = 072216	DF23 071405	DH105 = 066201
C3 005310	DD26 033460	DF135 = 072216	DF24 071415	DH106 = 067073
C35 005340	DD27 033466	DF136 = 072216	DF25 071424	DH107 = 067031
C4 005366	DD3 032740	DF137 = 072242	DF26 071450	DH11 = 066201
C45 005400	DD30 033500	DF14 = 071266	DF27 071475	DH110 = 067503
C5 005426	DD31 033534	DF140 = 072242	DF3 071256	DH111 = 067031
C55 005454	DD32 033556	DF141 = 072242	DF30 071515	DH112 = 067701
C6 005500	DD33 033576	DF142 = 072242	DF31 = 071450	DH113 = 067031
C65 005514	DD34 033606	DF143 = 072216	DF32 = 071475	DH114 = 067701
C7 005542	DD35 033614	DF144 = 072216	DF33 071531	DH115 = 070120
C75 005572	DD36 033632	DF145 = 072242	DF34 071557	DH116 = 070120
C8 005620	DD37 033666	DF146 = 072242	DF35 = 071557	DH117 = 066321
C85 005632	DD38 033710	DF147 = 072216	DF36 = 071557	DH12 = 000000
DDDATO 034556	DD39 033730	DF15 = 071266	DF37 = 071557	DH120 = 070404
DDDONE 034706	DD4 032760	DF150 = 072216	DF4 = 071256	DH121 = 066201
DDERO 033770	DD40 033740	DF151 = 072242	DF40 071603	DH122 = 067431
DDER1 034006	DD41 033746	DF152 = 072216	DF41 071631	DH123 = 067431
DDER10 034424	DD42 033764	DF153 = 072242	DF42 071645	DH124 = 066321
DDER11 034462	DD5 032770	DF154 072252	DF43 = 071645	DH125 = 066321
DDER12 034520	DD6 032776	DF155 = 072252	DF44 071673	DH126 = 066201
DDER2 034044	DD7 033014	DF156 = 072216	DF45 071716	DH127 = 067503
DDER3 034102	DD8 033050	DF157 = 072216	DF46 071743	DH13 = 000000
DDER4 034140	DERR1 006246	DF16 = 071350	DF47 071775	DH130 = 070404
DDER5 034176	DERR2 006342	DF160 = 072216	DF5 071266	DH131 = 067503
DDER6 034234	DF1 071236	DF161 072256	DF50 072012	DH132 = 067503
DDER7 034272	DF10 = 071266	DF162 = 072216	DF51 072036	DH133 070474
DDER8 034330	DF100 = 072063	DF163 = 072256	DF52 = 071775	DH134 = 070474
DDER9 034366	DF101 = 072110	DF164 = 071256	DF53 072054	DH135 = 070474
DDISP = 177570	DF102 = 072132	DF165 = 071256	DF54 072063	DH136 = 070474
DDONE 006366	DF103 = 072110	DF166 = 072216	DF55 = 071775	DH137 070604
DDP0 034566	DF104 = 072063	DF167 = 072216	DF56 = 072054	DH14 = 066201
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EM124	056405	EM206	065230	EM76	054304	FFP3	036040	GOR1	015170
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EM135	057510	EM24	047043	ERT4	042374	FF7	035650	GPAT13	015154
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MA3	016760	IPAT21	011262	KDAT11	017444	MDAT02	020354	MS6	044223
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QERR11	PFECWS	042412	QPAT21	022720	SW00 =	000001	TPAT11	012070
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QERR4	PPAT10	022216	Q10	022410	SW04 =	000020	TPAT21	012100
QERR5	PPAT11	022220	Q2	022274	SW05 =	000040	TPAT22	012102
QERR6	PPAT12	022222	Q3 =	022276	SW06 =	000100	TPAT23	012104
OPAT10	PPAT13	022224	Q4	022300	SW07 =	000200	TPVEC =	000064
OPAT11	PROGNUM =	000001	Q5	022322	SW08 =	000400	TRAPVE =	000034
OPAT12	PRO =	000000	Q6	022344	SW09 =	001000	TRTVEC =	000014
OPAT13	PR1 =	000040	Q7	022354	SW1 =	000002	TST1	004456
OPAT20	PR2 =	000100	Q8	022366	SW10 =	002000	TST10	011312
OPAT21	PR3 =	000140	Q9	022402	SW11 =	004000	TST11	012130
OPAT22	PR4 =	000200	RDCHR =	104410	SW12 =	010000	TST12	015212
OPAT23	PR5 =	000240	RESREG =	104412	SW13 =	020000	TST13	016142
OPAT24	PR6 =	000300	RESVEC =	000010	SW14 =	040000	TST14	016706
01	PR7 =	000340	RSETUP =	104413	SW15 =	100000	TST15	017206
010	PS =	177776	R6 =	X000006	SW2 =	000004	TST16	017504
011	PSW =	177776	R7 =	X000007	SW3 =	000010	TST17	020032
012	PWRVEC =	000024	SADR	016660	SW4 =	000020	TST2	005050
013	P1	021576	SAVREG =	104411	SW5 =	000040	TST20	020362
014	P2	021620	SCCPE =	000004	SW6 =	000100	TST21	021070
02	P3 =	021622	SDAT00	016674	SW7 =	000200	TST22	021574
03	P4	021624	SDAT01	016676	SW8 =	000400	TST23	022250
04	P5	021646	SDAT02	016700	SW9 =	001000	TST24	022750
05	P6	021670	SDAT03	016702	S1	016144	TST25	024110
06	P7	021700	SDONE	016704	S10	016322	TST26	024706
07	P8	021710	SERR0	016364	S11	016346	TST27	025522
08	QDAT10	022736	SERR1	016574	S12	016356	TST3	005156
09	QDAT11	022740	SERR10	016404	S2	016204	TST30	026132
PDAT10	QDAT12	022742	SERR15	016464	S3	016206	TST31	026440
PDAT11	QDAT13	022744	SERR2	016524	S4	016212	TST32	027506
PDAT12	QDAT00	022726	SERR20	016504	S5	016236	TST33	031324
PDAT13	QDAT01	022730	SERR3	016550	S6	016246	TST34	032660
PDAT00	QDAT02	022732	SERR4	016442	S7	016254	TST35	034710
PDAT01	QDAT03	022734	SERR5	016626	S8	016314	TST36	035474

*S137	036060	UFAT40	024064	XERR2	025426	Y2	025600	\$CRLF	001313
*S14	006122	UPAT41	024066	XERR3	025372	Y3	025624	\$DBLK	040614
*S15	006370	JPAT42	024070	XERR4	025442	Y4	025642	\$DDW0	001402
*S16	006534	UPAT43	024072	XPAT00	025470	Y5	025702	\$DDW1	001404
*S17	010440	JROM1	024102	XPAT01	025472	Y6	025704	\$DDW10	001426
*VPDS =	104405	JROM2	024104	XPAT02	025474	Y7	025720	\$DDW11	001430
*VPE =	104401	JROM3	024106	XPAT03	025476	ZDAT00	026376	\$DDW12	001432
*VPOC =	104402	UTMP1	024076	XPAT10	025500	ZDAT01	026400	\$DDW13	001434
*VPOW =	104404	UTMP2	024100	XPAT12	025504	ZDAT02	026402	\$DDW14	001436
*VPOS =	104403	U0	022766	XPAT13	025506	ZDAT03	026404	\$DDW15	001440
T1	011314	U1	023016	XPAT20	025510	ZDONE	026436	\$DDW2	001406
T10	011462	U10	023374	XPAT21	025512	ZERR1	026302	\$DDW3	001410
T105	011470	U11	023376	XPAT22	025514	ZERR2	026344	\$DDW4	001412
T11	011472	U12	023430	XPAT23	025516	ZFLAG	026370	\$DDW5	001414
T12	011500	U13	023446	XTMP	025456	ZPAT00	026406	\$DDW6	001416
T13	011514	U14	023500	X1	024710	ZPAT01	026410	\$DDW7	001420
T14	011556	U15	023534	X10	025112	ZPAT02	026412	\$DDW8	001422
T15	011560	U16	023536	X11	025126	ZPAT03	026414	\$DDW9	001424
T16	011562	U2	023066	X12	025166	ZPAT10	026416	\$DEVCT	001326
T17	011600	U3	023120	X13	025212	ZPAT11	026420	\$DEVN	001374
T2	011340	U4	023170	X14	025220	ZPAT12	026422	\$DJAGN	006442
T20	011640	U5	023222	X15	025234	ZPAT13	026424	\$DTBL	040604
T21	011654	U6	023272	X16	025274	ZPAT20	026426	\$ENDAD	036432
T22	011656	U7	023324	X17	025320	ZPAT21	026430	\$ENDCT	036124
T23	011670	WDAP00	024674	X2	024750	ZPAT22	026432	\$ENULL	036506
T3	011406	WDAT01	024676	X20	025326	ZPAT23	026434	\$EN'	001336
T4	011410	WDAT02	024700	X21	025342	ZTMP1	026372	\$ENVM	001337
T5	011412	WDAT03	024702	X3	024774	ZTMP2	026374	\$EOP	036060
T6	011436	WDONE	024704	X4	025002	Z1	026154	\$EOPCT	036112
T7	011452	WPAT00	024664	X5	025020	Z2	026202	\$ERFLG	001103
UDONE	024110	WPAT01	024666	X6	025060	Z3	026226	\$ERMAX	001115
UERR0	023554	WPAT02	024670	X7	025104	Z4	026234	\$ERROR	037146
UERR1	023600	WPAT03	024672	YDAT00	026070	Z5	026246	\$ERRPC	001116
UERR10	023606	WSETUP	024632	YDAT01	026072	Z6	026300	\$ERRTB	001442
UERR11	023650	W1	024112	YDAT02	026074	\$APTHD	003602	\$ERTTL	001112
UERR2	023664	W10	024334	YDAT03	026076	\$ATYC	040650	\$ESCAP	001304
UERR20	023672	W11	024362	YDONE	026130	\$ATY1	040624	\$ETABL	001336
UERR21	023734	W12	024416	YERR1	025730	\$ATY3	040632	\$ETEND	001442
UERR3	023750	W13	024442	YERR2	025772	\$ATY4	040642	\$FATAL	001320
UERR4	024000	W14	024456	YERR3	026034	\$AUTOB	001134	\$FFLG	041070
UFLAG	024074	W15	024504	YFLAG	026060	\$BASE	001372	\$FILLC	001156
UPAT00	024024	W16	024544	YPAT00	026100	\$BDADR	001122	\$FILLS	001155
UPAT01	024026	W17	024570	YPAT01	026102	\$BDDAT	001126	\$GDADR	001120
UPAT02	024030	W2	024146	YPAT02	026104	\$BELL	001306	\$GDDAT	001124
UPAT03	024032	W20	024604	YPAT03	026106	\$CDW1	001376	\$GET42	036404
UPAT10	024034	W3	024172	YPAT10	026110	\$CDW2	001400	\$GTSWR	041142
UPAT11	024036	W4	024210	YPAT11	026112	\$CHARC	040140	\$HD =	000003
UPAT12	024040	W5	024240	YPAT12	026114	\$CKSWR	041072	\$HIBTS	003602
UPAT13	024042	W6	024300	YPAT13	026116	\$CLR.T	036422	\$ICNT	001104
UPAT20	024044	W7	024324	YPAT20	026120	\$CMTAG	001100	\$ILLUP	042002
UPAT21	024046	XAPT11	025502	YPAT21	026122	\$CM1 =	000024	\$INTAG	001135
UPAT22	024050	XDAT00	025460	YPAT22	026124	\$CM2 =	000050	\$ITEMB	001114
UPAT23	024052	XDAT01	025462	YPAT23	026126	\$CM3 =	000024	\$LF	001314
UPAT30	024054	XDAT02	025464	YTMP1	026062	\$CM4 =	000024	\$LFLG	041067
UPAT31	024056	XDAT03	025466	YTMP2	026064	\$CNTLG	041511	\$LOOP	036500
UPAT32	024060	XDONE	025520	YTMP3	026066	\$CNTLU	041504	\$LPADR	001106
UPAT33	024062	XERR1	025344	Y1	025552	\$CPUOP	001344	\$LPERR	001110

\$MADR1	001350	\$PASS	001324	\$REG3	001170	\$TKS	001144	\$STRAP	041540
\$MADR2	001354	\$PASS2	036514	\$REG4	001172	\$TMP0	001232	\$STRAP2	041562
\$MADR3	001360	\$PASTM	003610	\$REG5	001174	\$TMP1	001234	\$STRP =	C00014
\$MADR4	001364	\$PWAD	041764	\$REG6	001176	\$TMP10	001252	\$STRPAD	041574
\$MAIL	001316	\$PWADN	041624	\$REG7	001200	\$TMP11	001254	\$STSTM	003606
\$MAMS1	001366	\$PWARMG	041760	\$RESRE	037542	\$TMP12	001256	\$STSTM	001102
\$MAMS2	001352	\$PWURUP	041676	\$RTNAD	036502	\$TMP13	001260	\$STYPDS	040400
\$MAMS3	001356	\$QUES	001312	\$RTRN	036476	\$TMP14	001262	\$STYPE	037600
\$MAMS4	001362	\$RDCHR	041354	\$SAVRE	037504	\$TMP15	001264	\$STYPEC	040012
\$MBADR	003604	\$RDSZ =	000001	\$SAVR6	042006	\$TMP16	001266	\$STYPEX	040142
\$MFLG	041066	\$REGAD	001160	\$SCOPE	036516	\$TMP17	001270	\$STYPOC	040170
\$MNEW	041527	\$REG0	001162	\$SETUP =	000137	\$TMP2	001236	\$STYPOD	040204
\$MSGAD	001332	\$REG1	001164	\$STUP =	177777	\$TMP20	001272	\$STYPOS	040144
\$MSGLG	001334	\$REG10	001202	\$SVLAD	037070	\$TMP21	001274	\$UNIT	001330
\$MSGTY	001316	\$REG11	001204	\$SVPC =	003602	\$TMP22	001276	\$UNITM	003612
\$MSWR	041516	\$REG12	001206	\$SWR =	177400	\$TMP23	001300	\$USWR	001342
\$MTYP1	001347	\$REG13	001210	\$SWREG	001340	\$TMP3	001240	\$VECT1	001366
\$MTYP2	001353	\$REG14	001212	\$SWRMK =	000000	\$TMP4	001242	\$VECT2	001370
\$MTYP3	001357	\$REG15	001214	\$SWRMS =	000200	\$TMP5	001244	\$XOFF =	000023
\$MTYP4	001363	\$REG16	001216	\$TAB	042740	\$TMP6	001246	\$XON =	000021
\$MXCNT	037140	\$REG17	001220	\$TBIT	036504	\$TMP7	001250	\$XTSTR	036642
\$NULL	001154	\$REG2	001166	\$TERM =	000030	\$TN =	000037	\$GET4 =	000001
\$NWTST =	000001	\$REG20	001222	\$TESTN	001322	\$TPB	001152	\$OFILL	040375
\$OCNT	040374	\$REG21	001224	\$THE	043134	\$TPFLG	001157	\$.RSET	042622
\$OMODE	040376	\$REG22	001226	\$TIMES	001302	\$TPS	001150	\$.SX =	003602
\$OVER	037124	\$REG23	001230	\$TKB	001146				

. ABS. 074420 000
000000 001
EPRORS DETECTED: 0

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

SYMBOL	CROSS REFERENCE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	
SYMBOL	VALUE									
AADATO	027404	49-5262	49-5269	49-5289	49-5296	49-5301	49-5327	49-5334	49-5372	49-5378
AADONE	027504	49-5386	49-5392	49-5397	49-5403	#49-5407				
AAERRC	027036	49-5342	49-5362	49-5374	49-5380	49-5388	49-5394	49-5400	49-5406	#49-5415
AAERR1	027124	49-5254	#49-5346							
AAERR2	027160	49-5273	#49-5369							
AAERR3	027214	49-5275	#49-5375							
AAERR4	027224	49-5305	#49-5381							
AAERR5	027260	49-5307	#49-5383							
AAERR6	027314	49-5307	#49-5389							
AAERR7	027350	49-5338	#49-5395							
AAER10	027132	49-5340	#49-5401							
AAPATC	027414	#49-5370	49-5382							
AAPAT1	027424	49-5255	49-5283	49-5317	49-5370	49-5376	49-5384	49-5390	49-5396	49-5402
AAPAT2	027434	#49-5408								
AAPAT3	027444	49-5259	49-5286	49-5371	49-5377	49-5385	49-5391	#49-5409		
AAPAT4	027454	49-5264	49-5295	49-5333	49-5369	49-5375	#49-5410			
AAPAT5	027464	49-5268	49-5291	49-5381	49-5383	49-5389	#49-5411			
AAPAT6	027474	49-5300	#49-5412							
AA1	026442	49-5321	49-5395	49-5401	#49-5413					
AA10	026562	49-5329	49-5398	49-5404	#49-5414					
AA11	026616	#49-5251								
AA12	026620	#49-5280								
AA13	026636	49-5285	#49-5287							
AA14	026656	#49-5289								
AA15	026676	#49-5293	49-5310							
AA16	026704	#49-5298	49-5308							
AA17	026710	#49-5303	49-5306							
AA2	026504	49-5304	#49-5306							
AA20	026714	49-5299	#49-5308							
AA21	026716	49-5258	#49-5260							
AA22	026754	49-5294	#49-5310							
AA23	026756	#49-5314								
AA24	026776	49-5320	#49-5322							
AA25	027016	#49-5324								
AA26	027024	#49-5331	49-5341							
AA27	027030	#49-5336	49-5339							
AA3	026506	49-5337	#49-5339							
AA4	026524	49-5332	#49-5341							
AA5	026544	#49-5262								
AA6	026552	#49-5266	49-5276							
AA7	026560	#49-5271	49-5274							
ABASE	- 000000	49-5272	#49-5274							
ACDW1	- 000000	49-5267	#49-5276							
ACDW2	- 000000	20-1795	20-1795							
ACPUOP	- 000000	20-1795	20-1795							
ACO	%000000	20-1795	20-1795							
		#19-1785	*30-2352	30-2391	*31-2720	*31-2726	31-2731	*31-2769	*31-2776	31-2789
		*32-2894	32-2903	*32-2937	32-2946	*33-3182	33-3182	*33-3182	33-3182	*33-3182
		33-3182	*33-3183	33-3183	*33-3183	33-3183	*33-3183	33-3183	*33-3184	33-3184
		*33-3184	33-3184	*33-3185	33-3185	*33-3185	33-3185	*33-3186	33-3186	*33-3186
		33-3186	*33-3187	33-3187	*33-3187	33-3187	*33-3188	33-3188	*33-3188	33-3188

SYMBOL CROSS REFERENCE
 SYMBOL VALUE

REFERENCES

SYMBOL	CROSS REFERENCE VALUE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES
		*33-3189	33-3189	*33-3189	33-3189	*33-3190	33-3190	*33-3190
		33-3191	*33-3191	33-3191	*33-3192	33-3192	*33-3192	33-3192
		*33-3193	33-3193	*34-3371	34-3371	*34-3372	34-3372	*34-3373
		34-3374	*34-3375	34-3375	*34-3381	34-3381	*34-3382	34-3382
		*34-3384	34-3384	*34-3385	34-3385	*34-3396	34-3396	*34-3397
		34-3399	*34-3399	34-3399	*34-3400	34-3400	*35-3467	*35-3477
		*35-3507	35-3513	*36-3628	*36-3634	36-3639	*37-3727	*37-3733
		*38-3837	38-3844	*39-3923	*39-3928	39-3942	*40-4026	*40-4033
		*41-4174	41-4179	*42-4307	*42-4313	42-4317	*43-4428	*43-4436
		*44-4590	*44-4606	*44-4613	*44-4625	*44-4631	*44-4643	*44-4648
		*45-4787	*45-4790	45-4794	*45-4815	*45-4822	45-4824	*45-4843
		*45-4871	*45-4876	45-4880	*46-4930	*46-4933	46-4937	*46-4953
		*46-4976	*46-4979	46-4983	*46-4999	*46-5002	46-5006	*47-5083
		*48-5178	*48-5180	48-5184	*49-5257	*49-5260	49-5263	*49-5284
		*49-5318	*49-5322	49-5328	*50-5433	*50-5435	50-5438	*50-5461
		*50-5487	*50-5491	50-5495	*50-5516	*50-5520	50-5524	*50-5547
		*50-5575	*50-5577	50-5580	*51-5693	*51-5695	51-5698	*51-5715
		*51-5741	*51-5746	51-5750	*51-5764	*51-5768	51-5772	*51-5795
		*51-5816	*51-5818	51-5821	*52-5903	*52-5905	52-5908	*52-5932
		*52-5954	*52-5956	52-5959	*52-5976	*52-5978	52-5981	*52-6004
		*52-6032	*52-6034	52-6037	*52-6061	*52-6063	52-6066	*53-6127
		*53-6156	*53-6158	53-6161	*54-6211	*54-6213	54-6216	*54-6233
AC1	-%000001	#19-1786	*31-2717	31-2726	*31-2766	31-2776	*32-2897	*32-2903
		*32-2946	32-2960	*33-3184	33-3184	*33-3185	33-3185	*34-3371
AC2	%000002	#19-1787	*33-3186	33-3186	*33-3187	33-3187	*34-3372	*34-3382
AC3	-%000003	#19-1788	*33-3188	33-3188	*33-3189	33-3189	*34-3373	*34-3383
AC4	-%000004	#19-1789	*33-3190	33-3190	*33-3191	33-3191	*34-3374	*34-3384
AC5	%000005	#19-1790	*33-3192	33-3192	*33-3193	33-3193	*34-3375	*34-3385
AC6	=%000006	#19-1791	35-3507					34-3400
AC7	-%000007	#19-1792	35-3477					
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ADDW8	= 000000	20-1795	20-1795					
ADDW9	= 000000	20-1795	20-1795					
ADEVCT	= 000000	20-1795	20-1795					
ADEVVM	= 000000	20-1795	20-1795					
ADONE	= 005046	25-1886	25-1890	25-1898	25-1906	25-1919	25-1932	#25-1938
AENV	= 000000	20-1795	20-1795					
AENVVM	= 000000	20-1795	20-1795					
AERFLG	= 004736	*25-1836	*25-1867	25-1873	25-1885	#25-1900	75-7167	

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

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

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

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

SYMBOL CROSS REFERENCE		REFERENCES								
SYMBOL	VALUE	36-3665	37-3764	39-3987	40-4089	40-4092	41-4229	41-4232	42-4341	43-4473
		#68-6457	70-6488							
CPTWO	042604	25-1859	25-1913	#69-6466	70-6489					
CR	= 000015	#19-1783	59-6277	59-6277						
RLF	= 000200	#19-1782	#19-1783	24-1812	24-1812	24-1813	24-1814	33-3325	33-3325	56-6271
		56-6271	56-6271	56-6271	59-6277	59-6277	71-6496	71-6496	71-6500	71-6501
		71-6502	71-6503	71-6505	71-6507	71-6509	71-6510	71-6512	71-6514	71-6515
		71-6530	71-6561	71-6562	71-6563	71-6564	71-6565	71-6566	72-6590	72-6593
		72-6596	72-6597	72-6601	72-6604	72-6611	72-6612	72-6617	72-6620	72-6623
		72-6625	72-6627	72-6629	72-6631	72-6637	72-6638	72-6660	72-6660	72-6660
		72-6663	72-6663	72-6663	72-6665	72-6665	72-6665	72-6668	72-6668	72-6669
		72-6672	72-6672	72-6673	72-6676	72-6700	72-6700	72-6700	72-6701	72-6703
		72-6705	72-6705	72-6705	72-6706	72-6708	72-6710	72-6711	72-6714	72-6715
		72-6733	72-6735	72-6739	72-6740	72-6742	72-6744	72-6746	72-6747	72-6749
		72-6751	72-6752	72-6755	72-6755	72-6757	72-6759	72-6820	72-6820	72-6820
		72-6821	72-6821	72-6821	72-6822	72-6822	72-6822	72-6823	72-6823	72-6823
		72-6824	72-6824	72-6825	72-6825	72-6830	72-6831	72-6831	72-6832	72-6833
		72-6833	72-6834	72-6834	72-6835	72-6835	72-6836	72-6836	72-6837	72-6837
		72-6838	72-6840	72-6841	72-6842	72-6843	72-6844	72-6848	73-6853	73-6880
		73-6884	73-6921	73-6944	73-6946	73-6946	73-6951	73-6951	73-6952	73-6968
		73-6984								
C1	005174	27-1992	#27-1994							
C15	005222	27-1999	#27-2001							
C2	005246	27-2009	#27-2010							
C25	005262	27-2013	#27-2014							
C3	005310	27-2022	#27-2023							
C35	005340	27-2028	#27-2029							
C4	005366	27-2037	#27-2038							
C45	005400	27-2040	#27-2042							
C5	005426	27-2050	#27-2051							
C55	005454	27-2056	#27-2058							
C6	005500	27-2066	#27-2067							
C65	005514	27-2069	#27-2071							
C7	005542	27-2079	#27-2080							
C75	005572	27-2084	#27-2086							
C8	005620	27-2094	#27-2095							
C85	005632	27-2097	#27-2099							
DDDATO	034556	52-5907	52-5913	52-5936	52-5958	52-5980	52-5986	52-6008	52-6014	52-6036
		52-6042	52-6065	52-6071	52-6089	52-6090	52-6091	52-6092	52-6093	52-6094
		52-6095	52-6096	52-6097	52-6098	52-6099	52-6100	#52-6101		
DDDONE	034706	52-6084	52-6088	52-6089	52-6090	52-6091	52-6092	52-6093	52-6094	52-6095
		52-6096	52-6097	52-6098	52-6099	52-6100	#52-6112			
DDERO	033770	52-5925	52-5947	52-5969	52-5997	52-6025	52-6054	52-6083	#52-6085	
DDER1	034006	52-5918	#52-6089							
DDER10	034424	52-6049	#52-6098							
DDER11	034462	52-6076	#52-6099							
DDER12	034520	52-6078	#52-6100							
DDER2	034044	52-5920	#52-6090							
DDER3	034102	52-5942	#52-6091							
DDER4	034140	52-5964	#52-6092							
DDER5	034176	52-5991	#52-6093							
DDER6	034234	52-5993	#52-6094							

CROSS REFERENCE

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

SYMBOL	CROSS REFERENCE VALUE	REFERENCES							
DD6	032776	52-5912	#52-5921						
DD7	033014	52-5924	#52-5927						
DD8	033050	52-5930	#52-5934						
DEAR1	006246	28-2199	#28-2227						
DEAR2	006342	28-2198	#28-2255						
DF1	071236	21-1802	#74-7023						
DF10	= 071266	21-1802	#74-7030						
DF100	= 072063	21-1802	#74-7086						
DF101	= 072110	21-1802	#74-7087						
DF102	= 072132	21-1802	#74-7088						
DF103	= 072110	21-1802	#74-7089						
DF104	= 072063	21-1802	#74-7090						
DF105	= 072110	21-1802	#74-7091						
DF106	= 072132	21-1802	#74-7092						
DF107	= 072110	21-1802	#74-7093						
DF11	= 071266	21-1802	#74-7031						
DF110	= 072063	21-1802	#74-7094						
DF111	= 072141	21-1802	#74-7095	74-7096	74-7097	74-7098	74-7099	74-7100	74-7108
DF112	= 072141	21-1802	#74-7096						
DF113	= 072141	21-1802	#74-7097						
DF114	= 072141	21-1802	#74-7098						
DF115	= 072141	21-1802	#74-7099						
DF116	= 072141	21-1802	#74-7100						
DF117	= 071256	21-1802	#74-7101						
DF12	= 071302	21-1802	#74-7032						
DF120	= 071256	21-1802	#74-7102						
DF121	= 071775	21-1802	#74-7103						
DF122	= 072012	21-1802	#74-7104						
DF123	= 072036	21-1802	#74-7105						
DF124	= 072145	21-1802	#74-7106	74-7107					
DF125	= 072145	21-1802	#74-7107						
DF126	= 072141	21-1802	#74-7108						
DF127	= 072141	21-1802	#74-7109						
DF13	= 071334	21-1802	#74-7033						
DF130	= 071256	21-1802	#74-7110						
DF131	= 072176	21-1802	#74-7111	74-7112					
DF132	= 072176	21-1802	#74-7112						
DF133	= 072216	21-1802	#74-7113	74-7114	74-7115	74-7116	74-7121	74-7122	74-7125
				74-7128	74-7132	74-7133	74-7134	74-7136	74-7140
				74-7148	74-7150	74-7151	74-7152	74-7153	74-7154
				74-7156	74-7157	74-7158			
				74-7162					
DF134	= 072216	21-1802	#74-7114						
DF135	= 072216	21-1802	#74-7115						
DF136	= 072216	21-1802	#74-7116						
DF137	= 072242	21-1802	#74-7117	74-7118	74-7119	74-7120	74-7123	74-7124	74-7127
DF14	= 071266	21-1802	#74-7034						
DF140	= 072242	21-1802	#74-7118						
DF141	= 072242	21-1802	#74-7119						
DF142	= 072242	21-1802	#74-7120						
DF143	= 072216	21-1802	#74-7121						
DF144	= 072216	21-1802	#74-7122						
DF145	= 072242	21-1802	#74-7123						

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES								
DF 146	-	072242	21-1802	#74-7124							
DF 147	=	072216	21-1802	#74-7125							
DF 15	=	071266	21-1802	#74-7035							
DF 150	=	072216	21-1802	#74-7126							
DF 151	=	072242	21-1802	#74-7127							
DF 152	=	072216	21-1802	#74-7128							
DF 153	=	072242	21-1802	#74-7129							
DF 154	=	072252	21-1802	#74-7130	74-7131						
DF 155	=	072252	21-1802	#74-7131							
DF 156	=	072216	21-1802	#74-7132							
DF 157	=	072216	21-1802	#74-7133							
DF 16	=	071350	21-1802	#74-7036							
DF 160	=	072216	21-1802	#74-7134							
DF 161	=	072256	21-1802	#74-7135	74-7137	74-7142	74-7143	74-7146	74-7147		
DF 162	=	072216	21-1802	#74-7136							
DF 163	=	072256	21-1802	#74-7137							
DF 164	=	071256	21-1802	#74-7138							
DF 165	=	071256	21-1802	#74-7139							
DF 166	=	072216	21-1802	#74-7140							
DF 167	=	072216	21-1802	#74-7141							
DF 17	=	071256	21-1802	#74-7037							
DF 170	=	072256	21-1802	#74-7142							
DF 171	=	072256	21-1802	#74-7143							
DF 172	=	072216	21-1802	#74-7144							
DF 173	=	072216	21-1802	#74-7145							
DF 174	=	072256	21-1802	#74-7146							
DF 175	=	072256	21-1802	#74-7147							
DF 176	=	072216	21-1802	#74-7148							
DF 177	=	072302	21-1802	#74-7149							
DF 2	=	071246	21-1802	#74-7024							
DF 20	=	071357	21-1802	#74-7038							
DF 200	-	072216	21-1802	#74-7150							
DF 201	=	072216	21-1802	#74-7151							
DF 202	=	072216	21-1802	#74-7152							
DF 203	=	072216	21-1802	#74-7153							
DF 204	=	072216	21-1802	#74-7154							
DF 205	-	071256	21-1802	#74-7155							
DF 206	-	072216	21-1802	#74-7156							
DF 207	-	072216	21-1802	#74-7157							
DF 21	=	071367	21-1802	#74-7039	74-7077	74-7082					
DF 210	=	072216	21-1802	#74-7158							
DF 211	=	072305	21-1802	#74-7159	74-7160	74-7161					
DF 212	-	072305	21-1802	#74-7160							
DF 213	-	072305	21-1802	#74-7161							
DF 214	=	072216	21-1802	#74-7162							
DF 22	=	071373	21-1802	#74-7040							
DF 23	=	071405	21-1802	#74-7041							
DF 24	=	071415	21-1802	#74-7042							
DF 25	=	071424	21-1802	#74-7043							
DF 26	=	071450	21-1802	#74-7044	74-7047						
DF 27	=	071475	21-1802	#74-7045	74-7048						
DF 3	=	071256	21-1802	#74-7025	74-7026	74-7037	74-7101	74-7102	74-7110	74-7138	74-7139

SYMBOL CROSS REFERENCE
SYMBOL VALUE

REFERENCES

SYMBOL	CROSS REFERENCE VALUE	REFERENCES	REF	V01
DF30	= 071515	74-7155		
DF31	= 071450	21-1802 #74-7046		
DF32	= 071475	21-1802 #74-7047		
DF33	= 071531	21-1802 #74-7048		
DF34	= 071557	21-1802 #74-7049		
DF35	= 071557	21-1802 #74-7050	74-7051	74-7052 74-7053
DF36	= 071557	21-1802 #74-7051		
DF37	= 071557	21-1802 #74-7052		
DF4	= 071256	21-1802 #74-7053		
DF40	= 071603	21-1802 #74-7026		
DF41	= 071631	21-1802 #74-7054		
DF42	= 071645	21-1802 #74-7055		
DF43	= 071645	21-1802 #74-7056	74-7057	
DF44	= 071673	21-1802 #74-7057		
DF45	= 071716	21-1802 #74-7058		
DF46	= 071743	21-1802 #74-7059		
DF47	= 071775	21-1802 #74-7060		
DF5	= 071266	21-1802 #74-7061	74-7064 74-7067 74-7103	
DF50	= 072012	21-1802 #74-7027	74-7028 74-7029 74-7030	74-7031
DF51	= 072036	21-1802 #74-7062	74-7104	
DF52	= 071775	21-1802 #74-7063	74-7105	
DF53	= 072054	21-1802 #74-7064		
DF54	= 072063	21-1802 #74-7065	74-7068 74-7070	
		21-1802 #74-7066	74-7069 74-7071	74-7072 74-7073 74-7076 74-7081 74-7086
		74-7090 74-7094		
DF55	= 071775	21-1802 #74-7067		
DF56	= 072054	21-1802 #74-7068		
DF57	= 072063	21-1802 #74-7069		
DF6	= 071266	21-1802 #74-7028	74-7034 74-7035	
DF60	= 072054	21-1802 #74-7070		
DF61	= 072063	21-1802 #74-7071		
DF62	= 072063	21-1802 #74-7072		
DF63	= 072063	21-1802 #74-7073		
DF64	= 072101	21-1802 #74-7074	74-7075	
DF65	= 072101	21-1802 #74-7075		
DF66	= 072063	21-1802 #74-7076		
DF67	= 071367	21-1802 #74-7077		
DF7	= 071266	21-1802 #74-7029		
DF70	= 072110	21-1802 #74-7078	74-7079 74-7083 74-7084 74-7087 74-7089 74-7091 74-7093	
DF71	= 072110	21-1802 #74-7079		
DF72	= 072132	21-1802 #74-7080	74-7085 74-7088 74-7092	
DF73	= 072063	21-1802 #74-7081		
DF74	= 071367	21-1802 #74-7082		
DF75	= 072110	21-1802 #74-7083		
DF76	= 072110	21-1802 #74-7084		
DF77	= 072132	21-1802 #74-7085		
DH1	= 065631	21-1802 #73-6855		
DH10	= 066201	21-1802 #73-6866		
DH100	= 067503	21-1802 #73-6934		
DH101	= 066201	21-1802 #73-6935		
DH102	= 067073	21-1802 #73-6936		
DH103	= 067031	21-1802 #73-6937		

SYMBOL CROSS REFERENCE		REFERENCES								
SYMBOL	VALUE									
DH162	= 067503	21-1802	#73-6995							
DH163	= 067503	21-1802	#73-6996							
DH164	= 066321	21-1802	#73-6997							
DH165	= 066321	21-1802	#73-6998							
DH166	= 067503	21-1802	#73-6999							
DH167	= 067503	21-1802	#73-7000							
DH17	= 066321	21-1802	#73-6874	73-6955	73-6961	73-6962	73-6997	73-6998	73-7014	
DH170	= 067503	21-1802	#73-7001							
DH171	= 067503	21-1802	#73-7002							
DH172	= 067503	21-1802	#73-7003							
DH173	= 067503	21-1802	#73-7004							
DH174	= 067503	21-1802	#73-7005							
DH175	= 067503	21-1802	#73-7006							
DH176	= 067503	21-1802	#73-7007							
DH177	= 071125	21-1802	#73-7008							
DH2	= 065721	21-1802	#73-6857							
DH20	= 066411	21-1802	#73-6876							
DH200	= 067503	21-1802	#73-7009							
DH201	= 067503	21-1802	#73-7010							
DH202	= 067503	21-1802	#73-7011							
DH203	= 067503	21-1802	#73-7012							
DH204	= 067503	21-1802	#73-7013							
DH205	= 066321	21-1802	#73-7014							
DH206	= 067503	21-1802	#73-7015							
DH207	= 067503	21-1802	#73-7016							
DH21	= 066201	21-1802	#73-6878							
DH210	= 067503	21-1802	#73-7017							
DH211	= 071171	21-1802	#73-7018							
DH212	= 066201	21-1802	#73-7019							
DH213	= 066201	21-1802	#73-7020							
DH214	= 067503	21-1802	#73-7021							
DH22	= 066477	21-1802	#73-6879							
DH23	= 066534	21-1802	#73-6880							
DH24	= 066672	21-1802	#73-6883							
DH25	= 067031	21-1802	#73-6885	73-6927	73-6932	73-6937	73-6941	73-6943	73-6948	
DH26	= 067073	21-1802	#73-6886	73-6888	73-6890	73-6891	73-6911	73-6914	73-6916	73-6928
			73-6933	73-6936	73-6940					
DH27	= 067073	21-1802	#73-6888							
DH3	= 066014	21-1802	#73-6859	75-7190	75-7220					
DH30	= 000000	21-1802	#73-6889							
DH31	= 067073	21-1802	#73-6890							
DH32	= 067073	21-1802	#73-6891							
DH33	= 067161	21-1802	#73-6892	73-6894	73-6895	73-6896	73-6897	73-6898		
DH34	= 067161	21-1802	#73-6894							
DH35	= 067161	21-1802	#73-6895							
DH36	= 067161	21-1802	#73-6896							
DH37	= 067161	21-1802	#73-6897							
DH4	= 066105	21-1802	#73-6861							
DH40	= 067161	21-1802	#73-6898							
DH41	= 000000	21-1802	#73-6899							
DH42	= 067264	21-1802	#73-6900	73-6902						
DH43	= 067264	21-1802	#73-6902							

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

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

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01						
DT46		073552	21-1802 #75-7232								
DT47		073640	21-1802 #75-7236	75-7241	75-7246	75-7284					
DT5		072402	21-1802 #75-7171								
D'50	=	073244	21-1802 #75-7238								
DT51		073672	21-1802 #75-7239	75-7286							
D'52	-	073640	21-1802 #75-7241								
DT53		073730	21-1802 #75-7242	75-7247	75-7249						
DT54		073750	21-1802 #75-7244	75-7248	75-7250	75-7251	75-7252	75-7256	75-7262	75-7267	
			75-7271 75-7275								
DT55	=	073640	21-1802 #75-7246								
DT56	=	073730	21-1802 #75-7247								
DT57	=	073750	21-1802 #75-7248								
DT6		072434	21-1802 #75-7173	75-7174	75-7175	75-7176	75-7183	75-7184			
DT60	=	073730	21-1802 #75-7249								
DT61	=	073750	21-1802 #75-7250								
DT62	=	073750	21-1802 #75-7251								
DT63	=	073750	21-1802 #75-7252								
DT64		074006	21-1802 #75-7253	75-7255							
DT65	=	074006	21-1802 #75-7255								
DT66	=	073750	21-1802 #75-7256								
DT67	=	072640	21-1802 #75-7257								
DT7	=	072434	21-1802 #75-7174								
DT70		074026	21-1802 #75-7258	75-7260	75-7264	75-7265	75-7268	75-7270	75-7272	75-7274	
DT71	=	074026	21-1802 #75-7260	75-7269							
DT72		074074	21-1802 #75-7261	75-7266	75-7273						
DT73	=	073750	21-1802 #75-7262								
DT74	=	072640	21-1802 #75-7263								
DT75	=	074026	21-1802 #75-7264								
DT76	=	074026	21-1802 #75-7265								
DT77	=	074074	21-1802 #75-7266								
D1		006152	28-2196 #28-2201	28-2219	28-2225						
D10		006354	28-2256 #28-2259								
D2		006176	*28-2204 28-2206	#28-2207							
D3		006200	#28-2208 28-2227								
D4		006204	#28-2210								
D5		006216	#28-2216 28-2247	28-2253	28-2263						
D6		006232	28-2217 #28-2221								
D7		006242	28-2222 #28-2224								
D8		006312	#28-2241 28-2250	28-2255							
D9		006324	28-2246 #28-2249								
EDONE		006532	29-2293 29-2299	29-2305	#29-2318						
EEDATO		035410	53-6131 53-6137	53-6160	53-6166	53-6184	53-6185	53-6186	53-6187	#53-6188	
EEDONE		035472	53-6179 53-6183	53-6184	53-6185	53-6186	53-6187	#53-6194			
EEERO		035202	53-6149 53-6178	#53-6180							
EEER1		035220	53-6142 #53-6184								
EEER2		035256	53-6144 #53-6185								
EEER3		035314	53-6171 #53-6186								
EEER4		035352	53-6173 #53-6187								
EEO		035420	53-6133 53-6162	53-6184	53-6185	53-6186	53-6187	#53-6189			
EOP1		035432	53-6126 53-6128	53-6184	53-6184	53-6185	53-6185	#53-6190			
EOP2		035442	53-6138 #53-6191								
EOP3		035452	53-6155 53-6157	53-6186	53-6186	53-6187	53-6187	#53-6192			

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

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01
EM135		057510	21-1802 #72-6805	72-6809	
EM136		057547	21-1802 #72-6806	72-6810	
EM137	=	057412	21-1802 #72-6807		
EM14		045762	21-1802 #72-6588		
EM140	=	057451	21-1802 #72-6808		
EM141	=	057510	21-1802 #72-6809		
EM142	=	057547	21-1802 #72-6810		
EM143		057606	21-1802 #72-6811	72-6813	
EM144		057641	21-1802 #72-6812	72-6814	
EM145	=	057606	21-1802 #72-6813		
EM146	=	057641	21-1802 #72-6814		
EM147		057674	21-1802 #72-6815	72-6816	72-6817
EM15		046105	21-1802 #72-6591		
EM150	=	057674	21-1802 #72-6816		
EM151	=	057674	21-1802 #72-6817		
EM152		057726	21-1802 #72-6818	72-6819	
EM153	=	057726	21-1802 #72-6819		
EM154		057760	21-1802 #72-6820		
EM155		060212	21-1802 #72-6821		
EM156		060445	21-1802 #72-6822		
EM157		060662	21-1802 #72-6823		
EM16		046230	21-1802 #72-6594		
EM160		061101	21-1802 #72-6824		
EM161		061306	21-1802 #72-6825		
EM162		061513	21-1802 #72-6826		
EM163		061560	21-1802 #72-6827		
EM164		061625	21-1802 #72-6828		
EM165		061672	21-1802 #72-6829		
EM166		061737	21-1802 #72-6830		
EM167		062047	21-1802 #72-6831		
EM17		046301	21-1802 #72-6595		
EM170		062306	21-1802 #72-6832		
EM171		062416	21-1802 #72-6833		
EM172		062655	21-1802 #72-6834		
EM173		063114	21-1802 #72-6835		
EM174		063353	21-1802 #72-6836		
EM175		063612	21-1802 #72-6837		
EM176		064051	21-1802 #72-6838		
EM177		064206	21-1802 #72-6839		
EM2		045407	21-1802 #72-6578		
EM20		046534	21-1802 #72-6599		
EM200		064242	21-1802 #72-6840		
EM201		064377	21-1802 #72-6841		
EM202		064534	21-1802 #72-6842		
EM203		064671	21-1802 #72-6843		
EM204		065026	21-1802 #72-6844		
EM205		065163	21-1802 #72-6845		
EM206		065230	21-1802 #72-6846		
EM207		065275	21-1802 #72-6847		
EM21		046712	21-1802 #72-6603		
EM210		065417	21-1802 #72-6849		
EM211	=	045560	21-1802 #72-6850		

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01
EM212	=	045614	21-1802 #72-6851		
EM213	=	045646	21-1802 #72-6852		
EM214		065474	21-1802 #72-6853		
EM22		047043	21-1802 #72-6606	72-6608	72-6609
EM23	=	047043	21-1802 #72-6608		
EM24	=	047043	21-1802 #72-6609		
EM25		047130	21-1802 #72-6610		
EM26		047243	21-1802 #72-6612	72-6614	
EM27	=	047243	21-1802 #72-6614		
EM3		045453	21-1802 #72-6579		
EM30		047311	21-1802 #72-6615		
EM31		047363	21-1802 #72-6617	72-6619	
EM32	=	047363	21-1802 #72-6619		
EM33		047431	21-1802 #72-6620		
EM34		047472	21-1802 #72-6622		
EM35		047574	21-1802 #72-6624		
EM36		047676	21-1802 #72-6626		
EM37		047777	21-1802 #72-6628		
EM4		045520	21-1802 #72-6580		
EM40		050100	21-1802 #72-6630		
EM41		050251	21-1802 #72-6632		
EM42		050306	21-1802 #72-6637		
EM43		050427	21-1802 #72-6638		
EM44		050550	21-1802 #72-6639	72-6640	
EM45	=	050550	21-1802 #72-6640		
EM46		050613	21-1802 #72-6641		
EM47		050671	21-1802 #72-6646		
EM5		045560	21-1802 #72-6581	72-6584	72-6850
EM50		051007	21-1802 #72-6647		
EM51		051105	21-1802 #72-6649		
EM52		051146	21-1802 #72-6659		
EM53		051267	21-1802 #72-6660		
EM54		051464	21-1802 #72-6661		
EM55		051530	21-1802 #72-6662		
EM56		051651	21-1802 #72-6663		
EM57		052046	21-1802 #72-6664		
EM6		045614	21-1802 #72-6582	72-6851	
EM60		052112	21-1802 #72-6665		
EM61		052307	21-1802 #72-6666		
EM62		052353	21-1802 #72-6667		
EM63		052545	21-1802 #72-6671		
EM64		052737	21-1802 #72-6675	72-6677	
EM65	=	052737	21-1802 #72-6677		
EM66		053073	21-1802 #72-6678		
EM67		053136	21-1802 #72-6700		
EM7		045646	21-1802 #72-6583	72-6852	
EM70		053367	21-1802 #72-6701		
EM71		053512	21-1802 #72-6702		
EM72		053614	21-1802 #72-6703		
EM73		053670	21-1802 #72-6704		
EM74		053730	21-1802 #72-6705		
EM75		054161	21-1802 #72-6706		

SYMBOL	CROSS REFERENCE VALUE	REFERENCES		SEQUENCE	CREF	V01					
		30-2549	30-2564	30-2579	30-2587	30-2593	30-2612	30-2622	30-2630	30-2649	
FECMS	043123	#71-6503	75-7172	#30-2697							
FERRO	007144	30-2369	#30-2445								
FERR1	007202	30-2358	#30-2453								
FERR10	007762	30-2424	30-2436	30-2539	30-2570	#30-2581					
FERR11	010016	30-2375	30-2442	#30-2589							
FERR2	007300	30-2362	#30-2476								
FERR20	010036	30-2348	#30-2595								
FERR21	010154	30-2603	#30-2624								
FERR25	010204	30-2387	#30-2632								
FERR26	010322	30-2640	#30-2661								
FERR3	007340	30-2397	#30-2489								
FERR4	007332	30-2401	#30-2486								
FERR5	007436	30-2408	30-2412	30-2416	30-2420	#30-2512					
FERR6	007472	30-2428	#30-2520								
FERR7	007626	30-2432	#30-2551								
FER2	007304	#30-2478	30-2487								
FFDAT0	036000	54-6215	54-6237	54-6255	54-6257	#54-6260					
FFD0NE	036060	54-6248	54-6253	54-6255	54-6257	#54-6266					
FFERO	035670	54-6225	54-6247	#54-6250							
FFER1	035704	54-6243	#54-6255								
FFER2	035742	54-6221	#54-6257								
FFP0	036010	54-6232	54-6255	#54-6261							
FFP1	036020	54-6234	54-6255	#54-6262							
FFP2	036030	54-6210	54-6257	#54-6263							
FFP3	036040	54-6212	54-6257	#54-6264							
FFP4	036050	54-6217	54-6239	54-6255	54-6257	#54-6265					
FF1	035476	#54-6206									
FF10	035656	54-6242	#54-6244								
FF11	035666	54-6246	#54-6248								
FF2	035532	54-6209	#54-6213								
FF3	035554	#54-6219	54-6222								
FF4	035562	54-6220	#54-6222								
FF5	035572	54-6224	#54-6228								
FF6	035626	54-6231	#54-6235								
FF7	035650	#54-6241	54-6244								
FPSMS	043057	#71-6502	75-7172								
FPSPUR	042534	25-1855	28-2229	29-2309	35-3527	35-3546	44-4687	44-4729	49-5350	#67-6444	
		70-6487									
FPVECT	= 000244	#19-1778	*25-1839	*25-1855	*28-2199	*29-2277	*35-3469	*35-3502	*44-4579	*44-4670	
		*49-5254	*51-5689	*70-6487							
FXDAT0	010416	30-2341	30-2365	30-2404	30-2446	30-2447	30-2516	#30-2687			
FXDAT1	010420	#30-2688									
FXDAT2	010422	#30-2689									
FXDAT3	010424	#30-2690									
FXDAT4	010426	30-2585	#30-2691								
FXDAT5	010430	#30-2692									
FXDAT6	010432	#30-2693									
FXDAT7	010434	#30-2694									
F1	006536	#30-2335	30-2335								
F10	006760	30-2378	#30-2391	30-2639							

SYMBOL CROSS REFERENCE

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

SYMBOL	CROSS REFERENCE	REFERENCES	SEQUENCE	CREF	V01					
SYMBOL	VALUE									
GRESET	014346	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3227					
GSETUP	014270	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3207					
GSUM	014500	33-3182	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190
		33-3191	33-3192	33-3193	#33-3262					
GS1	014320	#33-3217	33-3231							
GTSWR	= 104406	24-1812	#64-6287							
G1	012176	33-3182	33-3182	#33-3182	33-3182					
G10	012504	33-3184	#33-3184							
G11	012506	33-3184	#33-3184							
G12	012600	33-3185	33-3185	#33-3185	33-3185					
G13	012632	33-3185	#33-3185							
G14	012634	33-3185	#33-3185							
G15	012726	33-3186	33-3186	#33-3186	33-3186					
G16	012760	33-3186	#33-3186							
G17	012762	33-3186	#33-3186							
G2	012230	33-3182	#33-3182							
G20	013054	33-3187	33-3187	#33-3187	33-3187					
G21	013106	33-3187	#33-3187							
G22	013110	33-3187	#33-3187							
G23	013202	33-3188	33-3188	#33-3188	33-3188					
G24	013234	33-3188	#33-3188							
G25	013236	33-3188	#33-3188							
G26	013330	33-3189	33-3189	#33-3189	33-3189					
G27	013362	33-3189	#33-3189							
G3	012232	33-3182	#33-3182							
G30	013364	33-3189	#33-3189							
G31	013456	33-3190	33-3190	#33-3190	33-3190					
G32	013510	33-3190	#33-3190							
G33	013512	33-3190	#33-3190							
G34	013604	33-3191	33-3191	#33-3191	33-3191					
G35	013636	33-3191	#33-3191							
G36	013640	33-3191	#33-3191							
G37	013732	33-3192	33-3192	#33-3192	33-3192					
G4	012324	33-3183	33-3183	#33-3183	33-3183					
G40	013764	33-3192	#33-3192							
G41	013766	33-3192	#33-3192							
G42	014060	33-3193	33-3193	#33-3193	33-3193					
G43	014112	33-3193	#33-3193							
G44	014114	33-3193	#33-3193							
G5	012356	33-3183	#33-3183							
G6	012360	33-3183	#33-3183							
G7	012452	33-3184	33-3184	#33-3184	33-3184					
HADR	015744	*34-3404	34-3412	#34-3433						
HA1R	016020	34-3396	34-3406	34-3415	#34-3442					
HA1W	015750	34-3362	34-3371	34-3381	34-3405	34-3423	#34-3436			
HA2R	016030	34-3397	#34-3443							
HA2W	015760	34-3372	34-3382	#34-3437						
HA3R	016040	34-3398	#34-3444							
HA3W	015770	34-3373	34-3383	#34-3438						
HA4R	016050	34-3399	#34-3445							

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01
HA4W		016000	34-3374	34-3384	#34-3439
HASR		016060	34-3400	#34-3446	
HASW		016010	34-3375	34-3385	#34-3440
HCLR		015674	34-3368	34-3395	#34-3415
HCLR1		015704	#34-3417	34-3418	
HCMP		015636	34-3379	34-3381	34-3382 34-3383 34-3384 34-3385 #34-3404
HCMP1		015656	#34-3408	34-3411	
HCMP2		015666	34-3409	#34-3411	
HDAT1		016070	34-3363	#34-3448	
HDAT2		016100	#34-3449		
HDAT3		016110	#34-3450		
HDAT4		016120	#34-3451		
HDAT5		016130	#34-3452		
HDONE		016140	34-3389	34-3430	#34-3453
HERROR		015712	34-3410	#34-3422	
HFLAG		015746	*34-3361	34-3387	*34-3391 #34-3434
HSTD		015560	34-3377	34-3381	34-3382 34-3383 34-3384 34-3385 #34-3395
HT	=	000011	#19-1783	59-6277	59-6277
H1		015222	34-3359	#34-3361	
H10		015464	#34-3384	34-3384	
H11		015516	#34-3385	34-3385	
H12		015550	34-3388	#34-3391	
H2		015242	#34-3365	34-3366	
H3		015252	#34-3370	34-3392	
H4		015324	#34-3377		
H5		015346	#34-3381	34-3381	
H6		015400	#34-3382	34-3382	
H7		015432	#34-3383	34-3383	
IBSAVE		037144	#57-6273	*57-6273	*57-6273 57-6273 57-6273 57-6273 57-6273 #31-2871
IDAT10		011300	31-2710	31-2716	31-2734 31-2760 31-2765 31-2794 31-2830
IDAT11		011302	#31-2872		
IDAT12		011304	*31-2791	#31-2873	
IDAT13		011306	*31-2792	#31-2874	
IDAT00		011270	31-2730	31-2733	31-2788 31-2793 31-2831 #31-2866
IDAT01		011272	#31-2867		
IDAT02		011274	31-2739	31-2744	31-2799 #31-2868
IDAT03		011276	31-2802	#31-2869	
IDONE		011310	31-2808	31-2826	31-2833 31-2841 31-2853 #31-2876
IERR0		011050	31-2723	#31-2811	
IERR1		011132	31-2748	31-2801	#31-2829
IERR2		011152	31-2752	#31-2836	
IERR25		011174	#31-2839	31-2845	
IERR3		011224	31-2783	#31-2848	
IERR4		011200	31-2804	#31-2842	
ILLMS		044033	#71-6530	75-7195	
ILL1		043727	#71-6527		
ILL2		043772	#71-6529		
IOTVEC	=	000020	#19-1783	*24-1811	*24-1811
IPAT10		011250	31-2711	31-2759	#31-2856
IPAT11		011252	#31-2857		
IPAT12		011254	31-2799	#31-2858	
IPAT13		011256	31-2802	#31-2859	

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES					
IPAT20		011260	31-2719	31-2768	#31-2861			
IPAT21		011262	#31-2862					
IPAT22		011264	#31-2863					
IPAT23		011266	#31-2864					
I1		010450	31-2706	#31-2708				
I10		010632	31-2742	#31-2751				
I105		010640	31-2737	#31-2754				
I106		010634	31-2750	#31-2752				
I11		010642	#31-2758					
I12		010650	31-2758	#31-2759				
I13		010664	#31-2762	31-2763				
I14		010726	31-2772	#31-2776	31-2849			
I15		010730	#31-2777	31-2815				
I16		010732	#31-2778	31-2817				
I17		010750	31-2782	#31-2785				
I2		010466	#31-2713	31-2714				
I20		011010	#31-2796	31-2806				
I21		011024	#31-2801	31-2803				
I22		011030	31-2800	#31-2802				
I23		011044	31-2797	#31-2806				
I3		010534	31-2724	#31-2726				
I4		010536	#31-2727	31-2811				
I5		010540	#31-2728	31-2813				
I6		010564	#31-2736	31-2754				
I7		010600	#31-2741	31-2751				
JBUF0		017144	36-3641	#36-3690				
JBUF1		017146	#36-3691					
JBUF2		017150	#36-3692					
JBUF3		017152	#36-3693					
JDAT10		017154	36-3630	36-3645	36-3653	36-3677	36-3685	#36-3695
JDAT11		017156	#36-3696					
JDAT12		017160	#36-3697					
JDAT13		017162	#36-3698					
JDAT00		017164	36-3638	36-3646	36-3686	#36-3700		
JDAT0		017174	36-3627	#36-3705				
JDAT01		017166	#36-3701					
JDAT02		017170	#36-3702					
JDAT03		017172	#36-3703					
JDAT1		017176	#36-3706					
JDAT2		017200	#36-3707					
JDAT3		017202	#36-3708					
JDONE		017204	36-3657	36-3672	36-3679	36-3688	#36-3711	
JERRO		017024	36-3632	#36-3661				
JERR1		017072	36-3643	36-3655	#36-3674			
JERR2		017116	36-3650	#36-3683				
J1		016716	36-3622	#36-3624				
J10		017044	36-3662	36-3664	#36-3667			
J2		016742	#36-3634	36-3675	36-3684			
J3		016744	#36-3635	36-3661				
J4		016746	#36-3636	36-3663				
J5		017002	#36-3648	36-3651				
J6		017010	36-3649	#36-3651				

SYMBOL CROSS REFERENCE		REFERENCES			
SYMBOL	VALUE				
J7	017022	36-3654	#36-3657		
KBUF0	017452	37-3729	37-3740	37-3752	#37-3793
KBUF1	017454	#37-3794			
KBUF2	017456	#37-3795			
KBUF3	017460	#37-3796			
KDAT10	017442	37-3744	37-3775	37-3783	#37-3788
KDAT11	017444	#37-3789			
KDAT12	017446	#37-3790			
KDAT13	017450	#37-3791			
KDAT00	017462	37-3737	37-3745	37-3784	#37-3798
KDAT01	017464	#37-3799			
KDAT02	017466	#37-3800			
KDAT03	017470	#37-3801			
KDONE	017502	37-3756	37-3770	37-3777	37-3786 #37-3808
KERR0	017324	37-3731	#37-3760		
KERR1	017370	37-3742	37-3754	#37-3772	
KERR2	017414	37-3749	#37-3781		
KPATO	017472	37-3726	#37-3803		
KPAT1	017474	#37-3804			
KPAT2	017476	#37-3805			
K1	017216	37-3721	#37-3723		
K10	017344	37-3761	37-3763	#37-3766	
K2	017242	#37-3733	37-3773	37-3782	
K3	017244	#37-3734	37-3760		
K4	017246	#37-3735	37-3762		
K5	017302	#37-3747	37-3750		
K6	017310	37-3748	#37-3750		
K7	017322	37-3753	#37-3756		
LDAT10	020006	38-3826	38-3833	38-3852	38-3872 38-3884 #38-3898
LDAT11	020010	#38-3899			
LDAT12	020012	38-3846	*38-3850	38-3866	#38-3900
LDAT13	020014	*38-3851	#38-3901		
LDAT00	020020	38-3843	38-3853	38-3873	38-3878 #38-3902
LDAT01	020022	38-3885	#38-3903		
LDAT02	020024	#38-3904			
LDAT03	020026	#38-3905			
LDONE	020030	38-3861	38-3868	38-3875	38-3887 #38-3907
LD1	043567	#71-6517			
LD2	043617	#71-6518			
LERR1	017642	38-3848	#38-3863		
LERR2	017714	38-3858	#38-3877		
LERR3	017666	#38-3870	38-3881		
LF	= 000012	#19-1783	59-6277	59-6277	
LF1EX1	042745	#71-6500	75-7171	75-7173	
LF1EX2	043015	#71-6501	75-7171	75-7173	
LFPS1	043554	#71-6516			
LOOP	004456	#24-1816	55-6269		
LPAT10	017764	38-3823	#38-3889		
LPAT11	017766	#38-3890			
LPAT12	017770	#38-3891			
LPAT13	017772	#38-3892			
LPAT20	017774	38-3827	38-3877	#38-3894	

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

SYMBOL	CROSS REFERENCE	REFERENCES								
SYMBOL	VALUE									
MS3	044120	#71-6533	75-7198	75-7199	75-7211	75-7212				
MS30	045120	#71-6562	75-7232	75-7234						
MS31	045127	#71-6563	75-7232	75-7234						
MS32	045136	#71-6564	75-7233	75-7235						
MS33	045145	#71-6565	75-7233	75-7235						
MS34	045154	#71-6566	75-7233	75-7235						
MS35	045163	31-2725	32-2902	#71-6567						
MS36	045170	31-2773	32-2944	#71-6568						
MS37	045177	#71-6569	75-7289	75-7294						
MS4	044147	#71-6534	75-7198	75-7199	75-7211	75-7212				
MS40	045215	#71-6570	75-7295							
MS41	045251	#71-6572	75-7297							
MS415	045231	#71-6571	75-7295							
MS42	045275	#71-6573	75-7298							
MS43	045313	#71-6574	75-7298							
MS44	045330	#71-6575	75-7299							
MS5	044161	#71-6535								
MS6	044223	#71-6536	75-7201	75-7214	75-7224	75-7258	75-7288			
MS7	044241	#71-6537	75-7201	75-7202	75-7204	75-7214	75-7215	75-7224	75-7225	75-7236
		75-7258	75-7259	75-7288	75-7289					
M1	020034	#39-3919								
M15	020054	#39-3928	39-3962	39-3974	39-3979	39-3991				
M2	020060	#39-3931	39-3968	39-3990						
M3	020062	#39-3932								
M4	020064	#39-3933								
M5	020120	39-3946	#39-3948							
M6	020124	#39-3949	39-3951							
M7	020134	39-3950	#39-3954							
M8	020144	#39-3956	39-3959							
M9	020154	39-3957	#39-3959							
NDAT10	021056	40-4072	40-4129	40-4137	#40-4146					
NDAT11	021060	#40-4147								
NDAT12	021062	#40-4148								
NDAT13	021064	#40-4149								
NDAT00	021014	40-4037	40-4054	40-4061	40-4071	40-4128	#40-4133			
NDAT01	021016	#40-4134								
NDAT02	021020	#40-4135								
NDAT03	021022	#40-4136								
NDONE	021066	40-4077	40-4098	40-4106	40-4112	40-4124	40-4131	#40-4151		
NERRO	020556	40-4030	#40-4085							
NERR1	020656	40-4045	#40-4107							
NERR10	020610	40-4086	#40-4094							
NERR11	020622	40-4091	#40-4100							
NERR2	020712	40-4049	#40-4113							
NERR20	020664	#40-4108	40-4114	40-4116	40-4118					
NERR3	020722	40-4059	#40-4115							
NERR4	020732	40-4067	#40-4117							
NERR5	020742	40-4069	#40-4120							
NERR6	020766	40-4079	#40-4126							
NOOP1	043141	#71-6505	75-7177	75-7181						
NOOP10	043417	#71-6513	75-7179	75-7181						
NOOP11	043510	#71-6515	75-7181							

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
OPAT13		021560	#41-4286
OPAT20		021536	41-4181 41-4262 #41-4278
OPAT21		021540	41-4168 41-4184 41-4188 41-4192 41-4202 41-4230 #41-4279
OPAT22		021542	#41-4280
OPAT23		021544	#41-4281
OPAT24		021546	#41-4282
01		021072	#41-4162
010		021222	#41-4204 41-4206
011		021232	41-4205 #41-4209
012		021234	41-4182 #41-4211
013		021250	#41-4214 41-4216
014		021260	41-4215 #41-4219
02		021116	#41-4174 41-4251 41-4268
03		021120	#41-4175 41-4227
04		021122	#41-4176 41-4225 41-4263
05		021140	#41-4184
06		021150	41-4185 #41-4188
07		021160	41-4189 #41-4192
08		021174	#41-4196 41-4198
09		021206	41-4197 #41-4201
PDATIO		022226	42-4311 42-4319 42-4324 42-4345 42-4349 42-4353 42-4357 42-4361 42-4379
			42-4385 #42-4403
PDATI1		022230	#42-4404
PDATI2		022232	#42-4405
PDATI3		022234	#42-4406
PDAT00		022236	42-4316 42-4320 42-4329 42-4326 #42-4408
PDAT01		022240	#42-4409
PDAT02		022242	#42-4410
PDAT03		022244	#42-4411
PDONE		022246	42-4327 42-4371 42-4381 42-4388 42-4396 #42-4413
PERR0		021714	42-4309 #42-4337
PERR1		022134	42-4333 #42-4383
PERR10		021734	42-4340 #42-4343
PERR11		021744	42-4338 #42-4345
PERR12		021762	42-4346 #42-4349
PERR13		022000	42-4350 #42-4353
PERR14		022016	42-4354 #42-4357
PERR15		022034	42-4358 #42-4361
PERR16		022044	42-4362 #42-4364
PERR17		022052	42-4344 42-4348 42-4352 42-4356 42-4360 #42-4366
PERR2		022162	42-4335 #42-4390
PERR20		022100	42-4363 #42-4373
PERR21		022110	42-4326 #42-4376
PERR22		022116	42-4375 #42-4377
PFECAD		042506	66-6427 #66-6431
PFECDH		042456	66-6427 #66-6429
PFECEN		042422	66-6427 #66-6428
PFECFT		042516	66-6427 #66-6432
PFECWS		042412	#66-6427
PIRQ	=	177772	#19-1783
PIRQVE	=	000240	#19-1783
POWERM		042672	65-6291 #71-6496

SYMBOL CROSS REFERENCE		REFERENCES							
SYMBOL	VALUE								
PPAT10	022216	42-4306 #42-4398							
PPAT11	022220	#42-4399							
PPAT12	022222	#42-4400							
PPAT13	022224	#42-4401							
PROG NU	= 000001	#19-816 24-1812							
PRO	= 000000	#19-1783							
PR1	= 000040	#19-1783							
PR2	= 000100	#19-1783							
PR3	= 000140	#19-1783							
PR4	= 000200	#19-1783							
PR5	= 000240	#19-1783							
PR6	= 000300	#19-1783							
PR7	= 000340	#19-1783							
PS	= 177776	#19-1783 19-1783							
PSW	= 177776	#19-1783 26-1956							
PWRVEC	= 000024	#19-1783 *24-1811 *24-1811 *65-6291 *65-6291 *65-6291 *65-6291 *65-6291 *65-6291							
P1	021576	#42-4303							
P2	021620	#42-4313 42-4314 42-4376 42-4384 42-4391							
P3	= 021622	#42-4314 42-4337 43-4472							
P4	021624	#42-4316 42-4339							
P5	021646	#42-4321 42-4323							
P6	021670	42-4322 #42-4329							
P7	021700	#42-4331 42-4334							
P8	021710	42-4332 #42-4334							
QDAT10	022736	43-4444 43-4527 43-4537 #43-4547							
QDAT11	022740	#43-4548							
QDAT12	022742	#43-4549							
QDAT13	022744	#43-4550							
QDAT00	022726	43-4439 43-4443 43-4454 43-4462 43-4528 #43-4542							
QDAT01	022730	#43-4543							
QDAT02	022732	#43-4544							
QDAT03	022734	#43-4545							
QDONE	022746	43-4452 43-4503 43-4513 43-4523 43-4530 #43-4552							
QERRO	022414	43-4430 #43-4472							
QERR1	022660	43-4466 #43-4525							
QERR11	022424	#43-4475							
QERR12	022442	43-4476 #43-4479							
QERR13	022460	43-4480 #43-4483							
QERR14	022476	43-4484 #43-4487							
QERR15	022514	43-4488 #43-4492							
QERR16	022524	43-4493 #43-4496							
QERR17	022532	43-4478 43-4482 43-4486 43-4490 #43-4498							
QERR2	022614	43-4459 #43-4515							
QERR20	022560	43-4494 #43-4505							
QERR21	022570	43-4451 #43-4508							
QERR22	022576	43-4507 #43-4509							
QERR3	022624	43-4468 #43-4517							
QERR4	022632	43-4516 #43-4519							
QPAT10	022706	43-4427 #43-4532							
QPAT11	022710	#43-4553							
QPAT12	022712	#43-4534							
QPAT13	022714	#43-4535							

SYMBOL	CROSS REFERENCE	REFERENCES								
SYMBOL	VALUE									
QPAT20	022716	43-4434	43-4449	43-4461	43-4475	43-4479	43-4483	43-4487	43-4492	43-4511
		#43-4537								
QPAT21	022720	#43-4538								
QPAT22	022722	#43-4539								
QPAT23	022724	#43-4540								
Q1	022252	#43-4424								
Q10	022410	43-4465	#43-4467							
Q2	022274	#43-4436	43-4437	43-4508	43-4521	43-4526				
Q3	= 022276	#43-4437								
Q4	022300	#43-4439								
Q5	022322	#43-4445	43-4447							
Q6	022344	43-4446	#43-4454							
Q7	022354	#43-4456	43-4458							
Q8	022366	43-4457	#43-4461							
Q9	022402	#43-4464	43-4467							
RDCHR	= 104410	#64-6287								
RESREG	= 104412	#64-6287								
RESVEC	= 000010	#19-1783	*24-1811	24-1811	*24-1811					
RSETUP	= 104413	25-1938	26-1981	27-2173	28-2265	29-2318	30-2697	31-2876	32-3044	33-3351
		34-3453	35-3613	36-3711	37-3808	38-3907	39-4011	40-4151	41-4293	42-4413
		43-4552	45-4915	46-5065	47-5161	48-5240	49-5415	50-5672	51-5834	51-5839
		51-5888	52-6112	53-6194	#64-6288	67-6451	68-6460	69-6469		
R6	=%000006	#19-1783	*24-1811	*24-1811	24-1811					
R7	=%000007	#19-1783								
SADR	016660	*35-3529	35-3542	*35-3547	35-3554	35-3560	#35-3601			
SAVREG	= 104411	#64-6287								
SCOPE	= 000004	#19-1783	25-1835	26-1946	27-1991	28-2195	29-2275	30-2333	31-2705	32-2884
		33-3180	34-3358	35-3463	36-3621	37-3720	38-3817	39-3917	40-4020	41-4160
		42-4301	43-4422	44-4570	45-4782	46-4924	47-5074	48-5170	49-5250	50-5426
		51-5684	52-5896	53-6120	54-6204	55-6269				
		35-3482	35-3485	35-3512	35-3515	#35-3608				
SDATO0	016674	#35-3609								
SDATO1	016676	#35-3610								
SDATO2	016700	#35-3611								
SDATO3	016702	#35-3611								
SDONE	016704	35-3547	35-3566	35-3569	35-3573	35-3576	35-3588	35-3599	#35-3613	
SERRO	016364	35-3469	#35-3525							
SERR1	016574	35-3474	#35-3579							
SERR10	016404	#35-3531	35-3548							
SERR15	016464	35-3536	#35-3551							
SERR2	016524	35-3490	#35-3564							
SERR20	016504	35-3541	#35-3557							
SERR3	016550	35-3493	#35-3571							
SERR4	016442	35-3502	#35-3544							
SERR5	016626	35-3504	#35-3590							
SERR6	016536	35-3520	#35-3567							
SERR7	016562	35-3522	#35-3574							
SETD1	043705	27-2024	27-2122	#71-6524						
SETF1	043677	27-1995	27-2146	#71-6523						
SETI1	043713	27-2052	27-2152	#71-6525						
SETL1	043721	27-2081	27-2128	#71-6526						
SPACE	042742	66-6436	#71-6499							
SPAT10	016664	35-3466	35-3486	35-3499	35-3516	#35-3603				

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

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

SYMBOL CROSS REFERENCE		REFERENCES							
SYMBOL	VALUE								
UERR0	023554	44-4579	#44-4685						
UERR1	023600	44-4599	44-4656	#44-4695					
UERR10	023606	#44-4697	44-4711						
UERR11	023650	#44-4706							
UERR2	023664	44-4620	44-4638	#44-4710					
UERR20	023672	44-4696	#44-4712						
UERR21	023734	#44-4721							
UERR3	023750	44-4670	#44-4727						
UERR4	024000	44-4734	#44-4736						
UFLAG	024074	*44-4571	44-4657	*44-4664	#44-4766				
UPAT00	024024	44-4572	44-4583	44-4605	44-4624	44-4642	44-4660	44-4673	#44-4741
UPAT01	024026	#44-4742							
UPAT02	024030	#44-4743							
UPAT03	024032	#44-4744							
UPAT10	024034	44-4589	#44-4746						
UPAT11	024036	#44-4747							
UPAT12	024040	#44-4748							
UPAT13	024042	#44-4749							
UPAT20	024044	44-4611	#44-4751						
UPAT21	024046	#44-4752							
UPAT22	024050	#44-4753							
UPAT23	024052	#44-4754							
UPAT30	024054	44-4629	#44-4756						
UPAT31	024056	#44-4757							
UPAT32	024060	#44-4758							
UPAT33	024062	#44-4759							
UPAT40	024064	44-4647	44-4675	#44-4761					
UPAT41	024066	#44-4762							
UPAT42	024070	#44-4763							
UPAT43	024072	#44-4764							
UROM1	024102	*44-4585	*44-4607	*44-4626	*44-4644	44-4712	#44-4769		
UROM2	024104	*44-4586	*44-4608	*44-4627	*44-4645	44-4713	#44-4770		
UROM3	024106	*44-4587	*44-4609	*44-4628	*44-4646	44-4698	#44-4771		
UTMP1	024076	*44-4577	44-4585	44-4644	*44-4665	#44-4767			
UTMP2	024100	*44-4578	44-4607	44-4626	*44-4666	#44-4768			
U0	022766	#44-4574	44-4575						
U1	023016	#44-4580	44-4667						
U10	023374	#44-4648	44-4651						
U11	023376	#44-4649	44-4685						
U12	023430	44-4655	#44-4657						
U13	023446	#44-4662	44-4663						
U14	023500	44-4658	#44-4668						
U15	023534	#44-4676	44-4679	44-4736					
U16	023536	#44-4677	44-4727						
U2	023066	#44-4590	44-4592						
U3	023120	44-4598	#44-4601						
U4	023170	#44-4613	44-4615						
U5	023222	44-4619	#44-4621						
U6	023272	#44-4631	44-4633						
U7	023324	44-4637	#44-4639						
WDAPO0	024674	#45-4910							
WDAPO1	024676	#45-4911							

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

SYMBOL	CROSS REFERENCE VALUE	REFERENCES					
X12	025166	46-4977	#46-4979				
X13	025212	#46-4986	46-4989				
X14	025220	46-4987	#46-4989				
X15	025234	46-4992	#46-4994				
X16	025274	46-5000	#46-5002				
X17	025320	#46-5009	46-5012				
X2	024750	46-4931	#46-4933				
X20	025326	46-5010	#46-5012				
X21	025342	46-5015	#46-5017				
X3	024774	#46-4940	46-4943				
X4	025002	46-4941	#46-4943				
X5	025020	46-4946	#46-4948				
X6	025060	46-4954	#46-4956				
X7	025104	#46-4963	46-4966				
YDAT00	026070	47-5088	47-5108	47-5117	47-5125	#47-5141	
YDAT01	026072	#47-5142					
YDAT02	026074	#47-5143					
YDAT03	026076	#47-5144					
YDONE	026130	47-5105	47-5120	47-5128	47-5134	#47-5161	
YERR1	025730	47-5110	#47-5113				
YERR2	025772	47-5112	#47-5121				
YERR3	026034	47-5097	#47-5129				
YFLAG	026060	*47-5075	47-5098	*47-5100	#47-5136		
YPAT00	026100	47-5076	47-5102	#47-5146			
YPAT01	026102	#47-5147					
YPAT02	026104	#47-5148					
YPAT03	026106	#47-5149					
YPAT10	026110	47-5077	47-5101	#47-5151			
YPAT11	026112	#47-5152					
YPAT12	026114	#47-5153					
YPAT13	026116	#47-5154					
YPAT20	026120	47-5082	47-5116	47-5124	#47-5156		
YPAT21	026122	#47-5157					
YPAT22	026124	#47-5158					
YPAT23	026126	#47-5159					
YTMP1	026062	*47-5076	47-5084	*47-5101	47-5107	47-5115	47-5123 #47-5137
YTMP2	026064	*47-5077	47-5091	*47-5102	47-5118	47-5126	#47-5138
YTMP3	026066	*47-5078	47-5095	*47-5103	47-5132	#47-5139	
Y1	025552	#47-5079	47-5104				
Y2	025600	#47-5085	47-5114	47-5122	47-5130		
Y3	025624	#47-5092	47-5094				
Y4	025642	47-5096	#47-5098				
Y5	025702	47-5099	#47-5105				
Y6	025704	47-5093	#47-5106				
Y7	025720	#47-5109	47-5111				
ZDAT00	026376	48-5183	48-5205	#48-5220			
ZDAT01	026400	#48-5221					
ZDAT02	026402	#48-5222					
ZDAT03	026404	#48-5223					
ZDONE	026436	48-5200	48-5208	48-5214	#48-5240		
ZERR1	026302	48-5189	#48-5201				
ZERR2	026344	48-5193	#48-5209				

SYMBOL	CROSS REFERENCE VALUE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES
SCM3	= 000024	#20-1795	20-1795	20-1795						
SCM4	= 000024	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
		#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795	#20-1795	20-1795	20-1795
SCNTLG	041511	63-6285	#63-6285							
SCNTLU	041504	63-6285	#63-6285							
SCPUOP	001344	#20-1795								
SCRLF	001313	#20-1795	33-3318	55-6269	57-6273	57-6273	57-6273	59-6277	59-6277	59-6277
		63-6285	66-6301	66-6332	66-6339	66-6419	75-7190	75-7198	75-7198	75-7199
		75-7199	75-7200	75-7201	75-7201	75-7202	75-7204	75-7204	75-7204	75-7205
		75-7205	75-7211	75-7211	75-7211	75-7212	75-7214	75-7214	75-7214	75-7215
		75-7220	75-7220	75-7224	75-7224	75-7225	75-7225	75-7227	75-7227	75-7228
		75-7228	75-7228	75-7228	75-7229	75-7229	75-7230	75-7230	75-7230	75-7231
		75-7232	75-7233	75-7236	75-7237	75-7240	75-7240	75-7244	75-7244	75-7245
		75-7245	75-7258	75-7258	75-7259	75-7259	75-7287	75-7288	75-7288	75-7289
		75-7289	75-7289	75-7294	75-7294	75-7295	75-7295	75-7295	75-7295	75-7297
		75-7297	75-7298	75-7298	75-7298	75-7298	75-7299	75-7299	75-7299	
SDBLK	040614	61-6281	61-6281	#61-6281						
SDDW0	001402	#20-1795								
SDDW1	001404	#20-1795								
SDDW10	001426	#20-1795								
SDDW11	001430	#20-1795								
SDDW12	001432	#20-1795								
SDDW13	001434	#20-1795								
SDDW14	001436	#20-1795								
SDDW15	001440	#20-1795								
SDDW2	001406	#20-1795								
SDDW3	001410	#20-1795								
SDDW4	001412	#20-1795								
SDDW5	001414	#20-1795								
SDDW6	001416	#20-1795								
SDDW7	001420	#20-1795								
SDDW8	001422	#20-1795								
SDDW9	001424	#20-1795								
SDEVCT	001326	#20-1795								
SDEVM	001374	#20-1795								
SDOAGN	036442	55-6269	55-6269	55-6269	#55-6269					
SDTBL	040604	61-6281	#61-6281							
SENDAD	036432	22-1806	24-1812	#55-6269	57-6273					
SENDCT	036124	24-1811	#55-6269							
SENULL	036506	#55-6269								
SENV	001336	#20-1795	24-1812	57-6273	59-6277	62-6283	62-6283			
SEVM	001337	#20-1795	24-1811	59-6277	59-6277	62-6283				
SEOP	036060	#55-6269	67-6452	68-6461	69-6470					
SEOPCT	036112	*24-1811	#55-6269	55-6269						
SERFLG	001103	#20-1795	56-6271	*56-6271	56-6271	56-6271	*56-6271	56-6271	56-6271	*57-6273
		57-6273	57-6273							
SERMAX	001115	#20-1795	*24-1811	56-6271	*56-6271	56-6271	56-6271	56-6271	56-6271	

SYMBOL	CROSS REFERENCE VALUE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES
\$ERROR	037146	24-1811	#57-6273							
\$ERRPC	001116	#20-1795	*25-1895	*33-3273	*57-6273	*57-6273	57-6273	57-6273	*57-6273	57-6273
		57-6273	66-6304	66-6311	66-6431					
\$ERRTB	001442	#21-1795	66-6325							
\$ERTTL	001112	#20-1795	55-6269	55-6269	55-6269	*55-6269	*57-6273	57-6273	57-6273	
\$ESCAP	001304	#20-1795	*24-1811	*56-6271	57-6273	57-6273	57-6273	57-6273		
\$ETABL	001336	#20-1795								
\$ETEND	001442	#20-1795	23-1808							
\$FATAL	001320	#20-1795	*62-6283	*66-6320						
\$FFLG	041070	*62-6283	*62-6283	62-6283	*62-6283	#62-6283				
\$FILLC	001156	#20-1795	59-6277	59-6277	59-6277					
\$FILLS	001155	#20-1795	59-6277	59-6277						
\$GDADR	001120	#20-1795								
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		*27-2066	*27-2079	*27-2094	*28-2196	*29-2276	*30-2335	*30-2377	*31-2706	*31-2758
		*32-2885	*32-2928	*33-3182	*33-3183	*33-3184	*33-3185	*33-3186	*33-3187	*33-3188
		*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	*34-3359	*35-3464	*35-3496	*36-3622
		*37-3721	*38-3818	*44-4580	*44-4601	*44-4621	*44-4639	*44-4668	*45-4783	*45-4811
		*45-4839	*45-4867	*46-4925	*46-4948	*46-4971	*46-4994	*47-5079	*48-5174	*49-5251
		*49-5280	*49-5314	*50-5428	*50-5456	*50-5484	*50-5513	*50-5542	*50-5570	*51-5686
		*51-5710	*51-5738	*51-5761	*51-5790	*51-5811	*52-5898	*52-5927	*52-5949	*52-5971
		*52-5999	*52-6027	*52-6056	*53-6122	*53-6151	*54-6206	*54-6228	56-6271	*56-6271
		56-6271	56-6271	57-6273						
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\$MADR2	001354	#20-1795								
\$MADR3	001360	#20-1795								
\$MADR4	001364	#20-1795								
\$MAIL	001316	#20-1795	23-1808	23-1808	24-1811	24-1812	56-6271	57-6273	59-6277	
\$MAMS1	001346	#20-1795								
\$MAMS2	001352	#20-1795								
\$MAMS3	001356	#20-1795								
\$MAMS4	001362	#20-1795								
\$MBADR	003604	#23-1808								
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\$MNEW	041527	63-6285	#63-6285							
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\$MSGLG	001334	#20-1795	*62-6283							
\$MSGTY	001316	#20-1795	62-6283	*62-6283	62-6283	*62-6283				
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SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
SMTYP1		001347	#20-1795
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SMTYP3		001357	#20-1795
SMTYP4		001363	#20-1795
SMXCNT		037140	56-6271 56-6271 56-6271 #56-6271
SNULL		001154	#20-1795 59-6277 59-6277 59-6277
SNWTST	=	000001	#24-1835 24-1835 #25-1835 25-1835 #25-1946 25-1946 #26-1946 26-1946 #26-1991 26-1991 #27-1991 27-1991 #27-2195 27-2195 #28-2195 28-2195 #28-2275 28-2275 #29-2275 29-2275 #29-2333 29-2333 #30-2333 30-2333 #30-2705 30-2705 #31-2705 31-2705 #31-2884 31-2884 #32-2884 32-2884 #32-3180 32-3180 #33-3180 33-3180 #33-3358 33-3358 #34-3358 34-3358 #34-3463 34-3463 #35-3463 35-3463 #35-3621 35-3621 #36-3621 36-3621 #36-3720 36-3720 #37-3720 37-3720 #37-3817 37-3817 #38-3817 38-3817 #38-3917 38-3917 #39-3917 39-3917 #39-4020 39-4020 #40-4020 40-4020 #40-4160 40-4160 #41-4160 41-4160 #41-4301 41-4301 #42-4301 42-4301 #42-4422 42-4422 #43-4422 43-4422 #43-4570 43-4570 #44-4570 44-4570 #44-4782 44-4782 #45-4782 45-4782 #45-4924 45-4924 #46-4924 46-4924 #46-5074 46-5074 #46-5074 46-5074 #47-5074 47-5074 #47-5170 47-5170 #48-5170 48-5170 #48-5250 48-5250 #49-5250 49-5250 #49-5250 #49-5426 49-5426 #50-5426 50-5426 #50-5684 50-5684 #51-5684 51-5684 #51-5896 51-5896 #52-5896 52-5896 #52-6120 52-6120 #53-6120 53-6120 #53-6204 53-6204 #54-6204 54-6204
SOCNT		040374	*60-6279 *60-6279 #60-6279
SOMODE		040376	*60-6279 *60-6279 60-6279 *60-6279 *60-6279 #60-6279
SOVER		037124	56-6271 56-6271 56-6271 56-6271 #56-6271
SPASS		001324	#20-1795 *24-1811 *55-6269 *55-6269 55-6269 55-6269 55-6269 55-6269
SPASS2		036514	*55-6269 55-6269 55-6269 #55-6269
SPASTM		003610	#23-1808
SPWRAD		041764	#65-6291
SPWRDN		041624	24-1811 #65-6291 65-6291
SPWRMG		041760	#65-6291
SPWRUP		041676	65-6291 #65-6291
SQUES		001312	#20-1795 57-6273 57-6273 59-6277 59-6277 63-6285
SRDCHR		041354	#63-6285 64-6287 64-6287
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SREG17		001220	#20-1795
SREG2		001166	#20-1795
SREG20		001222	#20-1795
SREG21		001224	#20-1795
SREG22		001226	#20-1795

SYMBOL CROSS REFERENCE		REFERENCES									
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\$REG4	001172	#20-1795									
\$REG5	001174	#20-1795									
\$REG6	001176	#20-1795									
\$REG7	001200	#20-1795									
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\$RTNAD	036502	#55-6269									
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		24-1811	24-1811	24-1811	24-1811	24-1811	24-1811	24-1811	24-1812	24-1812	24-1812
		24-1812	55-6269	55-6269	56-6271	57-6273	57-6273	57-6273	57-6273	57-6273	63-6285
		63-6285	65-6291								
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		24-1811	24-1811	25-1835	26-1946	27-1991	28-2195	29-2275	30-2333	31-2705	31-2705
		32-2884	33-3180	34-3358	35-3463	36-3621	37-3720	38-3817	39-3917	40-4020	40-4020
		41-4160	42-4301	43-4422	44-4570	45-4782	46-4924	47-5074	48-5170	49-5250	49-5250
		50-5426	51-5684	52-5896	53-6120	54-6204	55-6269	55-6269	55-6269	55-6269	55-6269
		55-6269	56-6271	56-6271	56-6271	56-6271	56-6271	56-6271	56-6271	56-6271	56-6271
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		75-7187	75-7187	75-7188	75-7189	75-7191	75-7191	75-7192	75-7193	75-7193	75-7193
		75-7194	75-7196	75-7196	75-7197	75-7198	75-7200	75-7200	75-7203	75-7203	75-7203
		75-7206	75-7206	75-7210	75-7210	75-7213	75-7213	75-7221	75-7221	75-7222	75-7222
		75-7223	75-7223	75-7227	75-7229	75-7229	75-7236	75-7239	75-7239	75-7242	75-7242
		75-7242	75-7244	75-7253	75-7253	75-7258	75-7261	75-7261	75-7276	75-7287	75-7287
		75-7287	75-7294	75-7297	75-7303	75-7303	75-7316	75-7345	75-7345	75-7346	75-7346
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SYMBOL	CROSS REFERENCE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES
SYMBOL	VALUE									
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		75-7181	75-7185	75-7187	75-7189	75-7191	75-7193	75-7196	75-7198	75-7200
		75-7203	75-7206	75-7210	75-7213	75-7221	75-7223	75-7227	75-7229	75-7232
		75-7236	75-7239	75-7242	75-7244	75-7253	75-7258	75-7261	75-7276	75-7287
		75-7294	75-7297	75-7303	75-7316	75-7335	75-7345	75-7346		
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		75-7206	75-7210	75-7213	75-7221	75-7223	75-7227	75-7229	75-7232	75-7236
		75-7239	75-7242	75-7244	75-7253	75-7258	75-7261	75-7276	75-7287	75-7294
		75-7297	75-7303	75-7316	75-7335	75-7345	75-7346			
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		*44-4591	*44-4614	*44-4632	*44-4650	75-7177	75-7179	75-7181	75-7224	75-7234
		75-7289	75-7303							
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\$TMP17	001270	#20-1795								
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		*27-2013	*27-2028	*27-2040	*27-2056	*27-2069	*27-2084	*27-2097	*28-2206	*28-2260
		*29-2281	*29-2312	*30-2336	*30-2378	*30-2597	*30-2635	*31-2724	*31-2772	*31-2821
		*31-2849	*32-2901	*32-2943	*32-2992	*32-3018	*33-3182	*33-3183	*33-3184	*33-3185
		*33-3186	*33-3187	*33-3188	*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	34-3424
		*35-3531	*35-3564	*35-3567	*35-3571	*35-3574	*35-3585	*35-3596	*36-3669	*36-3675
		*36-3684	*37-3768	*37-3773	*37-3782	*38-3864	*38-3871	*38-3883	*39-3962	*39-3974
		*39-3979	*39-3991	*40-4095	*40-4100	*40-4110	*40-4122	*40-4127	*41-4235	*41-4251
		*41-4263	*41-4268	*42-4368	*42-4373	*42-4376	*42-4384	*42-4391	*43-4500	*43-4505
		*43-4508	*43-4521	*43-4526	*44-4592	*44-4615	*44-4633	*44-4651	*44-4679	*44-4688
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		*49-5359	*49-5363	*50-5431	*50-5459	*50-5485	*50-5514	*50-5545	*50-5573	*51-5690
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		75-7187	75-7189	75-7191	75-7193	75-7196	75-7200	75-7203	75-7206	75-7210
		75-7213	75-7221	75-7223	75-7227	75-7229	75-7232	75-7236	75-7239	75-7242
		75-7244	75-7253	75-7258	75-7261	75-7276	75-7287	75-7294	75-7297	75-7303
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		*28-2250	*29-2296	*29-2302	*29-2315	*30-2446	*30-2454	*30-2482	*30-2490	*30-2513
		*30-2528	*30-2543	*30-2559	*30-2574	*30-2582	*30-2590	*30-2598	*30-2634	*31-2725
		*31-2773	*31-2822	*31-2850	*32-2902	*32-2944	*32-2994	*32-3019	*33-3255	*33-3270
		*35-3552	*35-3558	*36-3667	*36-3676	*36-3685	*37-3766	*37-3774	*37-3783	*38-3865
		*38-3872	*38-3884	*39-3963	*39-3973	*39-3980	*39-3989	*40-4120	*40-4128	*41-4240
		*41-4261	*41-4269	*42-4378	*42-4385	*43-4510	*43-4527	*44-4706	*44-4721	*44-4738
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SYMBOL CROSS REFERENCE
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		*50-5633	*50-5639	*50-5642	*50-5648	*50-5651	*50-5654	*50-5657	*51-5832	*51-5837
		*51-5843	*51-5852	*51-5858	*51-5867	*52-6086	*52-6089	*52-6090	*52-6091	*52-6092
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		*53-6184	*53-6185	*53-6186	*53-6187	*54-6250	*54-6255	*54-6257	*67-6447	75-7165
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		75-7196	75-7198	75-7200	75-7203	75-7206	75-7210	75-7213	75-7221	75-7223
		75-7228	75-7230	75-7232	75-7236	75-7239	75-7242	75-7244	75-7245	75-7253
		75-7261	75-7287	75-7294	75-7297	75-7345				
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		*31-2830	*31-2851	*32-2995	*32-3001	*32-3020	*33-3256	*33-3271	*35-3551	*35-3557
		*36-3668	*36-3677	*36-3686	*37-3767	*37-3775	*37-3784	*38-3866	*38-3873	*38-3885
		*39-3964	*39-3969	*39-3981	*39-3990	*40-4121	*40-4129	*41-4249	*41-4262	*41-4270
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		*45-4863	*45-4893	*45-4901	*46-5022	*46-5027	*46-5037	*46-5042	*47-5116	*47-5124
		*47-5132	*48-5204	*48-5212	*49-5370	*49-5376	*49-5384	*49-5390	*49-5396	*49-5402
		*50-5598	*50-5602	*50-5608	*50-5614	*50-5623	*50-5629	*50-5635	*50-5645	*51-5831
		*51-5836	*51-5841	*51-5847	*51-5850	*51-5856	*51-5862	*51-5865	*51-5871	*51-5874
		*52 85	*52-6089	*52-6090	*52-6091	*52-6092	*52-6093	*52-6094	*52-6095	*52-6096
		*52-6097	*52-6098	*52-6099	*52-6100	*53-6180	*53-6184	*53-6185	*53-6186	*53-6187
		*54-6251	*54-6255	*54-6257	*67-6449	75-7166	75-7169	75-7172	75-7180	75-7182
		75-7188	75-7192	75-7194	75-7197	75-7198	75-7199	75-7200	75-7204	75-7207
		75-7211	75-7212	75-7212	75-7222	75-7228	75-7231	75-7233	75-7237	75-7240
		75-7243	75-7254	75-7261	75-7287	75-7295	75-7298			
\$TMP5	001244	*20-1795	*25-1880	*27-1993	*28-2205	*30-2448	*30-2455	*30-2491	*30-2515	*30-2529
		*30-2544	*30-2560	*30-2575	*30-2584	*30-2600	*30-2636	*31-2831	*31-2836	*31-2842
		*32-3002	*32-3009	*33-3182	*33-3183	*33-3184	*33-3185	*33-3186	*33-3187	*33-3188
		*33-3189	*33-3190	*33-3191	*33-3192	*33-3193	*40-4102	*40-4108	*41-4242	*42-4366
		*42-4392	*43-4498	*43-4519	*44-4697	*44-4712	*45-4903	*46-5023	*46-5028	*47-5117
		*47-5125	*48-5205	*49-5372	*49-5378	*49-5386	*49-5392	*49-5397	*49-5403	*50-5609
		*50-5615	*50-5624	*50-5630	*50-5636	*50-5644	*51-5844	*51-5853	*51-5859	*51-5868
		*52-6089	*52-6090	*52-6091	*52-6092	*52-6093	*52-6094	*52-6095	*52-6096	*52-6097
		*52-6098	*52-6099	*52-6100	*53-6184	*53-6185	*53-6186	*53-6187	*54-6255	*54-6257
		*55-6269	55-6269	*55-6269	*55-6269	*55-6269	*56-6271	75-7166	75-7177	75-7178
		75-7185	75-7199	75-7199	75-7201	75-7202	75-7204	75-7211	75-7212	75-7214
		75-7215	75-7224	75-7225	75-7227	75-7229	75-7233	75-7240	75-7258	75-7259
		75-7288	75-7289	75-7295	75-7298					
\$TMP6	001246	*20-1795	*27-2123	*27-2129	*27-2147	*27-2153	*30-2449	*30-2460	*30-2465	*30-2496
		*30-2501	*30-2516	*30-2530	*30-2545	*30-2561	*30-2576	*30-2585	*30-2609	*30-2619
		*30-2627	*30-2646	*30-2656	*30-2663	*31-2837	*31-2843	*32-3007	*32-3012	*33-3269
		*40-4104	*40-4107	*40-4113	*40-4115	*40-4117	*41-4244	*41-4248	*41-4254	*41-4256
		*41-4258	*42-4343	*42-4347	*42-4351	*42-4355	*42-4359	*42-4364	*42-4394	*43-4477
		*43-4481	*43-4485	*43-4489	*43-4496	*43-4515	*43-4517	*44-4705	*44-4720	*45-4902
		*46-5029	*47-5118	*47-5126	*48-5206	*49-5369	*49-5375	*49-5381	*49-5383	*49-5389
		*49-5398	*49-5404	*50-5607	*50-5613	*50-5619	*50-5622	*50-5628	*50-5634	*50-5640
		*50-5643	*50-5649	*50-5652	*50-5655	*50-5658	*51-5842	*51-5848	*51-5851	*51-5857
		*51-5863	*51-5866	*51-5872	*51-5875	*52-6089	*52-6090	*52-6091	*52-6092	*52-6093
		*52-6094	*52-6095	*52-6096	*52-6097	*52-6098	*52-6099	*52-6100	*53-6184	*53-6185
		*53-6186	*53-6187	*54-6255	*54-6257	75-7178	75-7199	75-7201	75-7211	75-7214
		75-7224	75-7230	75-7233	75-7259	75-7288	75-7299			

SYMBOL	CROSS REFERENCE	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES	REFERENCES
SYMBOL	VALUE									
\$TMP7	001250	#20-1795	*27-1994	*27-2023	*27-2051	*27-2080	*30-2456	*30-2492	*30-2531	*30-2546
		*30-2552	*30-2577	*30-2599	*30-2637	*31-2838	31-2844	*32-3008	*32-3013	*40-4103
		*40-4109	*41-4243	*41-4250	*42-4367	*42-4393	*43-4499	*43-4520	*44-4699	*44-4714
		75-7178	75-7202	75-7204	75-7215	75-7225	75-7234	75-7259	75-7289	
\$TN	= 000037	19-1777	#19-1777	24-1835	25-1835	#25-1835	5-1946	26-1946	#26-1946	26-1946
		27-1991	#27-1991	27-2195	28-2195	#28-2195	28-2275	29-2275	#29-2275	29
		30-2333	#30-2333	30-2705	31-2705	#31-2705	31-2884	32-2884	#32-2884	3
		33-3180	#33-3180	33-3358	34-3358	#34-3358	34-3463	35-3463	#35-3463	3 1
		36-3621	#36-3621	36-3720	37-3720	#37-3720	37-3817	38-3817	#38-3817	38 7
		39-3917	#39-3917	39-4020	40-4020	#40-4020	40-4160	41-4160	#41-4160	41-4160
		42-4301	#42-4301	42-4422	43-4422	#43-4422	43-4570	44-4570	#44-4570	44-471
		45-4782	#45-4782	45-4924	46-4924	#46-4924	46-5074	47-5074	#47-5074	47-5
		48-5170	#48-5170	48-5250	49-5250	#49-5250	49-5426	50-5426	#50-5426	50-568
		51-5684	#51-5684	51-5896	52-5896	#52-5896	52-6120	53-6120	#53-6120	53-6204
		54-6204	#54-6204	54-6267						
\$TPB	001152	#20-1795	59-6277	59-6277	59-6277					
\$TPFLG	001157	#20-1795	59-6277	59-6277	59-6277					
\$TPS	001150	#20-1795	59-6277	59-6277	59-6277					
\$STRAP	041540	24-1811	#64-6287							
\$STRAP2	041562	#64-6287	64-6287							
\$TRP	= 000014	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287
		64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287
		64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287
		64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287
		64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287	64-6287
		#64-6287	64-6287	64-6287	64-6287	64-6287	#64-6287	64-6287	64-6287	64-6287
		64-6288	#64-6288							
\$TRPAD	041574	64-6287	#64-6287	64-6289						
\$STSM	003606	#23-1808								
\$STSTM	001102	#20-1795	*55-6269	56-6271	56-6271	*56-6271	56-6271	56-6271	56-6271	56-6271
		57-6273	57-6273	57-6273	66-6302					
\$STYPBN	= *****	64-6287								
\$STYPDS	040400	#61-6281	64-6287	64-6287						
\$STYPE	037600	#59-6277	62-6283	64-6287	64-6287					
\$STYPEC	040012	59-6277	59-6277	59-6277	#59-6277	63-6285				
\$STYPEX	040142	59-6277	59-6277	59-6277	#59-6277					
\$STYPOC	040170	#60-6279	64-6287	64-6287						
\$STYPON	040204	60-6279	#60-6279	64-6287						
\$STYPOS	040144	#60-6279	64-6287							
\$SUNIT	001330	#20-1795								
\$SUNITM	003612	#23-1808								
\$SUSWR	001342	#20-1795								
\$SVECT1	001366	#20-1795								
\$SVECT2	001370	#20-1795								
\$XOFF	= 000023	59-6277	59-6277							
\$XON	= 000021	59-6277	59-6277	59-6277	63-6285					
\$XTSTR	036642	#56-6271								
\$SGET4	= 000001	#55-6269	#55-6269	55-6269						
\$OFILL	040375	*60-6279	*60-6279	60-6279	#60-6279					
\$LOCAT	= *****	56-6271	57-6273							
.RSET	042622	64-6288	#70-6480							
.SASTA	= *****	62-6283	62-6283							

SYMBOL	CROSS REFERENCE	REFERENCES
SYMBOL	VALUE	#23-1808 23-1808
.\$X	- 003602	

MACRO CROSS REFERENCE

MACRO NAME REFERENCES

LOADTP	#19-1168										
LPERR	#19-1325	25-1837	26-1947	27-1992	27-2009	27-2022	27-2037	27-2050	27-2066	27-2079	
	27-2094	28-2196	29-2276	30-2335	30-2377	31-2706	31-2758	32-2885	32-2928	33-3182	
	33-3183	33-3184	33-3185	33-3186	33-3187	33-3188	33-3189	33-3190	33-3191	33-3192	
	33-3193	34-3359	35-3464	35-3496	36-3622	37-3721	38-3818	44-4580	44-4601	44-4621	
	44-4639	44-4668	45-4783	45-4811	45-4839	45-4867	46-4925	46-4948	46-4971	46-4994	
	47-5079	48-5174	49-5251	49-5280	49-5314	50-5428	50-5456	50-5484	50-5513	50-5542	
	50-5570	51-5686	51-5710	51-5738	51-5761	51-5790	51-5811	52-5898	52-5927	52-5949	
	52-5971	52-5999	52-6027	52-6056	53-6122	53-6151	54-6206	54-6228			
MERROR MSG	#19-1229										
	#24-1817	#25-1835	#25-1941	#26-1946	#26-1983	#27-1991	#27-2176	#28-2195	#28-2268	#29-2275	
	#29-2321	#30-2333	#30-2700	#31-2705	#31-2878	#32-2884	#32-3047	#33-3180	#33-3352	#34-3358	
	#34-3456	#35-3463	#35-3615	#36-3621	#36-3713	#37-3720	#37-3810	#38-3817	#38-3909	#39-3917	
	#39-4013	#40-4020	#40-4153	#41-4160	#41-4295	#42-4301	#42-4415	#43-4422	#43-4554	#44-4570	
	#44-4775	#45-4782	#45-4918	#46-4924	#46-5067	#47-5074	#47-5162	#48-5170	#48-5243	#49-5250	
	#49-5416	#50-5426	#50-5674	#51-5684	#51-5889	#52-5896	#52-6113	#53-6120	#53-6195	#54-6204	
MULT NAMEP NEWTST	#19-1783										
	#19-1182	24-1812									
	#19-1783	#24-1835	#25-1946	#26-1991	#27-2195	#28-2275	#29-2333	#30-2705	#31-2884	#32-3180	
	#33-3358	#34-3463	#35-3621	#36-3720	#37-3817	#38-3917	#39-4020	#40-4160	#41-4301	#42-4422	
	#43-4570	#44-4782	#45-4924	#46-5074	#47-5170	#48-5250	#49-5426	#50-5684	#51-5896	#52-6120	
	#53-6204										
NTMPM POP	#19-1178										
PUSH	#19-1783	#58-6275	#61-6281	#62-6283	#62-6283	#65-6291	#65-6291				
REPORT	#19-1783	#58-6275	#61-6281	#62-6283	#62-6283	#62-6283	#65-6291	#65-6291			
ROMAC	#19-1283										
RSET	#19-1185	#25-1938	#26-1981	#27-2173	#28-2265	#29-2318	#30-2697	#31-2876	#32-3044	#33-3351	
	#34-3453	#35-3613	#36-3711	#37-3808	#38-3907	#39-4011	#40-4151	#41-4293	#42-4413	#43-4552	
	#45-4915	#46-5065	#47-5161	#48-5240	#49-5415	#50-5672	#51-5834	#51-5839	#51-5888	#52-6112	
	#53-6194	#67-6451	#68-6460	#69-6469							
RTMPM SETPRI	#19-1173										
SETTRA	#19-1783										
	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	#64-6287	
	#64-6287	#64-6288									
SETUP	#19-1783	24-1811									
SKIP	#19-1783										
SLASH	#19-1783										
SPACE	#19-1331	#19-1783									
SSKAD	#19-1322										
STARS	#19-1783	20-1795	20-1795	20-1795	22-1806	23-1808	23-1808	23-1808	25-1835	25-1855	
	26-1946	26-1946	27-1991	27-1991	28-2195	28-2195	29-2275	29-2275	30-2333	30-2333	
	31-2705	31-2705	32-2884	32-2884	33-3180	33-3180	33-3199	34-3358	34-3358	35-3463	
	35-3463	36-3621	36-3621	37-3720	37-3720	38-3817	38-3817	39-3917	39-3917	40-4020	
	40-4020	41-4160	41-4160	42-4301	42-4301	43-4422	43-4422	44-4570	44-4570	45-4782	
	45-4782	46-4924	46-4924	47-5074	47-5074	48-5170	48-5170	49-5250	49-5250	50-5426	
	50-5426	51-5684	51-5684	52-5896	52-5896	53-6120	53-6120	54-6204	54-6204	55-6269	
	55-6271	57-6273	58-6275	59-6277	60-6279	61-6281	62-6283	63-6285	63-6285	63-6285	
	64-6287	65-6291	65-6291	66-6294	67-6439	68-6454	69-6463	70-6472			
SUMMAC	#19-1310	#25-1835	#33-3180								
SWRSU	#19-1783	#24-1811	#24-1811								
TMAC	#19-1202	54-6267									

