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IDENTIFICATION

PRODUCT CODE: AC-F141D-MC

PRODUCT NAME: CJKDBD0 DCF11-AA CPU DIAG

DATE: JAN-81

MAINTAINER: DIAGNOSTIC ENGINEERING

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1.0 GENERAL INFORMATION

1.1 HISTORY:

THIS PROGRAM IS A COMBINED VERSION OF THE THREE BASIC 11/34 DIAGNOSTIC PROGRAMS WITH MODIFICATIONS AND ENHANCEMENTS MADE TO ACCOUNT FOR THE DIFFERENCES BETWEEN THE TWO PROCESSORS.

1.2 PROGRAM DESCRIPTION:

THIS PROGRAM CONTAINS THREE PARTS: CPU, TRAP AND EIS TESTS. IN THE FIRST AND SECOND PARTS, THE PROGRAM WILL HALT ON ERROR. IN PART THREE, EIS TEST, WHEN AN ERROR IS DETECTED, THE ERROR PC AND ERROR NUMBER WILL BE TYPED, THEN THE PROGRAM WILL CONTINUE EXECUTION. LOOP ON ERROR IS PROVIDED BY MANUALLY MGDIFYING SOME APPROPRIATE MEMORY LOCATIONS. SEE THE LISTING OF THAT TEST FOR DETAILS AND INSTRUCTIONS.

THIS PROGRAM ASSUMES SOME OPTIONS (FOR EIS TEST ONLY), THEY ARE:
1. ENABLE ERROR PRINTOUTS, 2. CONTINUE EXECUTION ON ERROR.

1.3 ABSTRACT

PART ONE:

CPU TEST, THIS IS THE FIRST PART OF THE MAIN PROGRAM. THIS TEST CHECK OUT THE BASIC PDP-11 INSTRUCTIONS IN EVERY ADDRESSING MODES WITH VARIOUS TYPES OF DATA PATTERNS.

PART TWO:

TRAP TEST, THIS IS THE SECOND PART OF THE MAIN PROGRAM. THIS IS A TEST OF ALL OPERATIONS AND INSTRUCTIONS THAT CAUSE TRAPS. ALSO TESTED ARE TRAP OVERFLOW CONDITIONS, ODDITIES OF REGISTER 6, INTERRUPTS, THE RESET AND WAIT INSTRUCTIONS. THIS PROGRAM CHECKS THAT ON ALL TRAP OPERATIONS REGISTER 6 IS DECREMENTED THE CORRECT AMOUNT, THAT THE CORRECT PC IS SAVED ON THE STACK, THAT THE OLD CONDITION CODES AND PRIORITY ARE PLACED ON THE STACK AND THAT THE NEW STATUS AND CONDITION CODES ARE CORRECT. BOTH THE "TRAP" AND "EMT" TRAP INSTRUCTIONS ARE TESTED TO SEE THAT ALL COMBINATIONS WILL TRAP. CHECKED ALSO IS THAT ALL RESERVED INSTRUCTIONS WILL TRAP. THE TRACE BIT IS CHECKED TO SEE IF IT CAUSES A TRAP. THE RTI AND RTT INSTRUCTIONS ARE CHECKED. STACK OVERFLOW IS ALSO CHECKED FOR ALL THE TRAP INSTRUCTIONS.

SPECIAL CHECKS ARE MADE TO SEE IF BUS
ERROR TRAPS OCCUR ON NON-EXISTENT MEMORY.
ALL INSTRUCTIONS THAT ARE RESERVED SHOULD TRAP TO LOCATION 10,
AND THE PC THAT POINTS TO THE TRAPPING INSTRUCTION
SHOULD BE PLACED ON THE STACK.

PART THREE:

THIS PROGRAM TESTS THE EXTENDED INSTRUCTION SET
<ASH, ASHC, MUL, AND DIV> USING REGISTERS 0-5 AT LEAST
ONCE WITH EACH INSTRUCTION.
THIS PROGRAM TESTS ALL THE EIS INSTRUCTIONS OF THE 11/34
FOR ASH AND ASHC INSTRUCTIONS EVERY EVEN PASS IS EXECUTED
WITH DESTINATION MODE 0 FOR ALL REGISTERS AND EVERY ODD PASS
WITH DESTINATION MODE OF 67. THE DIAGNOSTIC DOES NOT MAKE A
PASS WITH T BIT SET.

2.0 HARDWARE REQUIREMENT

A PROCESSOR WITH DCF11-AA CHIP SET, A MINIMUM OF 16K OF
MEMORY AND A CONSOLE TERMINAL. IF PROGRAM IS RUNNING
UNDER APT OR ACT, THE CONSOLE TERMINAL IS NOT NECESSARY.

3.0 RELATED DOCUMENTS AND STANDARDS:

ACT11/XXDP PROGRAMMING SPECIFICATION
STANDARD APT SYSTEM TO A PDP11 DIAGNOSTIC INTERFACE
PDP11 MAINDEC SYSMAC PACKAGE
KDF11-A MODULE SPECIFICATION

4.0 STARTING PROCEDURES

THE PROGRAM IS STARTED BY LOADING ADDRESS 200.
THE RESTART ADDRESS IS 1024.
PROGRAM IDENTIFICATION WILL BE TYPED AFTER THE FIRST
PASS OF THE WHOLE PROGRAM.

5.0 TRAPCATCHER ABSTRACTS

THIS IS A SERIES OF INSTRUCTIONS DESIGNED TO DETECT AND
ISOLATE UNEXPECTED TRAPS AND INTERRUPTS, THAT OCCUR IN THE
TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

THE PRINCIPLE OF THIS ROUTINE IS: THE VECTOR ENTRANCE
ADDRESS POINTS TO THE NEXT SEQUENTIAL WORD WHICH WILL CON-
TAIN A HAL (000000) (THIS LOCATION IS ALSO THE STATUS

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WORD FOR THAT VECTOR ENTRANCE. BUT THIS WILL HAVE NO EFFECT ON IT ALSO BEING THE NEXT INSTRUCTION).

IF A HALT OCCURS IN THE TRAP OR INTERRUPT VECTOR AREA, REGISTER SIX SHOULD BE EXAMINED TO DETERMINE ITS CONTENTS, THEN USE REGISTER SIX CONTENTS AS AN ADDRESS TO DETERMINE WHERE THE PROGRAM WAS. WHEN THE INTERRUPT OR TRAP OCCURRED; MEMORY AS SPECIFIED BY R6 CONTAINS THE PC OF THE INSTRUCTION FOLLOWING THE INSTRUCTION WHERE THE TRAP OCCURRED. THE CONTENTS OF LOCATION '\$TESTN'(304) CONTAINS THE TEST NUMBER THAT IT WAS DOING BEFORE IT TRAPPED.

6.1 ERROR HANDLING IN PART ONE AND PART TWO

IN PARTS ONE AND TWO, ALL ERRORS WILL CAUSE A HALT.

THE PROGRAM CHECKS TO SEE THAT THE PC. DOESN'T JUMP ERRATICALLY WITHIN THE TESTS BY USING A SEQUENCE COUNT CALLED '\$TESTN'.

EXAMPLE

```
TSTA: INC      (R2)           ;INCREMENT THE TEST NUMBER  
      CMP      #A,(R2)       ;COMPARE FOR THE RIGHT TEST  
      BNE     TSTA+1-10      ;IF NOT CORRECT BRANCH TO A HALT
```

* R2 CONTAINS THE ADDRESS OF \$TESTN (304).
A IS THE CURRENT TEST NUMBER.

IF AN ERROR IS DETECTED, THE PROGRAM WILL HALT IT COULD BE BECAUSE OF TWO REASONS.

- A) WRONG TEST NUMBER (SEQUENCE ERROR)
- B) ERROR IN THE PRESENT TEST.

THE TEST SEQUENCE COUNT 'TESTN' SHOULD BE CHECKED FIRST TO SEE IF IT MATCHES THE PRESENT TEST. IF IT DOESN'T MATCH ; THEN THE CONTENTS OF THIS LOCATION TELL YOU WHICH TEST IT WAS DOING BEFORE IT HALTED.

6.2 ERROR HANDLING IN PART THREE

IN PART THREE, ANY ERROR, INCLUDES SEQUENCE CHECK ERROR WILL CAUSE THE ERROR MESSAGE TO BE TYPED. THE PROGRAM WILL CONTINUE EXECUTION AFTER TYPE OUT.

THE ERROR REPORTING FORMAT IS AS FOLLOWS:

ERROR. PC AND ERROR # ARE:
PC #

ERROR #

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7.0 SWITCH SETTINGS

SINCE NO HARDWARE SWITCH REGISTER IS AVAILABLE, THE PROGRAM AUTOMATICALLY USES THE CONTENTS OF LOC. 176 AS THE SOFTWARE SWITCH REGISTER. THE INITIAL CONTENT OF LOC. 176 IS 000000. THE USER MAY PRE-SET THIS LOCATION BEFORE STARTING THE PROGRAM. IF THE PROGRAM IS BEING RUN IN APT MODE (BIT 0 OF \$ENV SET TO A ONE) THEN THE LOCATION \$SWREG IS USED AS THE SWITCH REGISTER.

BIT #	OCTAL VALUE	FUNCTION
15	100000.....	HALT ON ERROR
13	020000.....	INHIBIT ERROR PRINTOUT
2	000004.....	PROGRAM RESERVED -- PROGRAM WILL SET IF CIS OPTION IS AVAILABLE
1	000002.....	30K SYSTEM DO NOT CHECK FOR TRAPS BETWEEN 28K-30K
0	000001.....	SKIP TRAPS TEST

NOTE: SWITCHES '15' AND '13' ONLY EFFECT PART THREE OF THIS DIAGNOSTIC. PARTS 1 AND 2 ALWAYS HALT ON ERROR.

ALSO, WITHIN THE APT TABLE, AN 8 BIT BYTE \$ENVM [LOCATION 321] HAS BEEN USED TO DEFINE THE OPERATING MODE. ALL TYPEOUTS CAN BE SUPPRESSED BY MAKING BIT 5 OF BYTE \$ENVM HIGH, IN OTHER WORDS BY PLACING A 20000 IN LOCATION 320.

8.0 EXECUTION TIMES

THE RUN TIME FOR A SINGLE RUN (THE FIRST PASS) IS ONE SECOND. AFTER THE FIRST PASS, THE PROGRAM WILL ITERATE EVERY 15 TIMES BEFORE THE END OF PASS MESSAGE IS TYPED AGAIN. THE RUN TIME FOR EACH ADDITIONAL END OF PASS MESSAGE TYPED IS APPROXIMATELY 15 SECONDS.

9.0 ROUTINES ABSTRACT

9.1 HALT ROUTINE (APPLICABLE ONLY TO PART THREE).

THIS ROUTINE IS CALLED VIA A JSR INSTRUCTION EACH TIME AN ERROR IS SEEN AND AN ERROR MESSAGE IS THEN TYPED OUT UNLESS IT IS SUPPRESSED BY THE SWITCHES.

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THE COMMENTS BESIDE THE CALL TO THE HALT SUBROUTINE
TELLS WHAT WAS BEING TESTED AND WHAT WAS EXPECTED. ALL
PRINTOUTS WILL BE SUPPRESSED WHEN BIT 5 OF LOCATION
\$ENVM IS HIGH.
WHILE RUNNING UNDER APT THE DIAGNOSTIC WILL NOT
SUPPORT SPOOLING OF CONSOLE OUTPUTS.

9.2 POWER FAIL ROUTINE

IF A POWER FAIL OCCURS (FOLLOWED BY A POWER UP), THE
MESSAGE 'POWER FAIL' IS TYPED OUT AND THE PROGRAM WILL
RESTART EXECUTION AT 'RESTR1'.

.ENDR

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000240
000007
000006
177776
177560
177562
177564
177566
140000
030000
000400
000046
060554
000052
000000
000400
000300

```
.TITLE CJKDB-D DCF11-AA CPU DIAG.  
.ENABLE ABS  
.NLIST CND,MC,MD  
.LIST ME  
SCOPE=NOP  
R7=X7  
R6=X6  
PS=177776  
TKS=177560  
TKB=177562  
TPS=177564  
TPB=177566  
USRM=140000  
PUSRM=30000  
.SBTTL ACT11 HOOKS
```

```
*****  
:HOOKS REQUIRED BY ACT11  
$SVPC= . ;SAVE PC  
.-46  
$ENDAD ;:1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP  
.-52  
.WORD 0 ;:2)SET LOC.52 TO ZERO  
.= $SVPC ;: RESTORE PC  
.=300  
.SBTTL APT MAILBOX-E TABLE
```

```
*****  
:EVEN  
$MAIL: ;: APT MAILBOX  
$MSGTY: .WORD AMSGTY ;: MESSAGE TYPE CODE  
$FATAL: .WORD AFATAL ;: FA AL ERROR NUMBER  
$TESTN: .WORD ATESTN ;: TEST NUMBER  
$PASS: .WORD APASS ;: PASS COUNT  
$DEVCT: .WORD ADEVCT ;: DEVICE COUNT  
$UNIT: .WORD AUNIT ;: I/O UNIT NUMBER  
$MSGAD: .WORD AMSGAD ;: MESSAGE ADDRESS  
$MSGLG: .WORD AMSGLG ;: MESSAGE LENGTH  
$ETABLE: ;: APT ENVIRONMENT TABLE  
$ENV: .BYTE AENV ;: ENVIRONMENT BYTE  
$ENVM: .BYTE AENVM ;: ENVIRONMENT MODE BITS  
$SWREG: .WORD ASWREG ;: APT SWITCH REGISTER  
$USWR: .WORD AUSWR ;: USER SWITCHES  
$CPUOP: .WORD ACPUOP ;: CPU TYPE OPTIONS  
: *  
: * 11/04=01,11/05=02,11/20=03,11/40=04,11/45 05  
: * 11/70=06,PDQ=07,0=10  
: * BIT 10=REAL TIME CLOCK  
: * BIT 9=FLOATING POINT PROCESSOR  
: * BIT 8=MEMORY MANAGEMENT  
$ETEND:  
.MEXIT  
.SBTTL APT PARAMETER BLOCK
```



```
369
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371
372
373      000330
374      000024 000200
375      000024 000200
376      000044 000044
377      000044 000330
378      000330
379
380
381
382
383      000330
384      000330 000000
385      000332 000300
386      000334 000013
387      000336 000020
388      000340 000005
389      000342 000014
390
391
392
393      000004
394      000004 027324
395      000006 000000
396      000010 027334
397      000012 000000
398      000014 027344
399      000030 000030
400      000030 027354
401      000032 000000
402      000034 027364
403      000036 000000
404      000114 000114
405      000114 027374
406      000116 000000
407      000244 000244
408      000244 027404
409      000246 000000
410      000250 027414
411      000252 000000
412
413      000172
414      000172 000000
415      000174 000000
416      000176 000000
417
418
419
420
421
422      000370 000000 000000 000000
423      000376 000000 000000 000000
424      000404 000001 000001 177777
```

```
*****
:SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
*****
.$X=      ;;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.
$APTHDR  ;;POINT TO APT HEADER BLOCK
-.$X     ;;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 13     ;;RUN TIM OF LONGEST TEST
$PASTM: .WORD 20     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
$UNITM: .WORD 5      ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
        .WORD $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
*****
:SOME POINTERS TO CPU TRAP HANDLERS
*****
.-4
T04
0
T010
0
T014
.-30
T030
0
T034
0
.-114
T0114
0
.-244
T0244
0
T0250
0
.=172
LPADR:   0      ;LOOP ADDRESS (EIS TEST)
DISPREG: 0      ;SOFTWARE DISPLAY REGISTER
SWREG:   0      ;SOFTWARE SWITCH REGISTER
*****
:DATA TABLE FOR USE IN ADDRESSING MODE TESTS
*****
.=370
0,0,0,0,0,0
1,1,-1
```

```

425
426
427          000302
428          000304
429          001000
430 001000 000000
431
432          000200
433 000200 000167 000576
434 000204 012706 001000
435 000210 012702 000304
436 000214 000137
437 000216 000000
438
439          001002
440
441 001002 012737 061074 000024
442 001010 012737 000000 000306
443 001016 012737 000016 062540
444 001024 012706 001000
445 001030 012702 000304
446 001034 012737 000000 000304
447 001042 012737 000000 000302
448 001050 012737 000000 000300
449
450
451
452 001056 005212
453 001060 022712 000001
454 001064 001024
455 001066 000257
456 001070 001401
457 001072 000404
458
459
460
461
462 001074
463 001074 012742 000001
464 001100 005242
465 001102 000000
466 001104
467 001104 001004
468
469
470
471
472 001106 012742 000002
473 001112 005242
474 001114 000000
475 001116 000264
476 001120 001001
477 001122 000404
478
479
480

```

```

*****
:SET UP STARTING ADDRESS
$ERROR=$FATAL
$STNM=$STESTN
.=1000
STBOT: .WORD 0 ;STACK POINTER

.=200
JMP START
MOV #STBOT,R6 ;SET STACK POINTER
MOV #STESTN,R2 ;SET MAILBOX POINTER
JMP @PC+ ;JUMP TO SUBTEST
;ADDR. OF SUBTEST GOES HERE

.=1002
.SBTTL **STARTING OF CPU TEST **
START: MOV #PWRDN,@#24 ;SET UP FOR POWER FAIL
MOV #0,@#SPASS ;CLEAR PASS COUNT
MOV #16,@#PASSPT ;SET PRINT COUNTER
RESTR: MOV #STBOT,R6 ;INITIALIZE STACK POINTER
MOV #STESTN,R2 ;SET UP POINTER TO MESSAGE TYPE
MOV #0,@#STSTNM ;CLEAR TEST NUMBER
MOV #0,@#SEERROR ;CLEAR ERROR NUMBER
MOV #0,@#SMSGTY ;CLEAR MESSAGE TYPE (FOR APT)

*****
:TEST 1 CHECK BRANCHES ON Z BIT
*****
TS1: INC (R2) ;UPDATE TEST NUMBER
CMP #1,(R2) ;SEQUENCE ERROR?
BNE TS2-10 ;BR TO ERROR HALT ON SEQ ERROR
CCC ;CLEAR ALL CONDITION CODES
BEQ BRA1 ;SHOULD BRANCH
BR BRA2 ;BAD BRANCH OF Z-BIT
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; BRANCH INSTRUCTION AND <
; REPLACE THE MOVE INSTRUCTION <
; FOLLOWING W/ 774 <

BRA1: MOV #1,-(R2) ;MOVE TO MAILBOX # ***** 1 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;SHOULD HAVE BRANCHED: Z-0

BRA2: BNE BRA3
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 767 <

BRA3: MOV #2,-(R2) ;MOVE TO MAILBOX # ***** 2 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT
;
BRA3: SEZ
BNE BRA4
BR BRA5
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; BRANCH INSTRUCTION AND <-
; REPLACE THE MOVE INSTRUCTION <

```

```
481  
482 001124  
483 001124 012742 000003  
484 001130 005242  
485 001132 000000  
486 001134  
487 001134 001404  
488  
489  
490  
491  
492 001136 012742 000004  
493 001142 005242  
494 001144 000000  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511 001146 005212  
512 001150 022712 000002  
513 001154 001006  
514 001156 012737 000000 000000  
515  
516 001164 005737 000000  
517 001170 001404  
518  
519  
520  
521  
522 001172 012742 000005  
523 001176 005242  
524 001200 000000  
525  
526  
527  
528  
529  
530 001202 005212  
531 001204 022712 000003  
532 001210 001007  
533 001212 012737 125252 000000  
534  
535 001220 022737 125252 000000  
536 001226 001404
```

BRA4: : FOLLOWING W/ 760 <---=
: MOVE TO MAILBOX # ***** 3 *****
: SET MSGTYP TO FATAL ERROR
: SHOULD NOT HAVE BRANCHED HERE ON Z-1
BRA5: :
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==--=
: CONDITIONAL BRANCH INST. AND <==--=
: REPLACE THE MOVE INSTRUCTION <==--=
: WHICH FOLLOWS W/ 753 <=====
: MOVE TO MAILBOX # ***** 4 *****
: SET MSGTYP TO FATAL ERROR
: SHOULD HAVE BRANCHED ON Z=1
: OR SEQUENCE ERROR

:SBTTL DATA PATH TESTS
:

: THE DATA PATH TESTS ARE USED TO VERIFY THAT VARIOUS
: DATA PATTERNS CAN BE SUCCESSFULLY MOVED THROUGH THE DATA PATHS
: MOVE AND COMPARE MODE 2,3 INSTRUCTIONS ARE USED TO PASS AND
: TEST VARIOUS DATA PATTERNS IN THE DATA PATHS.
: THE TEST EXERCISES THE INTERNAL DATA PATHS, AND THE UNIBUS
: DATA TRANSCIEVERS.
: IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0)
: TO SEE WHICH BITS OF THE DATA PATH ARE FAILING.

:TEST 2 TEST OF ZEROES IN THE DATA PATH
:*****

```
TS2: INC (R2) :UPDATE TEST NUMBER  
CMP #2,(R2) :SEQUENCE ERROR?  
BNE TS3-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #0,@#0 :MOVE ZEROES THRU ADDRESS LINES, DATA  
:LINES AND INTERNAL PATHS  
TST @#0 :SUCCESSFUL?  
BEQ TS3  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=  
: CONDITIONAL BRANCH INST. AND <---=  
: REPLACE THE MOVE INSTRUCTION <---=  
: WHICH FOLLOWS W/ 771 <---=  
: MOVE TO MAILBOX # ***** 5 *****  
: SET MSGTYP TO FATAL ERROR  
: DATA INCORRECT  
: OR SEQUENCE ERROR
```

:TEST 3 TEST OF PATTERN 125252 IN DATA PATH
:*****

```
TS3: INC (R2) :UPDATE TEST NUMBER  
CMP #3,(R2) :SEQUENCE ERROR?  
BNE TS4-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #125252,@#0 :MOVE ALTERNATING ONES AND ZEROES  
:THRU DATA PATHS  
CMP #125252,@#0 :SUCCESSFUL  
BEQ TS4
```

```

537 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
538 ; CONDITIONAL BRANCH INST. AND <====
539 ; REPLACE THE MOVE INSTRUCTION <====
540 ; WHICH FOLLOWS W/ 770 <====
541 001230 012742 000006 MOV #6,-(R2) ;MOVE TO MAILBOX # ***** 6 *****
542 001234 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
543 001236 000000 HALT ;DATA INCORRECT
; OR SEQUENCE ERROR

```

```

*****
;TEST 4 TEST OF PATTERN 052525 IN DATA PATH
*****

```

```

547
548
549 001240 005212 TS4: INC (R2) ;UPDATE TEST NUMBER
550 001242 022712 000004 CMP #4,(R2) ;SEQUENCE ERROR?
551 001246 001007 BNE TS5-10 ;BR TO ERROR HALT ON SEQ ERROR
552 001250 012737 052525 000000 MOV #052525,@#0 ;MOVE ALTERNATING ZEROES AND ONES
553 ;THRU DATA PATH
554 001256 022737 052525 000000 CMP #052525,@#0 ;SUCCESSFUL?
555 001264 001404 BEQ TS5

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 770 <====
560 001266 012742 000007 MOV #7,-(R2) ;MOVE TO MAILBOX # ***** 7 *****
561 001272 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
562 001274 000000 HALT ;DATA INCORRECT
; OR SEQUENCE ERROR

```

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*****
;TEST 5 TEST OF ALL ONES IN DATA PATH
*****

```

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567
568 001276 005212 TS5: INC (R2) ;UPDATE TEST NUMBER
569 001300 022712 000005 CMP #5,(R2) ;SEQUENCE ERROR?
570 001304 001007 BNE TS6-10 ;BR TO ERROR HALT ON SEQ ERROR
571 001306 012737 177777 000000 MOV #177777,@#0 ;MOVE ONES THRU DATA PATH
572 001314 022737 177777 000000 CMP #177777,@#0 ;SUCCESSFUL
573 001322 001404 BEQ TS6

```

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; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 770 <====
578 001324 012742 000010 MOV #10,-(R2) ;MOVE TO MAILBOX # ***** 10 *****
579 001330 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
580 001332 000000 HALT ;DATA INCORRECT
; OR SEQUENCE ERROR

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```

*****
;SBITL B-REGISTER TEST

```

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585
586 ; THE B-REGISTER (LOCATION 0) SHIFTING LOGIC TESTS ARE USED
587 ; TO TEST THAT THE B-REGISTER CAN HOLD VARIOUS DATA PATTERNS AND THAT
588 ; THE ASSOCIATED LOGIC SUPPORTS THE SHIFTING FUNCTIONS WITHIN THE
589 ; B-REGISTER AND C-BIT.
590 ; A ONE IS SHIFTED THROUGH EVERY BIT IN THE B-REGISTER AND C-BIT IN
591 ; BOTH DIRECTIONS.
592 ; THE B-REGISTER ITSELF IS TESTED IN ITS ABILITY AS A BUFFER AND AS

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:A SHIFT REGISTER. DATA IS ALSO PASSED THROUGH THE DATA PATH AND ALU,
: IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0) TO SEE
: WHICH BITS OF THE B-REGISTER MAY BE FAILING.

:TEST 6 SHIFT BIT 0 TO BIT 1

```
TS6:  INC      (R2)          ;UPDATE TEST NUMBER
      CMP      #6,(R2)      ;SEQUENCE ERROR?
      BNE     TS7-10 ;BR TO ERROR HALT ON SEQ ERROR
      CLC
      MOV     #1,@#0        ;LOAD A 1
      ROL     @#0          ;SHIFT LEFT
      CMP     #2,@#0        ;SUCCESSFUL
      BEQ     TS7
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
      ;          CONDITIONAL BRANCH INST. AND <-
      ;          REPLACE THE MOVE INSTRUCTION <-
      ;          WHICH FOLLOWS W/ 765 <-
      MOV     #11,-(R2)     ;MOVE TO MAILBOX # ***** 11 *****
      INC     -(R2)
      HALT                 ;SET MSGTYP TO FATAL ERROR
                               ;BIT 1 NOT SET
                               ; OR SEQUENCE ERROR
```

:TEST 7 SHIFT CARRY INTO BIT 0

```
TS7:  INC      (R2)          ;UPDATE TEST NUMBER
      CMP     #7,(R2)      ;SEQUENCE ERROR?
      BNE     TS10-10 ;BR TO ERROR HALT ON SEQ ERROR
      MOV     #0,@#0       ;CLEAR LOCATION
      SEC
      ROL     @#0          ;SET CARRY
      BCC     TS10        ;ROTATE CARRY BIT TO BIT 0
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
      ;          CONDITIONAL BRANCH INST. AND <-
      ;          REPLACE THE MOVE INSTRUCTION <-
      ;          WHICH FOLLOWS W/ 770 <-
      MOV     #12,-(R2)     ;MOVE TO MAILBOX # ***** 12 *****
      INC     -(R2)
      HALT                 ;SET MSGTYP TO FATAL ERROR
                               ;CARRY CLEAR
                               ; OR SEQUENCE ERROR
                               ;BIT 0 SET
```

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <-
: REPLACE THE MOVE INSTRUCTION <-
: WHICH FOLLOWS W/ 760 <-

```
MOV     #13,-(R2)     ;MOVE TO MAILBOX # ***** 13 *****
INC     -(R2)
HALT                 ;SET MSGTYP TO FATAL ERROR
                               ;BIT 0 NOT SET
                               ; OR SEQUENCE ERROR
```

:TEST 10 LEFT SHIFT FROM BIT 0 TO C-BIT

```
649 001456 005212          TS10:  INC      (R2)          ;UPDATE TEST NUMBER
650 001460 022712 000010    CMP      #10,(R2)         ;SEQUENCE ERROR?
651 001464 001014          BNE     TS11-10          ;BR TO ERROR HALT ON SEQ ERROR
652 001466 012737 000001 000000 MOV     #1,@#0           ;SET BIT 0
653 001474 012700 177757    MOV     #-21,R0          ;SET BIT COUNTER
654 001500 000241          CLC                    ;CLEAR C-BIT
655 001502 005200          SHL:   INC      R0          ;INCREMENT BIT COUNTER
656 001504 001404          BEQ     SHLE            ;BR TO ERROR HALT IF BIT IS LOST
657 001506 006137 000000    ROL     @#0             ;SHIFT LEFT ONE POSITION
658 001512 103373          BCC     SHL             ;BRANCH IF C-BIT NOT SET
659 001514 001404          BEQ     TS11
660                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
661                                     ; CONDITIONAL BRANCH INST. AND <====
662                                     ; REPLACE THE MOVE INSTRUCTION <====
663                                     ; WHICH FOLLOWS W/ 763 <====
664 001516                                     SHLE:
665 001516 012742 000014    MOV     #14,-(R2)        ;MOVE TO MAILBOX # ***** 14 *****
666 001522 005242          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
667 001524 000000          HALT                    ;LEFT SHIFTING LOGIC FAILED
668                                     ; OR SEQUENCE ERROR
669
670 :*****
671 :TEST 11      SHIFT BIT 15 TO BIT 14
672 :*****
673 001526 005212          TS11:  INC      (R2)          ;UPDATE TEST NUMBER
674 001530 022712 000011    CMP     #11,(R2)         ;SEQUENCE ERROR?
675 001534 001012          BNE     TS12-10          ;BR TO ERROR HALT ON SEQ ERROR
676 001536 012737 100000 000000 MOV     #100000,@#0      ;SET BIT 15
677 001544 000241          CLC                    ;CLEAR CARRY
678 001546 006037 000000    ROR     @#0             ;SHIFT BIT 15 TO BIT 14
679 001552 022737 040000 000000 CMP     #40000,@#0       ;SUCCESSFUL
680 001560 001404          BEQ     TS12
681                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
682                                     ; CONDITIONAL BRANCH INST. AND <====
683                                     ; REPLACE THE MOVE INSTRUCTION <====
684                                     ; WHICH FOLLOWS W/ 765 <====
685 001562 012742 000015    MOV     #15,-(R2)        ;MOVE TO MAILBOX # ***** 15 *****
686 001566 005242          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
687 001570 000000          HALT                    ;BIT 14 NOT SET
688                                     ; OR SEQUENCE ERROR
689
690 :*****
691 :TEST 12      RIGHT SHIFT FROM BIT 15 TO C-BIT
692 :*****
693 001572 005212          TS12:  INC      (R2)          ;UPDATE TEST NUMBER
694 001574 022712 000012    CMP     #12,(R2)         ;SEQUENCE ERROR?
695 001600 001014          BNE     TS13-10          ;BR TO ERROR HALT ON SEQ ERROR
696 001602 012737 100000 000000 MOV     #100000,@#0      ;SET BIT 15
697 001610 012700 177757    MOV     #-21,R0          ;SET BIT COUNTER
698 001614 000241          CLC                    ;CLEAR C-BIT
699 001616 005200          SHR:   INC      R0          ;INCREMENT BIT COUNTER
700 001620 001404          BEQ     SHRE            ;BR TO ERROR HALT IF BIT IS LOST
701 001622 006037 000000    ROR     @#0             ;ROTATE RIGHT ONE POSITION
702 001626 103373          BCC     SHR             ;BRANCH IF C-BIT CLEAR
703 001630 001404          BEQ     TS13
704                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
```

```
705 ; ; ; CONDITIONAL BRANCH INST. AND <-->
706 ; ; ; REPLACE THE MOVE INSTRUCTION <-->
707 ; ; ; WHICH FOLLOWS W/ 763 <-->
708 001632 SHRE: MOV #16,-(R2) ;MOVE TO MAILBOX # ***** 16 *****
709 001632 012742 000016 INC -(R2) ;SET MSGTYP TO FATAL ERROR
710 001636 005242 ;RIGHT SHIFT LOGIC FAILED
711 001640 000000 HALT ; OR SEQUENCE ERROR
712 ;
713 ;
```

```
714 ;*****
715 ;SBTTL SCRATCH AD TESTS
716 ;
717 ; THE SCRATCH PAD TESTS ARE USED TO VERIFY THAT VARIOUS
718 ;DATA PATTERNS CAN BE SUCCESSFULLY HELD IN THE SCRATCH PAD
719 ;CIRCUITRY. MOVE AND COMPARE INSTRUCTIONS ARE USED TO TEST THAT
720 ;R0 CAN HOLD VARIOUS DATA PATTERNS. EACH DATA PATTERN IS
721 ;MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR SCOPING. THE
722 ;SUCCESSFUL COMPLETION OF THESE TESTS SHOULD VERIFY THE CIRCUITRY EXTERNAL
723 ;TO THE SCRATCH PAD ITSELF.
724 ; THE REMAINDER OF THE GENERAL REGISTERS ARE TESTED BY MOVING
725 ;A BIT INTO BIT 0 OF THE REGISTER AND SHIFTING IT LEFT ONE
726 ;BIT AT A TIME INTO THE CARRY BIT. THE RESULT IS THEN CHECKED TO INSURE THAT
727 ;NO BITS WERE PICKED. THE PROCEDURE IS THEN REPEATED UNDER OPPOSITE
728 ;CONDITIONS. THE GENERAL REGISTER AND THE CARRY BIT ARE SET TO
729 ;ALL ONES, AND A ZERO IS SHIFTED LEFT FROM BIT 0 INTO THE CARRY BIT.
730 ;THE RESULT IS THEN CHECKED TO INSURE THAT NO ZEROES WERE PICKED.
731 ; AT THIS POINT ALL OF THE GENERAL REGISTERS HAVE BEEN EXERCISED
732 ;AS WELL AS REGISTER 11.
733 ;
```

```
734 ;*****
735 ;TEST 13 TEST IF R0 CAN HOLD ALL ZEROES
736 ;*****
737 001642 005212 TS13: INC (R2) ;UPDATE TEST NUMBER
738 001644 022712 000013 CMP #15,(R2) ;SEQUENCE ERROR?
739 001650 001004 BNE TS14-10 ;BR TO ERROR HALT ON SEQ ERROR
740 ;
741 001652 012700 000000 MOV #0,R0 ;MOVE ZEROES TO R0
742 001656 005700 TST R0 ;SUCCESSFUL?
743 001660 001404 BEQ TS14
744 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
745 ; CONDITIONAL BRANCH INST. AND <
746 ; REPLACE THE MOVE INSTRUCTION <=-
747 ; WHICH FOLLOWS W/ 773 <
748 001662 012742 000017 MOV #17,-(R2) ;MOVE TO MAILBOX # ***** 17 *****
749 001666 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
750 001670 000000 HALT ;R0 NOT 0
751 ; OR SEQUENCE ERROR
752 ;
```

```
753 ;*****
754 ;TEST 14 TEST IF R0 CAN HOLD ONES AND ZEROES
755 ;*****
756 001672 005212 TS14: INC (R2) ;UPDATE TEST NUMBER
757 001674 022712 000014 CMP #14,(R2) ;SEQUENCE ERROR?
758 001700 001005 BNE TS15-10 ;BR TO ERROR HALT ON SEQ ERROR
759 001702 012700 125252 MOV #125252,R0 ;MOVE ALTERNATING ONES AND ZEROES TO R0
760 001706 020027 125252 CMP R0,#125252 ;SUCCESSFUL?
```

```
761 001712 001404          BEQ      TS15          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <= - -
762                                     ;          CONDITIONAL BRANCH INST. AND <= - -
763                                     ;          REPLACE THE MOVE INSTRUCTION <= - -
764                                     ;          WHICH FOLLOWS W/ 772 <= - -
765                                     ;          MOVE TO MAILBOX # ***** 20 *****
766 001714 012742 000020    MOV      #20,-(R2)      ; MOVE TO MAILBOX # ***** 20 *****
767 001720 005242          INC      -(R2)        ; SET MSGTYP TO FATAL ERROR
768 001722 000000          HALT                    ; RO NOT 125252
769                                     ; OR SEQUENCE ERROR
770
```

```
771 :*****
772 :TEST 15      TEST IF RO CAN HOLD ZEROES AND ONES
773 :*****
```

```
774 001724 005212          TS15:  INC      (R2)          ; UPDATE TEST NUMBER
775 001726 022712 000015    CMP      #15,(R2)      ; SEQUENCE ERROR?
776 001732 001005          BNE     TS16-10        ; BR TO ERROR HALT ON SEQ ERROR
777 001734 012700 052525    MOV      #052525,R0    ; MOVE ALTERNATING ZEROES AND ONES TO RO
778 001740 020027 052525    CMP      R0,#052525    ; SUCCESSFUL?
779 001744 001404          BEQ     TS16
```

```
780                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
781                                     ;          CONDITIONAL BRANCH INST. AND <
782                                     ;          REPLACE THE MOVE INSTRUCTION <
783                                     ;          WHICH FOLLOWS W/ 772 <
784 001746 012742 000021    MOV      #21,-(R2)      ; MOVE TO MAILBOX # ***** 21 *****
785 001752 005242          INC      -(R2)        ; SET MSGTYP TO FATAL ERROR
786 001754 000000          HALT                    ; RO NOT 52525
787                                     ; OR SEQUENCE ERROR
788
```

```
789 :*****
790 :TEST 16      TEST IF RO CAN HOLD ALL ONES
791 :*****
```

```
792 001756 005212          TS16:  INC      (R2)          ; UPDATE TEST NUMBER
793 001760 022712 000016    CMP      #16,(R2)      ; SEQUENCE ERROR?
794 001764 001005          BNE     TS17-10        ; BR TO ERROR HALT ON SEQ ERROR
795 001766 012700 177777    MOV      #177777,R0    ; MOVE ALL ONES TO RO
796 001772 020027 177777    CMP      R0,#177777    ; SUCCESSFUL?
797 001776 001404          BEQ     TS17
```

```
798                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < -
799                                     ;          CONDITIONAL BRANCH INST. AND < -
800                                     ;          REPLACE THE MOVE INSTRUCTION < -
801                                     ;          WHICH FOLLOWS W/ 772 < -
802 002000 012742 000022    MOV      #22,-(R2)      ; MOVE TO MAILBOX # ***** 22 *****
803 002004 005242          INC      -(R2)        ; SET MSGTYP TO FATAL ERROR
804 002006 000000          HALT                    ; RO NOT 177777
805                                     ; OR SEQUENCE ERROR
806
```

```
807 :*****
808 :TEST 17      TEST IF R1 CAN HOLD A ONE IN ALL BITS
809 :*****
```

```
810 002010 005212          TS17:  INC      (R2)          ; UPDATE TEST NUMBER
811 002012 022712 000017    CMP      #17,(R2)      ; SEQUENCE ERROR?
812 002016 001012          BNE     TS20-10        ; BR TO ERROR HALT ON SEQ ERROR
813 002020 012701 000001    MOV      #1,R1         ; SET BIT 0
814 002024 012700 177757    MOV      #-21,R0       ; SET BIT COUNTER
815 002030 000241          CLC                    ; CLEAR C-BIT
816 002032 005200          REG1: INC      R0      ; INCREMENT BIT COUNTER
```



```
873 002160 012702 000304      MOV    # $TESTN,R2      ;RESTORE POINTER
874 002164 012742 000025      MOV    #25,-(R2)        ;MOVE TO MAILBOX # ***** 25 *****
875 002170 005242              INC    -(R2)            ;SET MSGTYP TO FATAL ERROR
876 002172 000000              HALT                   ;FAILURE WITH R2
877 002174 012702 000304 REG2A: MOV    # $TESTN,R2      ;RESTORE POINTER
```

```
878
879
880 ;*****
881 ;TEST 22 TEST IF R2 CAN HOLD A ZERO IN ALL BITS
882 ;*****
```

```
882 002200 005212              TS22: INC    (R2)          ;UPDATE TEST NUMBER
883 002202 022712 000022      CMP    #22,(R2)        ;SEQUENCE ERROR?
884 002206 001020              BNE    TS23-10         ;BR TO ERROR HALT ON SEQ ERROR
885 002210 012702 177776      MOV    #-2,R2          ;SET ALL ONES IN R2 EXCEPT FOR BIT 0
886 002214 012700 177757      MOV    #-21,R0         ;SET BIT COUNTER
887 002220 000261              SEC                   ;SET C-BIT
888 002222 005200              REG2B: INC   R0          ;INCREMENT BIT COUNTER
889 002224 001407              BEQ    R2ERR           ;BR TO ERROR HALT IF COUNTER=0
890 002226 006102              ROL    R2              ;ROTATE 1 POSITION
891 002230 103774              BCS   REG2B            ;CONTINUE UNTIL C-BIT IS CLEAR
892 002232 022702 177777      CMP    #-1,R2          ;CHECK DATA IN R2
893 002236 001406              BEQ    REG2C           ;
894 002240 012702 000304 REG2C: MOV    # $TESTN,R2      ;RESTORE POINTER
895 002244              R2ERR:
896 002244 012742 000026      MOV    #26,-(R2)        ;MOVE TO MAILBOX # ***** 26 *****
897 002250 005242              INC    -(R2)            ;SET MSGTYP TO FATAL ERROR
898 002252 000000              HALT                   ;FAILURE WITH R2
899 002254 012702 000304 REG2C: MOV    # $TESTN,R2      ;RESTORE POINTER
```

```
900
901 ;*****
902 ;TEST 23 TEST IF R3 CAN HOLD A ONE IN ALL BITS
903 ;*****
```

```
904 002260 005212              TS23: INC    (R2)          ;UPDATE TEST NUMBER
905 002262 022712 000023      CMP    #23,(R2)        ;SEQUENCE ERROR?
906 002266 001012              BNE    TS24-10         ;BR TO ERROR HALT ON SEQ ERPOR
907 002270 012703 000001      MOV    #1,R3           ;SET BIT 0
908 002274 012700 177757      MOV    #-21,R0         ;SET BIT COUNTER
909 002300 000241              CLC                   ;CLEAR C-BIT
910 002302 005200              REG3: INC   R0          ;INCREMENT BIT COUNTER
911 002304 001403              BEQ    REG3E           ;BR TO ERROR HALT IF BIT IS LOST
912 002306 006103              ROL    R3              ;ROTATE 1 POSITION
913 002310 103374              BCC   REG3             ;ALL DONE
914 002312 001404              BEQ    TS24
```

```
915
916 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
917 ; CONDITIONAL BRANCH INST. AND <
918 ; REPLACE THE MOVE INSTRUCTION <
919 ; WHICH FOLLOWS W/ 765 <
```

```
919 002314              REG3E:
920 002314 012742 000027      MOV    #27,-(R2)        ;MOVE TO MAILBOX # ***** 27 *****
921 002320 005242              INC    -(R2)            ;SET MSGTYP TO FATAL ERROR
922 002322 000000              HALT                   ;FAILURE WITH R3
923
924 ; OR SEQUENCE ERROR
```

```
925 ;*****
926 ;TEST 24 TEST IF R3 CAN HOLD A ZERO IN ALL BITS
927 ;*****
```

```
928 002324 005212              TS24: INC    (R2)          ;UPDATE TEST NUMBER
```

```
929 002326 022712 000024      CMP      #24,(R2)      ;SEQUENCE ERROR?
930 002332 001014              BNE      TS25-10      ;BR TO ERROR HALT ON SEQ ERROR
931 002334 012703 177776      MOV      #-2,R3      ;SET ALL ONES IN R3 EXCEPT FOR BIT 0
932 002340 012700 177757      MOV      #-21,R0     ;SET BIT COUNTER
933 002344 000261              SEC      ;SET C-BIT
934 002346 005200      REG3A: INC      R0      ;INCREMENT BIT COUNTER
935 002350 001405              BEQ      R3ERR      ;BR TO ERROR HALT IF COUNTER=0
936 002352 006103              ROL      R3          ;ROTATE 1 POSITION
937 002354 103774              BCS      REG3A      ;CONTINUE UNTIL C-BIT IS CLEAR
938 002356 022703 177777      CMP      #-1,R3     ;CHECK DATA
939 002362 001404              BEQ      TS25
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 763 <
```

```
944 002364              R3ERR: MOV      #30,-(R2)   ;MOVE TO MAILBOX # ***** 30 *****
945 002364 012742 000030      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
946 002370 005242              HALT     ;FAILURE WITH R3
947 002372 000000              ; OR SEQUENCE ERROR
```

```
*****
;TEST 25 TEST IF R4 CAN HOLD A ONE IN ALL BITS
*****
```

```
953 002374 005212      TS25: INC      (R2)      ;UPDATE TEST NUMBER
954 002376 022712 000025      CMP      #25,(R2)   ;SEQUENCE ERROR?
955 002402 001012              BNE      TS26-10      ;BR TO ERROR HALT ON SEQ ERROR
956 002404 012704 000001      MOV      #1,R4      ;SET BIT 0
957 002410 012700 177757      MOV      #-21,R0     ;SET BIT COUNTER
958 002414 000241              CLC      ;CLEAR C-BIT
959 002416 005200      REG4: INC      R0      ;INCREMENT BIT COUNTER
960 002420 001403              BEQ      REG4E      ;BR TO ERROR HALT IF BIT IS LOST
961 002422 006104              ROL      R4          ;ROTATE 1 POSITION
962 002424 103374              BCC      REG4      ;ALL DONE
963 002426 001404              BEQ      TS26
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 765 <
```

```
968 002430              REG4E: MOV      #31,-(R2)   ;MOVE TO MAILBOX # ***** 31 *****
969 002430 012742 000031      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
970 002434 005242              HALT     ;FAILURE WITH R4
971 002436 000000              ; OR SEQUENCE ERROR
```

```
*****
;TEST 26 TEST IF R4 CAN HOLD A ZERO IN ALL BITS
*****
```

```
977 002440 005212      TS26: INC      (R2)      ;UPDATE TEST NUMBER
978 002442 022712 000026      CMP      #26,(R2)   ;SEQUENCE ERROR?
979 002446 001014              BNE      TS27-10      ;BR TO ERROR HALT ON SEQ ERROR
980 002450 012704 177776      MOV      #-2,R4      ;SET ALL ONES IN R4 EXCEPT FOR BIT 0
981 002454 012700 177757      MOV      #-21,R0     ;SET BIT COUNTER
982 002460 000261              SEC      ;SET C-BIT
983 002462 005200      REG4A: INC      R0      ;INCREMENT BIT COUNTER
984 002464 001405              BEQ      R4ERR      ;BR TO ERROR HALT IF COUNTER 0
```

```
985 002466 006104 ROL R4 ;ROTATE 1 POSITION
986 002470 103774 BCS REG4A ;CONTINUE UNTIL C-BIT IS CLEAR
987 002472 022704 177777 CMP #-1,R4 ;CHECK DATA
988 002476 001404 BEQ TS27
989 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
990 ; CONDITIONAL BRANCH INST. AND <-
991 ; REPLACE THE MOVE INSTRUCTION <-
992 ; WHICH FOLLOWS W/ 763 <
993 002500 R4ERR:
994 002500 012742 000032 MOV #32,-(R2) ;MOVE TO MAILBOX # ***** 32 *****
995 002504 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
996 002506 000000 HALT ;FAILURE WITH R4
997 ; OR SEQUENCE ERROR
998
999
```

```
1000 *****
1001 :TEST 27 TEST IF R5 CAN HOLD A ONE IN ALL BITS
1002 *****
1003 002510 005212 TS27: INC (R2) ;UPDATE TEST NUMBER
1004 002512 022712 000027 CMP #27,(R2) ;SEQUENCE ERROR?
1005 002516 001012 BNE TS30-10 ;BR TO ERROR HALT ON SEQ ERROR
1006 002520 012705 000001 MOV #1,R5 ;SET BIT 0
1007 002524 012700 177757 MOV #-21,R0 ;SET BIT COUNTER
1008 002530 000241 CLC ;CLEAR C-BIT
1009 002532 005200 REG5: INC R0 ;INCREMENT BIT COUNTER
1010 002534 001403 BEQ REG5E ;BR TO ERROR HALT IF BIT IS LOST
1011 002536 006105 ROL R5 ;ROTATE 1 POSITION
1012 002540 103374 BCC REG5 ;ALL DONE
1013 002542 001404 BEQ TS30
```

```
1014 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1015 ; CONDITIONAL BRANCH INST. AND <
1016 ; REPLACE THE MOVE INSTRUCTION <
1017 ; WHICH FOLLOWS W/ 765 <
1018 002544 REG5E:
1019 002544 012742 000033 MOV #33,-(R2) ;MOVE TO MAILBOX # ***** 33 *****
1020 002550 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1021 002552 000000 HALT ;FAILURE WITH R5
1022 ; OR SEQUENCE ERROR
1023
1024
```

```
1025 *****
1026 :TEST 30 TEST IF R5 CAN HOLD A ZERO IN ALL BITS
1027 *****
1028 002554 005212 TS30: INC (R2) ;UPDATE TEST NUMBER
1029 002556 022712 000030 CMP #30,(R2) ;SEQUENCE ERROR?
1030 002562 001014 BNE TS31-10 ;BR TO ERROR HALT ON SEQ ERROR
1031 002564 012705 177776 MOV #-2,R5 ;SET ALL ONES IN R5 EXCEPT FOR BIT 0
1032 002574 000261 MOV #-21,R0 ;SET BIT COUNTER
1033 002576 005200 REG5A: INC R0 ;INCREMENT BIT COUNTER
1034 002600 001405 BEQ RSERR ;BR TO ERROR HALT IF COUNTER 0
1035 002602 006105 ROL R5 ;ROTATE 1 POSITION
1036 002604 103774 BCS REG5A ;CONTINUE UNTIL C-BIT IS CLEAR
1037 002606 022705 177777 CMP #-1,R5 ;CHECK DATA
1038 002612 001404 BEQ TS31
```

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1039 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1040 ; CONDITIONAL BRANCH INST. AND <
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1041 :
1042 : REPLACE THE MOVE INSTRUCTION <===
1043 : WHICH FOLLOWS W/ 763 <===
1044 R5ERR: 002614 012742 000034 MOV #34, -(R2) ;MOVE TO MAILBOX # ***** 34 *****
1045 002620 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1046 002627 000000 HALT ;FAILURE WITH R5
1047 : ; OR SEQUENCE ERROR
1048 :
1049 :
1050 :*****
1051 :TEST 31 TEST IF R6 CAN HOLD A ONE IN ALL BITS
1052 :*****
1053 TS31: 002624 005212 INC (R2) ;UPDATE TEST NUMBER
1054 002626 022712 000031 CMP #31, (R2) ;SEQUENCE ERROR?
1055 002632 001015 BNE TS32-10 ;BR TO ERROR HALT ON SEQ ERROR
1056 002634 012767 000340 175134 MOV #340, PS ;LOCK OUT INTERRUPTS WHILE PLAYING WITH R6
1057 002642 012706 000001 MOV #1, R6 ;SET BIT 0
1058 002646 012700 177757 MOV #-21, R0 ;SET BIT COUNTER
1059 002652 000241 CLC ;CLEAR C-BIT
1060 REG6: 002654 005200 INC R0 ;INCREMENT BIT COUNTER
1061 002656 001403 BEQ REG6E ;BR TO ERROR HALT IF BIT IS LOST
1062 002660 006106 ROL R6 ;ROTATE 1 POSITION
1063 002662 103374 BCC REG6 ;ALL DONE
1064 002664 001404 BEQ TS32
1065 : ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1066 : CONDITIONAL BRANCH INST. AND <
1067 : REPLACE THE MOVE INSTRUCTION <
1068 : WHICH FOLLOWS W/ 762 <
1069 REG6E: 002666 012742 000035 MOV #35, -(R2) ;MOVE TO MAILBOX # ***** 35 *****
1070 002672 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1071 002674 000000 HALT ;FAILURE WITH R6
1072 : ; OR SEQUENCE ERROR
1073 :
1074 :
1075 :*****
1076 :TEST 32 TEST IF R6 CAN HOLD A ZERO IN ALL BITS
1077 :*****
1078 TS32: 002676 005212 INC (R2) ;UPDATE TEST NUMBER
1079 002700 022712 000032 CMP #32, (R2) ;SEQUENCE ERROR?
1080 002704 001014 BNE TS33-10 ;BR TO ERROR HALT ON SEQ ERROR
1081 002706 012706 177776 MOV #-2, R6 ;SET ALL ONES IN R6 EXCEPT FOR BIT 0
1082 002712 012700 177757 MOV #-21, R0 ;SET BIT COUNTER
1083 002716 000261 SEC ;SET C-BIT
1084 REG6A: 002720 005200 INC R0 ;INCREMENT BIT COUNT
1085 002722 001405 BEQ R6ERR ;BR TO ERROR HALT IF COUNTER 0
1086 002724 006106 ROL R6 ;ROTATE 1 POSITION
1087 002726 103774 BCS REG6A ;CONTINUE UNTIL C-BIT IS CLEAR
1088 002730 022706 177777 CMP #-1, R6 ;CHECK DATA
1089 002734 001404 BEQ TS33
1090 : ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1091 : CONDITIONAL BRANCH INST. AND <
1092 : REPLACE THE MOVE INSTRUCTION <
1093 : WHICH FOLLOWS W/ 763 <
1094 R6ERR: 002736 012742 000036 MOV #36, -(R2) ;MOVE TO MAILBOX # ***** 36 *****
1095 002742 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1096 002744 000000 HALT ;FAILURE WITH R6
```

: OR SEQUENCE ERROR

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.....
:SBTTL PSW TESTS
:.....

: THE PSW TESTS ARE USED TO VERIFY THAT VARIOUS DATA
: PATTERNS CAN BE SUCCESSFULLY HELD IN THE PSW AND THAT THE
: PSW ADDRESSING LOGIC IS FUNCTIONING. MOVE AND COMPARE INSTRUCTIONS
: ARE USED TO TEST THAT THE PSW CAN HOLD VARIOUS DATA PATTERNS.
: EACH DATA PATTERN IS MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR
: SCOPING.

: THE PSW REGISTER IS TESTED, THE CC INPUTS ARE TESTED
: LATER IN THE MICROCODE TESTS. SETTING OF THE T-BIT BY THE
: TEST PATTERNS IS PURPOSELY AVOIDED. TESTING OF THE
: T-BIT TRAP CIRCUITRY IS LEFT FOR THE TRAP TEST.

.....
:TEST 33 TEST IF PSW WILL HOLD ZEROES
:.....

TS33: INC (R2) ;UPDATE TEST NUMBER
CMP #33,(R2) ;SEQUENCE ERROR?
BNE TS34-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #STBOT,R6
MOV #0,@#PS ;SET PSW TO ZERO
TST @#PS ;SUCCESSFUL
BEQ TS34

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 767 <
: MOVE TO MAILBOX # ***** 37 *****
: SET MSGTYP TO FATAL ERROR
: PSW NOT 0
: OR SEQUENCE ERROR

.....
:TEST 34 TEST IF PSW WILL HOLD ONES AND ZEROES
:.....

TS34: INC (R2) ;UPDATE TEST NUMBER
CMP #34,(R2) ;SEQUENCE ERROR?
BNE TS35-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #252,@#PS ;MOVE ALT. ONES AND ZEROES TO PSW
CMP @#PS,#252 ;SUCCESSFUL?
BEQ TS35

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 770 <
: MOVE TO MAILBOX # ***** 40 *****
: SET MSGTYP TO FATAL ERROR
: PSW NOT 252
: OR SEQUENCE ERROR

.....
:TEST 35 TEST IF PSW (EXCEPT T-BIT) WILL HOLD ZEROES AND ONES
:.....

1153	003044	005212			TS35: INC (R2)	:UPDATE TEST NUMBER
1154	003046	022712	000035		CMP #35,(R2)	:SEQUENCE ERROR?
1155	003052	001007			BNE TS36-10	:BR TO ERROR HALT ON SEQ ERROR
1156	003054	012737	000105	177776	MOV #105,@#PS	:MOVE ALI. ONES AND ZEROES TO PSW
1157	003062	023727	177776	000105	CMP @#PS,#105	:SUCCESSFUL?
1158	003070	001404			BEQ TS36	
1159						: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
1160						: CONDITIONAL BRANCH INST. AND
1161						: REPLACE THE MOVE INSTRUCTION
1162						: WHICH FOLLOWS W/ 770
1163	003072	012742	000041		MOV #41,-(R2)	:MOVE TO MAILBOX # ***** 41 *****
1164	003076	005242			INC -(R2)	:SET MSGTYP TO FATAL ERROR
1165	003100	000000			HALT	:PSW NOT 105
1166						: OR SEQUENCE ERROR

:TEST 36 TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES

1171	003102	005212			TS36: INC (R2)	:UPDATE TEST NUMBER
1172	003104	022712	000036		CMP #36,(R2)	:SEQUENCE ERROR?
1173	003110	001007			BNE TS37-10	:BR TO ERROR HALT ON SEQ ERROR
1174	003112	012737	000357	177776	MOV #357,@#PS	:MOVE ONES TO PSW
1175	003120	023727	177776	000357	CMP @#PS,#357	:SUCCESSFUL
1176	003126	001404			BEQ TS37	
1177						: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
1178						: CONDITIONAL BRANCH INST. AND
1179						: REPLACE THE MOVE INSTRUCTION
1180						: WHICH FOLLOWS W/ 770
1181	003130	012742	000042		MOV #42,-(R2)	:MOVE TO MAILBOX # ***** 42 *****
1182	003134	005242			INC -(R2)	:SET MSGTYP TO FATAL ERROR
1183	003136	000000			HALT	:PSW NOT 357
1184						: OR SEQUENCE ERROR

.SBTTL CONDITION CODE TEST

:
: THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE Z-BIT.
: THE Z-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
: BEQ AND BNE ARE TESTED FOR PROPER EXECUTION. THEN THE Z-BIT IS
: SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
: AGAIN FOR PROPER OPERATION.
: THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
: CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
: BRANCH ROM. THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
: LEAVING THE PC UNALTERED IS TESTED. ONLY THOSE ROM ADDRESSES SPECIFICALLY
: USED IN THE TEST ARE VERIFIED HERE.
:

:TEST 37 TEST BRANCHES AROUND Z-BIT

1203	003140	005212			TS37: INC (R2)	:UPDATE TEST NUMBER
1204	003142	022712	000037		CMP #37,(R2)	:SEQUENCE ERROR?
1205	003146	001014			BNE TS40-10	:BR TO FRROR HALT ON SEQ ERROR
1206						:FIRST WITH Z-BIT ON
1207	003150	000257			CCC	:CC=0100: JUST Z-BIT
1208	003152	000264			SEZ	

```
1209 003154 001001          BNE    BRZ1          ;CHECK OPPOSITE CONDITION
1210 003156 001404          BEQ    BRZ2          ;
1211                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
1212                          ;          CONDITIONAL BRANCH INST. AND <---
1213                          ;          REPLACE THE MOVE INSTRUCTION <---
1214                          ;          WHICH FOLLOWS W/ 773 <---
1215 003160
1216 003160 012742 000043    BRZ1:  MOV    #43,-(R2)  ;MOVE TO MAILBOX # ***** 43 *****
1217 003164 005242          INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
1218 003166 000000          HALT                   ;IMPROPER BR W/ Z-1
1219                          ;CHECK WITH Z-BIT OFF
1220 003170 000277          BRZ2:  SCC                   ;CC=1011: ALL BUT Z-BIT
1221 003172 000244          CLZ
1222 003174 001401          BEQ    BRZ3
1223 003176 001004          BNE    TS40
1224                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
1225                          ;          CONDITIONAL BRANCH INST. AND <---
1226                          ;          REPLACE THE MOVE INSTRUCTION <---
1227                          ;          WHICH FOLLOWS W/ 763 <---
1228 003200
1229 003200 012742 000044    BRZ3:  MOV    #44,-(R2)  ;MOVE TO MAILBOX # ***** 44 *****
1230 003204 005242          INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
1231 003206 000000          HALT                   ;IMPROPER BR W/ Z=0
1232                          ; OR SEQUENCE ERROR
1233
1234 :*****
1235 :
1236 :          THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE N-BIT.
1237 :THE N-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
1238 :BMI AND BPL ARE TESTED FOR PROPER EXECUTION. THEN THE N-BIT IS
1239 :SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
1240 :AGAIN FOR PROPER OPERATION.
1241 :          THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
1242 :CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
1243 :BRANCH ROM. THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
1244 :LEAVING THE PC UNALTERED IS TESTED. ONLY THOSE ROM ADDRESSES SPECIFICALLY
1245 :USED IN THE TEST ARE VERIFIED HERE.
1246 :
1247 :*****
1248 :TEST 40          TEST BRANCHES AROUND N-BIT
1249 :*****
1250 003210 005212          TS40:  INC    (R2)         ;UPDATE TEST NUMBER
1251 003212 022712 000040    CMP    #40,(R2)       ;SEQUENCE ERROR?
1252 003216 001014          BNE    TS41-10        ;BR TO ERROR HALT ON SEQ ERROR
1253                          ;FIRST WITH N-BIT ON
1254 003220 000257          CCC                   ;CC=1000: JUST N-BIT
1255 003222 000270          SEN
1256 003224 100001          BPL    BRN1
1257 003226 100404          BMI    BRN2
1258                          ;CHECK OPPOSITE CONDITION
1259                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
1260                          ;          CONDITIONAL BRANCH INST. AND <---
1261                          ;          REPLACE THE MOVE INSTRUCTION <---
1262                          ;          WHICH FOLLOWS W/ 773 <---
1263 003230
1264 003230 012742 000045    BRN1:  MOV    #45,-(R2)  ;MOVE TO MAILBOX # ***** 45 *****
1264 003234 005242          INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
```



```
1265 003236 000000          HALT                ;IMPROPER BR W/ N-1
1266                          ;CHECK WITH N-BIT OFF
1267 003240 000277          BRN2.  SCC           ;CC=0111
1268 003242 000250          CLN
1269 003244 100401          BMI      BRN3       ;CHECK OPPOSITE CONDITION
1270 003246 100004          BPL      TS41
1271                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1272                          ;          CONDITIONAL BRANCH INST. AND <====
1273                          ;          REPLACE THE MOVE INSTRUCTION <====
1274                          ;          WHICH FOLLOWS W/ 763 <====
1275 003250
1276 003250 012742 000046          BRN3:  MOV      #46,-(R2) ;MOVE TO MAILBOX # ***** 46 *****
1277 003254 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1278 003256 000000          HALT                ;IMPROPER BR W/ N=0
1279                          ; OR SEQUENCE ERROR
1280
1281 :*****
1282 :
1283 :          THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE V-BIT.
1284 :THE V-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
1285 :BVS AND BVC ARE TESTED FOR PROPER EXECUTION. THEN THE V-BIT IS
1286 :SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
1287 :AGAIN FOR PROPER OPERATION.
1288 :
1289 :*****
1290 :TEST 41          TEST BRANCHES AROUND V-BIT
1291 :*****
1292 003260 005212          TS41:  INC      (R2)    ;UPDATE TEST NUMBER
1293 003262 022712 000041          CMP      #41,(R2)    ;SEQUENCE ERROR?
1294 003266 001014          BNE      TS42-10    ;BR TO ERROR HALT ON SEQ ERROR
1295                          ;FIRST WITH V-BIT ON
1296 003270 000257          CCC                ;CC=0010: JUST V-BIT
1297 003272 000262          SEV
1298 003274 102001          BVC      BRV1       ;CHECK OPPOSITE CONDITION
1299 003276 102404          BVS      BRV2
1300                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
1301                          ;          CONDITIONAL BRANCH INST. AND <==
1302                          ;          REPLACE THE MOVE INSTRUCTION <==
1303                          ;          WHICH FOLLOWS W/ 773 <==
1304 003300
1305 003300 012742 000047          BRV1:  MOV      #47,-(R2) ;MOVE TO MAILBOX # ***** 47 *****
1306 003304 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1307 003306 000000          HALT                ;IMPROPER BR W/ V=1
1308                          ;CHECK WITH V-BIT OFF
1309 003310 000277          BRV2:  SCC           ;CC=1101: ALL BVT V-BIT
1310 003312 000242          CLV
1311 003314 102401          BVS      BRV3       ;CHECK OPPOSITE CONDITION
1312 003316 102004          BVC      TS42
1313                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
1314                          ;          CONDITIONAL BRANCH INST. AND <==
1315                          ;          REPLACE THE MOVE INSTRUCTION <==
1316                          ;          WHICH FOLLOWS W/ 763 <==
1317 003320
1318 003320 012742 000050          BRV3:  MOV      #50,-(R2) ;MOVE TO MAILBOX # ***** 50 *****
1319 003324 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1320 003326 000000          HALT                ;IMPROPER BR W/ V 0
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1334 003330 005212
1335 003332 022712 000042
1336 003336 001014
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1338 003340 000257
1339 003342 000261
1340 003344 103001
1341 003346 103404
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1346 003350
1347 003350 012742 000051
1348 003354 005242
1349 003356 000000
1350
1351 003360 000277
1352 003362 000241
1353 003364 103401
1354 003366 100404
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1359 003370
1360 003370 012742 000052
1361 003374 005242
1362 003376 000000
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; OR SEQUENCE ERROR

: THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE C-BIT.
: THE C-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
: BCS AND BCC ARE TESTED FOR PROPER EXECUTION. THEN THE C-BIT IS
: SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
: AGAIN FOR PROPER OPERATION.
: *****

: TEST 42 TEST BRANCHES AROUND C-BIT

TS42: INC (R2) ;UPDATE TEST NUMBER
CMP #42,(R2) ;SEQUENCE ERROR?
BNE TS43-10 ;BR TO ERROR HALT ON SEQ ERROR
;FIRST WITH C-BIT ON
CCC ;CC=0001: JUST C-BIT
SEC
BCC BRC1 ;CHECK OPPOSITE CONDITION
BCS BRC2

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <=
: REPLACE THE MOVE INSTRUCTION <-
: WHICH FOLLOWS W/ 773 <=

BRC1: MOV #51,-(R2) ;MOVE TO MAILBOX # ***** 51 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;IMPROPER BR W/ C-1
;CHECK WITH C-BIT OFF

BRC2: SCC ;CC=1110
CLC
BCS BRC3 ;CHECK OPPOSITE CONDITION
BMI TS43

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <-
: WHICH FOLLOWS W/ 763 <-

BRC3: MOV #52,-(R2) ;MOVE TO MAILBOX # ***** 52 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;IMPROPER BR W/ C=0
; OR SEQUENCE ERROR

: SBTTL MICROCODE TESTS

: THE TEST EXERCISES BRANCHES IN THE MICROCODE BY
: TESTING AT LEAST ONE INSTRUCTION FROM EVERY CLASS OF INSTRUCTION IN
: ALL POSSIBLE MODES. FOR EXAMPLE, TO TEST THE SINGLE OPERAND INSTRUCTIONS,
: AT LEAST ONE SINGLE OPERAND INSTRUCTION IS VERIFIED IN ALL UNIQUE
: ADDRESSING MODES. BYTE MODES ARE ALSO TESTED. AS EACH NEW
: MODE IS INTRODUCED THE SAME INSTRUCTION IS TRIED AND TESTED IN
: A SMALL LOOP CONVENIENT FOR SCOPING. THE TEST IS SET UP USING
: ONLY INSTRUCTIONS AND ADDRESSING MODES WHICH HAVE BEEN PREVIOUSLY
: VERIFIED.

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: IF THESE TESTS FAIL, CHECK THE RESULTS FOR A CLUE TO THE
: FAULT.

: THE CLR INSTRUCTION IS USED TO INTRODUCE EACH ADDRESSING
: MODE WITH THE SINGLE OPERAND INSTRUCTION. FOLLOWING THE SEQUENCE CHECK,
: THE CLR INSTRUCTION IS EXECUTED AND A BRANCH TEST IS EXECUTED WHICH
: CHECKS THAT THE Z-BIT WAS PROPERLY SET. THIS TEST CAN CHECK IR DECODE
: AND MICROCODE FOR SOP INSTRUCTIONS WITH MODE 0. FOLLOWING THIS TEST
: SEVERAL OTHER SOP INSTRUCTIONS ARE INTRODUCED WITH MODE 0. THESE
: INSTRUCTIONS MAINPULATE DATA AND SERVE TO CHECK THE DATA RESULTS
: OF THE SOP INSTRUCTIONS IN THIS TEST. THE DATA IN THIS TEST IS
: OPERATED ON BY EACH INSTRUCTION WITHOUT REINITIALIZING.

TEST 43 TEST MODE 0 USING SOP INST.

TS43: INC (R2) ;UPDATE TEST NUMBER
CMP #43,(R2) ;SEQUENCE ERROR?
BNE TS44-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;TRY THE CLEAR INST.
BEQ SOP0A
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 775 <-
MOV #53,-(R2) ;MOVE TO MAILBOX # ***** 53 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CLR DID NOT SET Z-BIT
SOP0A: INC R0 ;TRY THE INCREMENT INST.
COM R0 ;TRY COMPLEMENT
INC R0
BMI SOP0B
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 765 <-
MOV #54,-(R2) ;MOVE TO MAILBOX # ***** 54 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;NEGATE DID NOT SET N-BIT
SOP0B: COM R0 ;TRY COMPLEMENT INST.
BEQ TS44
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== -
: CONDITIONAL BRANCH INST. AND <== -
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 757 <====
MOV #55,-(R2) ;MOVE TO MAILBOX # ***** 55 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CUMMULATIVE RESULT OF CLR,INC,NEG AND COM INSTS. FAILED
: OR SEQUENCE ERROR

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1447 003462 022712 000044
1448 003466 001021
1449 003470 005000
1450 003472 005300
1451 003474 100404
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1456 003476 012742 000056
1457 003502 005242
1458 003504 000000
1459 003506 000261
1460 003510 005500
1461 003512 001007
1462 003514 000261
1463 003516 005600
1464 003520 100004
1465 003522 005100
1466 003524 005200
1467 003526 005300
1468 003530 001404
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1471
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1473 003532
1474 003532 012742 000057
1475 003536 005242
1476 003540 000000
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.....  
: THIS TEST INTRODUCES THE REMAINING SOP INSTRUCTIONS AND TESTS  
: THEM IN MODE 0. THE PURPOSE IS TO PROVIDE A BASELINE OF  
: INSTRUCTIONS FOR USE IN THE SUBSEQUENT TESTS. SINCE THE MICROCODE FOR  
: THESE INSTRUCTIONS IS IDENTICAL TO THAT ALREADY TESTED, ANY TROUBLE  
: SHOOTING EFFORTS SHOULD BE AIMED AT THE ACTUAL IR DECODE AND ALU  
: FUNCTIONING.  
:.....  
: TEST 44 TEST REMAINDER OF SOP INSTS IN MODE 0  
:.....  
TS44: INC (R2) ;UPDATE TEST NUMBER  
CMP #44,(R2) ;SEQUENCE ERROR?  
BNE TS45-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;INITIALIZE  
DEC R0 ;TRY DECREMENT INST.  
BMI SOP0C ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-  
; CONDITIONAL BRANCH INST. AND <=  
; REPLACE THE MOVE INSTRUCTION <  
; WHICH FOLLOWS W/ 774 <  
MOV #56,-(R2) ;MOVE TO MAILBOX # ***** 56 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;N-BIT NOT SET ON DEC  
SOP0C: SEC ;INITIALIZE CARRY  
ADC R0 ;TRY ADD CARRY INST  
BNE SOP0D  
SEC ;INITIALIZE CARRY  
SBC R0 ;TRY SUBTRACT-CARRY INST  
BPL SOP0D  
COM R0  
INC R0  
DEC R0  
BEQ TS45 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
; CONDITIONAL BRANCH INST. AND < -  
; REPLACE THE MOVE INSTRUCTION <=---  
; WHICH FOLLOWS W/ 756 <---  
SOP0D: MOV #57,-(R2) ;MOVE TO MAILBOX # ***** 57 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ; CUMULATIVE RESULT OF ADC,SBC,COM,INC AND DEC INSTS. F  
; OR SEQUENCE ERROR  
:.....  
: THIS TEST INTRODUCES THE BYTE CONTROL LOGIC OF THE PROCESSOR.  
: THE MODE 0 BYTE MICROCODE IS TESTED. THE METHOD AND SEQUENCE  
: OF TESTING IS THE SAME AS THAT USED IN THE SOP MODE 0 TESTS.  
:.....  
: TEST 45 TEST MODE 0 EVEN BYTE USING SOP INST  
:.....  
TS45: INC (R2) ;UPDATE TEST NUMBER
```

```
1489 003544 022712 000045      CMP      #45,(R2)      ;SEQUENCE ERROR?
1490 003550 001012              BNE      TS46-10      ;BR TO ERROR HALT ON SEQ ERROR
1491 003552 105000              CLR      R0          ;TRY CLEARING EVEN BYTE OF REGISTER
1492 003554 001404              BEQ      SOPB0A
1493                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1494                          ;          CONDITIONAL BRANCH INST. AND <====
1495                          ;          REPLACE THE MOVE INSTRUCTION <====
1496                          ;          WHICH FOLLOWS W/ 775 <====
1497 003556 012742 000060      MOV      #60,-(R2)    ;MOVE TO MAILBOX # ***** 60 *****
1498 003562 005242              INC      -(R2)       ;SET MSGTYP TO FATAL ERROR
1499 003564 000000              HALT                    ;CLR DID NOT SET Z-BIT
1500 SOPB0A: COMB      R0          ;TRY SETTING EVEN BYTE OF REGISTER
1501 003570 100002              BPL      SOPB0B
1502 003572 105200              INCB     R0          ;TRY INCREMENTING EVEN BYTE OF REGISTER>>
1503 003574 001404              BEQ      TS46
1504                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1505                          ;          CONDITIONAL BRANCH INST. AND <====
1506                          ;          REPLACE THE MOVE INSTRUCTION <====
1507                          ;          WHICH FOLLOWS W/ 765 <====
1508 003576 012742 000061      MOV      #61,-(R2)    ;MOVE TO MAILBOX # ***** 61 *****
1509 003576 005242              INC      -(R2)       ;SET MSGTYP TO FATAL ERROR
1510 003602 005242              HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE BYTE INST.
1511 003604 000000              ; OR SEQUENCE ERROR
1512
1513
1514 :*****
1515 :
1516 :       THIS TEST USES THE CLR INSTRUCTION TO INTRODUCE AND TEST
1517 :SINGLE OPERAND MODE 1 INSTRUCTIONS. AGAIN, THE CLR INSTRUCTION
1518 :IS USED TO INTRODUCE THE MICROCODE AND TO TEST THAT THE PROPER
1519 :CONDITION CODES ARE SET. OTHER SOP INSTRUCTIONS ARE USED TO MANIPULATE
1520 :COMMON DATA TO VERIFY THAT THE CORRECT DATA IS PRODUCED.
1521 :
1522 :*****
1523 :TEST 46      TEST MODE 1 USING SOP INST.
1524 :*****
1525 003606 005212 000046      TS46:  INC      (R2)          ;UPDATE TEST NUMBER
1526 003610 022712              CMP      #46,(R2)    ;SEQUENCE ERROR?
1527 003614 001014              BNE      TS47-10      ;BR TO ERROR HALT ON SEQ ERROR
1528 003616 005000              CLR      R0          ;INITIALIZE R0
1529 003620 005010              CLR      (R0)        ;TRY CLEAR INST W/MODE 1
1530 003622 001404              BEQ      SOP1A
1531                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1532                          ;          CONDITIONAL BRANCH INST. AND <
1533                          ;          REPLACE THE MOVE INSTRUCTION <
1534                          ;          WHICH FOLLOWS W/ 774 <
1535 003624 012742 000062      MOV      #62,-(R2)    ;MOVE TO MAILBOX # ***** 62 *****
1536 003630 005242              INC      -(R2)       ;SET MSGTYP TO FATAL ERROR
1537 003632 000000              HALT                    ;CLR DID NOT SET Z-BIT
1538 003634 005310              SOP1A: DEC      (R0)        ;TRY DECREMENT INST W/MODE 1
1539 003636 100003              BPL      SOP1B
1540 003640 000261              SEC
1541 003642 005510              ADC      (R0)        ;INITIALIZE CARRY
1542 003644 001404              BEQ      TS47        ;TRY ADD-CARRY W/MODE 1
1543                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1544                          ;          CONDITIONAL BRANCH INST. AND <
```

```
1545 : REPLACE THE MOVE INSTRUCTION <-
1546 : WHICH FOLLOWS W/ 763 <=
1547 003646 SOP1B:
1548 003646 012742 000063 MOV #63,-(R2) ;MOVE TO MAILBOX # ***** 63 *****
1549 003652 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1550 003654 000000 HALT ;TEST CUMMULATIVE RESULT OF ABOVE INST
1551 : OR SEQUENCE ERROR
1552
1553 :*****
1554 :
1555 : THIS TEST VERIFIES THE BYTE INSTRUCTION MICROCODE FOR MODE 1
1556 : SINGLE OPERAND INSTRUCTIONS.
1557 : THIS IS THE FIRST PLACE THE SIGN EXTEND LOGIC IS EXERCISED
1558 : AND VERIFIED.
1559 :
1560 :*****
1561 : TEST 47 TEST MODE 1 EVEN BYTE USING SOP INST
1562 :*****
1563 003656 005212 TS47: INC (R2) ;UPDATE TEST NUMBER
1564 003660 022712 000047 CMP #47,(R2) ;SEQUENCE ERROR?
1565 003664 001020 BNE TS50-10 ;BR TO ERROR HALT ON SEQ ERROR
1566 003666 005000 CLR R0 ;INITIALIZE R0
1567 003670 005010 CLR (R0) ;INITIALIZE LOC. 0
1568 003672 005110 COM (R0)
1569 003674 105010 CLRB (R0) ;TRY TO CLEAR BYTE 0
1570 003676 001404 BEQ SOPB1A
1571 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
1572 : CONDITIONAL BRANCH INST. AND <-
1573 : REPLACE THE MOVE INSTRUCTION <-
1574 : WHICH FOLLOWS W/ 772 <=
1575 003700 012742 000064 MOV #64,-(R2) ;MOVE TO MAILBOX # ***** 64 *****
1576 003704 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1577 003706 000000 HALT ;CLRB DID NOT SET Z-BIT
1578 003710 005210 SOPB1A: INC (R0) ;INCREMENT TO TEST WORD
1579 003712 100005 BPL SOPB1B
1580 003714 105110 COMB (R0) ;COMPLEMENT: ODD BYTE 376
1581 003716 105210 INCB (R0) ;INC: ODD BYTE = 377
1582 003720 100002 BPL SOPB1B
1583 003722 105210 INCB (R0) ;INCREMENT ODD BYTE=0
1584 003724 001404 BEQ TS50
1585 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
1586 : CONDITIONAL BRANCH INST. AND <-
1587 : REPLACE THE MOVE INSTRUCTION <-
1588 : WHICH FOLLOWS W/ 757 <-
1589 003726 SOPB1B:
1590 003726 012742 000065 MOV #65,-(R2) ;MOVE TO MAILBOX # ***** 65 *****
1591 003732 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
1592 003734 000000 HALT ;CHECK CUMMULATIVE RESULT OF ABOVE INST
1593 : OR SEQUENCE ERROR
1594
1595 :*****
1596 :
1597 : THIS TEST VERIFIES THAT SINGLE OPERAND BYTE INSTRUCTIONS WILL
1598 : FUNCTION CORRECTLY FOR ODD BYTES.
1599 : THIS IS THE FIRST TIME THAT ADDRESS LINE 0 HAS BEEN
1600 :
```

1601
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1608 003736 005212
1609 003740 022712 000050
1610 003744 001022
1611 003746 005000
1612 003750 005010
1613 003752 005110
1614 003754 005200
1615 003756 105010
1616 003760 001404
1617
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1620
1621 003762 012742 000066
1622 003766 005242
1623 003770 000000
1624 003772 005300
1625 003774 005210
1626 003776 005200
1627 004000 105110
1628 004002 105210
1629 004004 100002
1630 004006 105210
1631 004010 001404
1632
1633
1634
1635
1636 004012
1637 004012 012742 000067
1638 004016 005242
1639 004020 000000
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1655 004022 005212
1656 004024 022712 000051

```
;EXERCISED. CHECKS ARE MADE THAT THE PROPER BYTE IS MODIFIED AND  
;THE CONDITION CODES ARE CHECKED. IT IS ALSO VERIFIED THAT THE UNADDRESSED  
;BYTE IS NOT ALTERED BY THE INSTRUCTION.  
:.....  
:TEST 50 TEST MODE 1 ODD BYTE USING SOP INST  
:.....  
TS50: INC (R2) ;UPDATE TEST NUMBER  
CMP #50,(R2) ;SEQUENCE ERROR?  
BNE TS51-0 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;INITIALIZE R0  
CLR (R0) ;INITIALIZE LOC. 0  
COM (R0)  
INC R0 ;R0=ODD BYTE  
CLRB (R0) ;TRY TO CLEAR BYTE 1  
BEQ SOPB1C  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
; CONDITIONAL BRANCH INST. AND <  
; REPLACE THE MOVE INSTRUCTION <  
; WHICH FOLLOWS W/ 771 <  
MOV #66,-(R2) ;MOVE TO MAILBOX # ***** 66 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CLRB DID NOT SET Z-BIT  
SOPB1C: DEC R0 ;R0=WORD ADDR.  
INC (R0) ;INCREMENT TO TEST WORD  
INC R0 ;R0=ODD BYTE  
COMB (R0) ;TRY TO COMPLEMENT BYTE 1  
INCB (R0)  
BPL SOPB1D  
INCB (R0) ;TRY TO INCREMENT BYTE 1  
BEQ TS51  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-- =  
; CONDITIONAL BRANCH INST. AND <-- --  
; REPLACE THE MOVE INSTRUCTION <-- --  
; WHICH FOLLOWS W/ 755 <-- --  
SOPB1D: MOV #67,-(R2) ;MOVE TO MAILBOX # ***** 67 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;TEST CUMULATIVE RESULT OF ABOVE INST.  
; OR SEQUENCE ERROR  
:.....  
; THIS TEST VERIFIES MODE 2 SINGLE-OPERAND INSTRUCTIONS. PREVIOUSLY  
; TESTED INSTRUCTIONS ARE USED TO SET A POINTER IN R0 TO LOC. 400.  
; LOC. 400 IS INITIALIZED TO -1 BEFORE A CLR MODE 2 IS EXECUTED.  
; THEN R0 IS DECREMENTED BY TWO TO AGAIN POINT TO 400 BEFORE EACH  
; OF SEVERAL MODE 2 INSTRUCTIONS ARE USED TO VERIFY THE DATA RESULTS OF  
; THE TEST. THIS PROCEDURE ALSO VERIFIES THE PROPER INCREMENTING OF THE  
; REGISTER.  
:.....  
:TEST 51 TEST MODE 2 USING SOP INST.  
:.....  
TS51: INC (R2) ;UPDATE TEST NUMBER  
CMP #51,(R2) ;SEQUENCE ERROR?
```

```

1657 004030 001023          BNE    T552-10          ;BR TO ERROR HALT ON SEQ ERROR
1658 004032 005000          CLR    R0              ;SET R0=400
1659 004034 105100          COMB   R0
1660 004036 005200          INC    R0
1661 004040 005010          CLR    (R0)           ;CLEAR 400
1662 004042 005110          COM    (R0)           ;INITIALIZE: 400=-1
1663 004044 005020          CLR    (R0)+         ;TRY CLEARING WITH MODE 2
1664 004046 001404          BEQ    SOPZA
1665                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
1666                                     ;          CONDITIONAL BRANCH INST. AND
1667                                     ;          REPLACE THE MOVE INSTRUCTION
1668                                     ;          WHICH FOLLOWS W/ 770
1669 004050 012742 000070    MOV    #70, -(R2)      ;MOVE TO MAILBOX # ***** 70 *****
1670 004054 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
1671 004056 000000          HALT
1672 004060 005300          SOPZA: DEC    R0      ;CLR INST DID NOT SET Z-BIT
1673 004062 005300          DEC    R0            ;RESET R0
1674 004064 005120          COM    (R0)+         ;TRY COMPLEMENTING WITH MODE 2
1675 004066 100004          BPL    SOP2B
1676 004070 005300          DEC    R0            ;RESET R0
1677 004072 005300          DEC    R0
1678 004074 005220          INC    (R0)+         ;TRY INCREMENTING WITH MODE 2
1679 004076 001404          BEQ    T552
1680                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
1681                                     ;          CONDITIONAL BRANCH INST. AND
1682                                     ;          REPLACE THE MOVE INSTRUCTION
1683                                     ;          WHICH FOLLOWS W/ 754
1684 004100          SOP2B:
1685 004100 012742 000071    MOV    #71, -(R2)      ;MOVE TO MAILBOX # ***** 71 *****
1686 004104 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
1687 004106 000000          HALT                 ;CHECK CUMULATIVE RESULT OF ABOVE INST
1688                                     ; OR SEQUENCE ERROR
1689
1690 .....
1691 .....
1692 .....
1693 .....
1694 .....
1695 .....
1696 .....
1697 .....
1698 .....
1699 .....
1700 .....
1701 .....
1702 .....
1703 004110 005212          T552: INC    (R2)      ;UPDATE TEST NUMBER
1704 004112 022712 000052    CMP    #52, (R2)      ;SEQUENCE ERROR?
1705 004116 001023          BNE    T553-10        ;BR TO ERROR HALT ON SEQ ERROR
1706 004120 005000          CLR    R0            ;SET R0=400
1707 004122 105100          COMB   R0
1708 004124 005200          INC    R0
1709 004126 005010          CLR    (R0)           ;CLEAR 400
1710 004130 005110          COM    (R0)           ;INITIALIZE: 400=-1
1711 004132 105020          CLRB  (R0)+         ;TRY TO CLEAT 400 W/MODE 2
1712 004134 001404          BEQ    SOPB2A

```

.....
 THIS TEST VERIFIES MODE 2 SINGLE OPERAND INSTRUCTIONS WHICH
 ADDRESS EVEN BYTES. R0 IS SET TO 400 AND USED TO INITIALIZE LOCATION
 400 TO -1. CLRB INSTRUCTION IS THEN EXECUTED ON BYTE 400 WITH
 MODE 2.
 R0 IS THEN DECREMENTED BEFORE EACH OF SEVERAL MODE 2 INSTRUCTIONS
 WHICH ARE USED TO VERIFY THE DATA RESULTS OF THE TEST. THIS PROCEDURE ALSO
 VERIFIES THE PROPER INCREMENTING OF THE REGISTER.

.....
 TEST 52 TEST MODE 2 EVEN BYTE USING SOP INST.


```
1713 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1714 ; CONDITIONAL BRANCH INST. AND <====
1715 ; REPLACE THE MOVE INSTRUCTION <====
1716 ; WHICH FOLLOWS W/ 770 <====
1717 004136 012742 000072          MOV #72,-(R2) ;MOVE TO MAILBOX # ***** 72 *****
1718 004142 005242          INC -(R2) ;SET MSGTYP TO FATAL ERROR
1719 004144 000000          HALT ;CLR DID NOT SET Z-BIT
SOPB2A: 1720 004146 005300          DEC R0 ;RESULT R0=400
1721 004150 005210          INC (R0) ;INC 400 TO TEST WORD
1722 004152 105110          COMB (R0)
1723 004154 105220          INCB (R0)+ ;TRY TO INC EVEN BYTE
1724 004156 100003          BPL SOPB2B
1725 004160 005300          DEC R0 ;RESET R0=400
1726 004162 105220          INCB (R0)+ ;TRY INCREMENT OF EVEN BYTE
1727 004164 001404          BEQ TS53
1728 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1729 ; CONDITIONAL BRANCH INST. AND <====
1730 ; REPLACE THE MOVE INSTRUCTION <====
1731 ; WHICH FOLLOWS W/ 754 <====
SOPB2B: 1732 004166 012742 000073          MOV #73,-(R2) ;MOVE TO MAILBOX # ***** 73 *****
1733 004166 012742 000073          INC -(R2) ;SET MSGTYP TO FATAL ERROR
1734 004172 005242          HALT ;TEST CUMMULATIVE RESULT OF ABOVE INST.
1735 004174 000000          ; OR SEQUENCE ERROR
1736
1737
1738 ;*****
1739 ;
1740 ; THIS TEST FOLLOWS THE SAME PROCEDURE DESCRIBED IN THE PREVIOUS
1741 ; TEST. HERE, THE BYTE INSTRUCTION IS USED TO ADDRESS AN ODD BYTE.
1742 ;
1743 ;*****
1744 ;TEST 53 TEST MODE 2 ODD BYTE USING SOP INST.
1745 ;*****
SOPB2C: 1746 004176 005212 000053          TS53: INC (R2) ;UPDATE TEST NUMBER
1747 004200 022712          CMP #53,(R2) ;SEQUENCE ERROR?
1748 004204 001026          BNE TS54-10 ;BR TO ERROR HALT ON SEQ ERROR
1749 004206 005000          CLR R0 ;SET R0=400
1750 004210 105100          COMB R0
1751 004212 005200          INC R0
1752 004214 005010          CLR (R0) ;CLEAR LOC 400
1753 004216 005110          COM (R0) ;INITIALIZE: 400 -1
1754 004220 005200          INC R0 ;R0=ODD BYTE
1755 004222 105020          CLRB (R0)+ ;TRY TO CLEAR ODD BYTE
1756 004224 001404          BEQ SOPB2C
1757 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1758 ; CONDITIONAL BRANCH INST. AND <====
1759 ; REPLACE THE MOVE INSTRUCTION <====
1760 ; WHICH FOLLOWS W/ 767 <====
SOPB2C: 1761 004226 012742 000074          MOV #74,-(R2) ;MOVE TO MAILBOX # ***** 74 *****
1762 004232 005242          INC -(R2) ;SET MSGTYP TO FATAL ERROR
1763 004234 000000          HALT ;CLRB DID NOT SET Z-BIT
1764 004236 005300          DEC R0 ;R0=WORD ADDR.
1765 004240 005300          DEC R0
1766 004242 005220          INC (R0)+ ;INCREMENT WORD
1767 004244 005300          DEC R0 ;POINT TO ODD BYTE
1768 004246 105110          COMB (R0) ;COMPLEMENT ODD BYTE
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1769 004250 105220      INCB      (R0)+      ;TRY TO INCREMENT ODD BYTE
1770 004252 100003      BPL      SOPB2D
1771 004254 005300      DEC      R0          ;RESET R0 TO ODD BYTE
1772 004256 105220      INCB      (R0)+      ;TRY TO INCREMENT ODD BYTE
1773 004260 001404      BEQ      T554
1774                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
1775                      ;          CONDITIONAL BRANCH INST. AND <====
1776                      ;          REPLACE THE MOVE INSTRUCTION <====
1777                      ;          WHICH FOLLOWS W/ 751 <--
1778 004262                SOPB2D:
1779 004262 012742 000075  MOV      #75,-(R2)    ;MOVE TO MAILBOX # ***** 75 *****
1780 004266 005242        INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1781 004270 000000        HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST.
1782                      ; OR SEQUENCE ERROR
1783
1784                      :*****
1785                      :
1786                      :   THESE TESTS CHECK THE NEGATE INSTRUCTION IN ALL MODES. PREVIOUSLY
1787                      :   TESTED SINGLE-OPERAND INSTRUCTIONS ARE USED TO TEST THE NEGATE INSTRUCTION.
1788                      :
1789                      :*****
1790                      :TEST 54      TEST MODE 0 USING NEGATE INSTRUCTION
1791                      :*****
1792 004272 005212                T554:  INC      (R2)          ;UPDATE TEST NUMBER
1793 004274 022712 000054  CMP      #54,(R2)      ;SEQUENCE ERROR?
1794 004300 001035        BNE      T555-10      ;BR TO ERROR HALT ON SEQ ERROR
1795 004302 005000        CLR      R0          ;SET R0=0
1796 004304 005200        INC      R0          ;      R0=1
1797 004306 005400        NEG      R0          ;TRY NEGATE MODE 0: R0--1
1798 004310 100003      BPL      NEG00        ;CC=1001?
1799 004312 001402      BEQ      NEG00
1800 004314 102401      BVS      NEG00
1801 004316 103404      BCS      NEG01
1802                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1803                      ;          CONDITIONAL BRANCH INST. AND <-
1804                      ;          REPLACE THE MOVE INSTRUCTION <-
1805                      ;          WHICH FOLLOWS W/ 770 <-
1806 004320                NEG00:
1807 004320 012742 000076  MOV      #76,-(R2)    ;MOVE TO MAILBOX # ***** 76 *****
1808 004324 005242        INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1809 004326 000000        HALT                    ;NEGATE DID NOT SET CC'S CORRECTLY
1810
1811 004330                NEG01:  INC      R0          ;TEST DATA RESULT
1812 004332 001404      BEQ      NEG02
1813                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
1814                      ;          CONDITIONAL BRANCH INST. AND <---=
1815                      ;          REPLACE THE MOVE INSTRUCTION <---=
1816                      ;          WHICH FOLLOWS W/ 762 <---=
1817 004334 012742 000077  MOV      #77,-(R2)    ;MOVE TO MAILBOX # ***** 77 *****
1818 004340 005242        INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
1819 004342 000000        HALT                    ;DATA RESULT OF NEGATE INCORRECT
1820
1821 004344 105100                NEG02:  COMB     R0          ;R0=377
1822 004346 105400        NEGB     R0          ;R0=1
1823 004350 100403      BMI      NEG03        ;CC=0001?
1824 004352 001402      BEQ      NEG03
  
```

```
1825 004354 102401      BVS  NEG03
1826 004356 103404      BCS  NEG04
1827                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1828                                     :          CONDITIONAL BRANCH INST. AND <====
1829                                     :          REPLACE THE MOVE INSTRUCTION <====
1830                                     :          WHICH FOLLOWS W/ 750 <====
1831 004360
1832 004360 012742 000100  NEG03:  MOV  #100,-(R2)      ;MOVE TO MAILBOX # ***** 100 *****
1833 004364 005242      INC  -(R2)          ;SET MSGTYP TO FATAL ERROR
1834 004366 000000      HALT                ;NEGB DID NOT SET CC'S CORRECTLY
1835 004370 005300      NEG04:  DEC  R0          ;TEST DATA RESULT
1836 004372 001404      BEQ  TS55
1837                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1838                                     :          CONDITIONAL BRANCH INST. AND <====
1839                                     :          REPLACE THE MOVE INSTRUCTION <====
1840                                     :          WHICH FOLLOWS W/ 742 <====
1841 004374 012742 000101      MOV  #101,-(R2)      ;MOVE TO MAILBOX # ***** 101 *****
1842 004400 005242      INC  -(R2)          ;SET MSGTYP TO FATAL ERROR
1843 004402 000000      HALT                ;DATA RESULT OF NEGB INCORRECT
1844                                     : OR SEQUENCE ERROR
1845 *****
1846 :TEST 55      *ESI MODE 1 USING NEGATE INST.
1847 *****
1848 004404 005212      TS55:  INC  (R2)          ;UPDATE TEST NUMBER
1849 004406 022712 000055      CMP  #55,(R2)        ;SEQUENCE ERROR?
1850 004412 001040      BNE  TS56-10        ;BR TO ERROR HALT ON SEQ ERROR
1851 004414 005000      CLR  R0            ;POINT TO LOC. 0
1852 004416 005010      CLR  (R0)          ;CLEAR LOC. 0
1853 004420 005210      INC  (R0)          ;LOC. 0=1
1854 004422 005410      NEG  (R0)          ;TRY NEG. LOC. 0=-1
1855 004424 100003      BPL  NEG10         ;CC=1001
1856 004426 001402      BEQ  NEG10
1857 004430 102401      BVS  NEG10
1858 004432 103404      BCS  NEG11
1859                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
1860                                     :          CONDITIONAL BRANCH INST. AND <====
1861                                     :          REPLACE THE MOVE INSTRUCTION <
1862                                     :          WHICH FOLLOWS W/ 767 <
1863 004434
1864 004434 012742 000102  NEG10:  MOV  #102,-(R2)      ;MOVE TO MAILBOX # ***** 102 *****
1865 004440 005242      INC  -(R2)          ;SET MSGTYP TO FATAL ERROR
1866 004442 000000      HALT                ;NEGATE DID NOT SET CC'S CORRECTLY
1867
1868 004444 005237 000000  NEG11:  INC  @#0          ;TEST DATA RESULT
1869 004450 001404      BEQ  NEG12
1870                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
1871                                     :          CONDITIONAL BRANCH INST. AND <====
1872                                     :          REPLACE THE MOVE INSTRUCTION <====
1873                                     :          WHICH FOLLOWS W/ 760 <====
1874 004452 012742 000103      MOV  #103,-(R2)      ;MOVE TO MAILBOX # ***** 103 *****
1875 004456 005242      INC  -(R2)          ;SET MSGTYP TO FATAL ERROR
1876 004460 000000      HALT                ;DATA RESULT OF NEGATE INCORRECT
1877 004462 105110      NEG12:  COMB (R0)        ;LOC. 0=377
1878 004464 105410      NEGB (R0)          ;TRY NEGB LOC. 0=1
1879 004466 100403      BMI  NEG13
1880 004470 001402      BEQ  NEG13
```

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1881 004472 102401      BVS    NEG13
1882 004474 103404      BCS    NEG14
1883                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1884                      ; CONDITIONAL BRANCH INST. AND <====
1885                      ; REPLACE THE MOVE INSTRUCTION <====
1886                      ; WHICH FOLLOWS W/ 746 <====
1887 004476
1888 004476 012742 000104  NEG13:  MOV    #104,-(R2)  ;MOVE TO MAILBOX # ***** 104 *****
1889 004502 005242          INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1890 004504 000000          HALT                ;NEGB DID NOT SET CC'S CORRECTLY
1891 004506 005337 000000  NEG14:  DEC    @#0      ;TEST DATA RESULT
1892 004512 001404          BEQ    TS56
1893
1894                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
1895                      ; CONDITIONAL BRANCH INST. AND <====
1896                      ; REPLACE THE MOVE INSTRUCTION <====
1897 004514 012742 000105  NEG13:  MOV    #105,-(R2)  ;MOVE TO MAILBOX # ***** 105 *****
1898 004520 005242          INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1899 004522 000000          HALT                ;DATA RESULT OF NEGB INCORRECT
1900
1901                      ; OR SEQUENCE ERROR
1902
1903  ;*****
1904  ;TEST 56          TEST MODE 2 USING NEGATE INSTRUCTION
1905  ;*****
1906  TS56:  INC    (R2)          ;UPDATE TEST NUMBER
1907         CMP    #56,(R2)    ;SEQUENCE ERROR?
1908         BNE   TS57-10      ;BR TO ERROR HALT ON SEQ ERROR
1909         CLR   R0           ;POINT TO LOC. 0
1910         CLR   (R0)         ;CLEAR LOC. 0
1911         INC   (R0)         ;LOC. 0-1
1912         NEG   (R0)+        ;TRY NEG.: LOC. 0=-1
1913         BPL   NEG20        ;CC=1001?
1914         BEQ   NEG20
1915         BVS   NEG20
1916         BCS   NEG21
1917
1918                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
1919                      ; CONDITIONAL BRANCH INST. AND <--
1920                      ; REPLACE THE MOVE INSTRUCTION <--
1921                      ; WHICH FOLLOWS W/ 767 <-
1922 004554
1923 004554 012742 000106  NEG20:  MOV    #106,-(R2)  ;MOVE TO MAILBOX # ***** 106 *****
1924 004560 005242          INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1925 004562 000000          HALT                ;NEGATE DID NOT SET CC'S CORRECTLY
1926 004564 105300          NEG21:  DECB   R0          ;RO=LOC. 0
1927 004566 105300          DECB   R0
1928 004570 105420          NEGB   (R0)+        ;BYTE 0-1  RO=1
1929 004572 105420          NEGB   (R0)+        ;BYTE 1=1  RO=2
1930 004574 105340          DECB   -(R0)        ;RO=1  LOC. 0=01
1931 004576 005300          DEC    R0
1932 004600 001404          BEQ    NEG22
1933
1934                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
1935                      ; CONDITIONAL BRANCH INST. AND <----
1936                      ; REPLACE THE MOVE INSTRUCTION <----
1937                      ; WHICH FOLLOWS W/ 754 <----
1938 004602 012742 000107  NEG20:  MOV    #107,-(R2)  ;MOVE TO MAILBOX # ***** 107 *****
1939 004606 005242          INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1940 004610 000000          HALT                ;REGISTER NOT INCREMENTED CORRECTLY
```

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1937 004612 005337 000000      NEG22: DEC    @#0      ;LOC. 0=0
1938 004616 001404              BEQ    TS57
1939                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
1940                               ;          CONDITIONAL BRANCH INST. AND <===
1941                               ;          REPLACE THE MOVE INSTRUCTION <---
1942                               ;          WHICH FOLLOWS W/ 745 <===
1943 004620 012742 000110      MOV    #110,-(R2)    ;MOVE TO MAILBOX # ***** 110 *****
1944 004624 005242              INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1945 004626 000000              HALT               ;NEG BYTE INSTRUCTIONS FAILED
1946                               ; OR SEQUENCE ERROR
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: THIS TEST VERIFIES MODE 3 SINGLE OPERAND INSTRUCTIONS. IT
: USES LOCATION 0 AS ITS TARGET DATA. A TABLE LOCATED AT LOC. 400
: THRU 402 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
: INSTRUCTIONS UNDER TEST.
: R0 IS SET TO 400, THE START OF THE ADDRESS TABLE, AND A CLR
: INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR LOC. 0. THEN R0
: IS DECREMENTED BY TWO AND TWO OTHER MODE 3 INSTRUCTIONS OPERATE ON
: LOC. 0 TO VERIFY THE DATA RESULTS OF THE TEST. THE PROPER INCREMENTING
: OF THE REGISTER IS ALSO VERIFIED IN THIS MANNER.
: IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
: (LOC. 400-402) HAS THE PROPER VALUES (0).

```
1965 004630 005212 000057      TS57: INC    (R2)      ;UPDATE TEST NUMBER
1966 004632 022712              CMP    #57,(R2)     ;SEQUENCE ERROR?
1967 004636 001020              BNE   TS60-10      ;BR TO ERROR HALT ON SEQ ERROR
1968 004640 005000              CLR   R0           ;SET R0=400
1969 004642 105100              COMB  R0
1970 004644 005200              INC   R0
1971 004646 005010              CLR   (R0)         ;CLEAR LOC 400
1972 004650 005030              CLR   @(R0)+       ;TRY TO CLEAR LOC 0 USING MODE 3 ;R0 402
1973 004652 001404              BEQ   SOP3A
1974                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
1975                               ;          CONDITIONAL BRANCH INST. AND <-
1976                               ;          REPLACE THE MOVE INSTRUCTION <-
1977                               ;          WHICH FOLLOWS W/ 771 <-
1978 004654 012742 000111      MOV    #111,-(R2)    ;MOVE TO MAILBOX # ***** 111 *****
1979 004660 005242              INC    -(R2)        ;SET MSGTYP TO FATAL ERROR
1980 004662 000000              HALT               ;CLR DID NOT SET Z-BIT
1981 004664 005300      SOP3A: DEC    R0           ;RESET R0=400
1982 004666 005300              DEC    R0
1983 004670 005130              COM   @(R0)+       ;TRY TO COMPLEMENT LOC 0 OF MODE 3 ;R0=402
1984 004672 100002              BPL   SOP3B
1985 004674 005230              INC   @(R0)+       ;TRY TO INCREMENT LOC 0 W/MODE 3 ;R0-404
1986 004676 001404              BEQ   TS60
1987                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
1988                               ;          CONDITIONAL BRANCH INST. AND <-
1989                               ;          REPLACE THE MOVE INSTRUCTION <-
1990                               ;          WHICH FOLLOWS W/ 757 <-
1991 004700      SOP3B: MOV    #112,-(R2)    ;MOVE TO MAILBOX # ***** 112 *****
1992 004700 012742 000112
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1993 004704 005242
1994 004706 000000
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2012 004710 005212
2013 004712 022712 000060
2014 004716 001026
2015 004720 005004
2016 004722 105104
2017 004724 005204
2018 004726 005000
2019 004730 005010
2020 004732 005110
2021 004734 105034
2022 004736 001404
2023
2024
2025
2026
2027 004740 012742 000113
2028 004744 005242
2029 004746 000000
2030 004750 005304
2031 004752 005304
2032 004754 005234
2033 004756 100006
2034 004760 105434
2035 004762 100004
2036 004764 005304
2037 004766 005304
2038 004770 105234
2039 004772 001404
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2044 004774
2045 004774 012742 000114
2046 005000 005242
2047 005002 000000
2048

```
INC      -(R2)      ;SET MSGTYP TO FATAL ERROR  
HALT     ;CUMMULATIVE RFSULT OF ABOVE INST FAILED  
          ; OR SEQUENCE ERROR  
:*****  
: THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS  
: WHICH ADDRESS EVEN BYTES. AGAIN, THE TARGET LOCATION 0 IS USED  
: AND THE SAME TABLE AT 400 IS EMPLOYED.  
: AFTER POINTING R4 TO THE TABLE (400) AND SETTING LOCATION  
: 0 TO -1, A CLRB INSTRUCTION IS USED TO CLEAR BYTE 0.  
: SEVERAL OTHER MODE 3 INSTRUCTIONS ARE THEN USED WITH THE TABLE  
: TO VERIFY THE DATA RESULTS AND THE PROPER INCREMENTING OF THE REGISTER.  
: IF A FAILURE IS DETECTED, BE SURE THAT THE TABLE (LOCATION 400-402) HAS  
: THE PROPER VALUES (0).  
:*****  
:TEST 60 TEST MODE 3 EVEN BYTE USING SOP INST.  
:*****  
TS60: INC      (R2)      ;UPDATE TEST NUMBER  
      CMP      #60,(R2) ;SEQUENCE ERROR?  
      BNE     TS61-10   ;BR TO ERROR HALT ON SEQ ERROR  
      CLR     R4        ;SET R4=400  
      COMB    R4  
      INC     R4  
      CLR     R0        ;INITIALIZE LOC. 0=-1  
      CLR     (R0)  
      COM     (R0)      ;LOC. 0=-1  
      CLRB    @(R4)+    ;TRY TO CLEAR EVEN BYTE ,LOC. 0-177400 R4-402  
      BEQ     SOPB3A  
          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < -  
          ; CONDITIONAL BRANCH INST. AND < -  
          ; REPLACE THE MOVE INSTRUCTION < -  
          ; WHICH FOLLOWS W/ 767 < -  
2027: MOV      #113,-(R2) ;MOVE TO MAILBOX # ***** 113 *****  
      INC     -(R2)  
      HALT  
SOPB3A: DEC     R4        ;SET MSGTYP TO FATAL ERROR  
      DEC     R4        ;CLRB DID NOT SET Z-BIT  
      INC     @(R4)+    ;RESET POINTER R4=400  
          ;TRY INCREMENTING WORD LOC.0=177401 R4=402  
      BPL     SOPB3B  
          ;TRY TO NEGATE EVEN BYTE ;LOC.0--1 R4-404  
      NEGB    @(R4)+  
      BPL     SOPB3B  
      DEC     R4        ;R4=402  
      DEC     R4  
      INCB    @(R4)+    ;TRY TO INCREMENT EVEN BYTE ;LOC. 0=17400  
      BEQ     TS61  
          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==--  
          ; CONDITIONAL BRANCH INST. AND <==--  
          ; REPLACE THE MOVE INSTRUCTION <==--  
          ; WHICH FOLLOWS W/ 751 <==--  
SOPB3B: MOV      #114,-(R2) ;MOVE TO MAILBOX # ***** 114 *****  
      INC     -(R2)  
      HALT  
          ;SET MSGTYP TO FATAL ERROR  
          ;CUMMULATIVE RESULT OF ABOVE INST FAILED  
          ; OR SEQUENCE ERROR
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005004 005212
005006 022712 000061
005012 001024
005014 005000
005016 105100
005020 005200
005022 005030
005024 005130
005026 105030
005030 001404
005032 012742 000115
005036 005242
005040 000000
005042 005300
005044 005300
005046 005300
005050 005300
005052 005230
005054 105430
005056 100002
005060 105230
005062 001404
005064 012742 000116
005070 005242
005072 000000
005074 005212

TS61: INC (R2) ;UPDATE TEST NUMBER
CMP #61,(R2) ;SEQUENCE ERROR?
BNE TS62-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR RO ;SET RO=400
COMB RO
INC RO
CLR @(RO)+ ;INITIALIZE
COM @(RO)+ ;LOC 0=-1 RO=404
CLRB @(RO)+ ;TRY TO CLEAR ODD BYTE LOC. 0=377 RO=406
BEQ SOPB3C
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 770 <====
MOV #115,-(R2) ;MOVE TO MAILBOX # ***** 115 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CLRB DID NOT SET Z-BIT
SOPB3C: DEC RO ;RESET RO=402
DEC RO
DEC RO ;POINT TO EVEN BYTE ADDR.
DEC RO
INC @(RO)+ ;INCREMENT WORD LOC. 0=400 RO=404
NEGB @(RO)+ ;TRY TO NEGATE ODD BYTE LOC. 0-177400 RO=406
BPL SOPB3D
INCB @(RO)+ ;TRY TO INCREMENT ODD BYTE LOC.0=0 RO=410
BEQ TS62
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
; CONDITIONAL BRANCH INST. AND <===
; REPLACE THE MOVE INSTRUCTION <===
; WHICH FOLLOWS W/ 753 <====
SOPB3D: MOV #116,-(R2) ;MOVE TO MAILBOX # ***** 116 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CUMMULATIVE RESULT OF ABOVE INSTS FAILED
; OR SEQUENCE ERROR
;*****
;TEST 62 TEST MODE 3 USING NEGATE INSTRUCTION
;*****
TS62: INC (R2) ;UPDATE TEST NUMBER

2105	005076	022712	000062	CMF	#62,(R2)	;SEQUENCE ERROR?	
2106	005102	001054		BNE	TS63-10	;BR TO ERROR HALT ON SEQ ERROR	
2107	005104	005000		CLR	R0	;R0=400	
2108	005106	105100		COMB	R0		
2109	005110	005200		INC	R0		
2110	005112	005010		CLR	(R0)	;LOC. 400=0	
2111	005114	005004		CLR	R4	;R4=0	
2112	005116	005014		CLR	(R4)	;LOC. 0=0	
2113	005120	005214		INC	(R4)	;LOC. 0=1	
2114	005122	005430		NEG	@(R0)+	;TRY NEGATE LOC. 0=-1 R0-402	
2115	005124	100003		BPL	NEG30	;CC=1001?	
2116	005126	001402		BEQ	NEG30		
2117	005130	102401		BVS	NEG30		
2118	005132	103404		BCS	NEG31		
2119						; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
2120						CONDITIONAL BRANCH INST. AND	<===
2121						REPLACE THE MOVE INSTRUCTION	<---=
2122						WHICH FOLLOWS W/ 763	<---=
2123	005134			NEG30:			
2124	005134	012742	000117	MOV	#117,-(R2)	;MOVE TO MAILBOX # ***** 117 *****	
2125	005140	005242		INC	-(R2)	;SET MSGTYP TO FATAL ERROR	
2126	005142	000000		HALT		;NEG DID NOT SET CC'S CORRECTLY	
2127	005144	005214		NEG31:	(R4)		
2128	005146	001404		BEQ	NEG32	;LOC. 0=0	
2129						; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
2130						CONDITIONAL BRANCH INST. AND	<===
2131						REPLACE THE MOVE INSTRUCTION	<---=
2132						WHICH FOLLOWS W/ 755	<---=
2133	005150	012742	000120	MOV	#120,-(R2)	;MOVE TO MAILBOX # ***** 120 *****	
2134	005154	005242		INC	-(R2)	;SET MSGTYP TO FATAL ERROR	
2135	005156	000000		HALT		;DATA RESULT OF NEG INCORRECT	
2136	005160	105137	000001	NEG32:	@#1	;LOC 0=177400	
2137	005164	005237	000000	COMB	@#0	;LOC. 0=177401	
2138	005170	105430		INC	@(R0)+	;TRY NEGB LOC. 0=177777 R0-404	
2139	005172	100404		NEGB	NEG33		
2140				BMI	NEG33		
2141						; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
2142						CONDITIONAL BRANCH INST. AND	<===
2143						REPLACE THE MOVE INSTRUCTION	<---=
2144						WHICH FOLLOWS W/ 743	<---=
2144	005174	012742	000121	MOV	#121,-(R2)	;MOVE TO MAILBOX # ***** 121 *****	
2145	005200	005242		INC	-(R2)	;SET MSGTYP TO FATAL ERROR	
2146	005202	000000		HALT		;NEGB FAILED WITH EVEN BYTE	
2147	005204	105430		NEG33:	@(R0)+	;TRY NEGB LOC.0=777 R0=406	
2148	005206	100004		NEGB	NEG34		
2149				BPL	NEG34		
2150						; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
2151						CONDITIONAL BRANCH INST. AND	<===
2152						REPLACE THE MOVE INSTRUCTION	<---=
2153						WHICH FOLLOWS W/ 735	<---=
2153	005210	012742	000122	MOV	#122,-(R2)	;MOVE TO MAILBOX # ***** 122 *****	
2154	005214	005242		INC	-(R2)	;SET MSGTYP TO FATAL ERROR	
2155	005216	000000		HALT		;NEGB FAILED WITH ODD BYTE	
2156	005220	105137	000001	NEG34:	@#1	;LOC. 0=177377	
2157	005224	105237	000001	COMB	@#1	;LOC. 0=177777	
2158	005230	005214		INC	(R4)	;LOC. 0=0	
2159	005232	001404		BEQ	TS63		
2160						; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====

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T62 TEST MODE 3 USING NEGATE INSTRUCTION

SEQ 0041

2161
2162
2163
2164 005234 012742 000123
2165 005240 005242
2166 005242 000000
2167
2168
2169
2170
2171
2172

MOV #123, -(R2)
INC -(R2)
HALT

: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 723 <-==
: MOVE TO MAILBOX # ***** 123 *****
: SET MSGTYP TO FATAL ERROR
: DATA RESULT OF NEGB'S INCORRECT
: OR SEQUENCE ERROR

.....
: THIS TEST VERIFIES MODE 4 SINGLE OPERAND INSTRUCTIONS.
: RO IS SET TO 400. A CLR INSTRUCTION IS EXECUTED IN MODE 4 TO CLEAR

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2173 :LOC. 376. R0 IS RESET TO 400 AND A COM INSTRUCTION USING MODE 4
2174 :COMPLEMENTS LOC.376.
2175 : TWO INC INSTRUCTIONS AND A MODE 4 INSTRUCTION ARE EXECUTED
2176 : TO COMPLETE THE TEST.
2177 :*****
2178 :TEST 63 TEST MODE 4 USING SOP INSTS
2179 :*****
2180 005244 005212 TS63: INC (R2) ;UPDATE TEST NUMBER
2181 005246 022712 000063 CMP #63,(R2) ;SEQUENCE ERROR?
2182 005252 001021 BNE TS64-10 ;BR TO ERROR HALT ON SEQ ERROR
2183 005254 005000 CLR R0 ;SET R0-400
2184 005256 105100 COMB R0
2185 005260 005200 INC R0
2186 005262 005040 CLR -(R0) ;TRY TO CLEAR USING MODE 4
2187 005264 001404 BEQ SOP4A
2188 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < - -
2189 : CONDITIONAL BRANCH INST. AND < - -
2190 : REPLACE THE MOVE INSTRUCTION < - -
2191 : WHICH FOLLOWS W/ 772 < - -
2192 005266 012742 000124 MOV #124,-(R2) ;MOVE TO MAILBOX # ***** 124 *****
2193 005272 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2194 005274 000000 HALT ;CLR DID NOT SET Z-BIT
2195 005276 005200 SOP4A: INC R0 ;RESET R0
2196 005300 005200 INC R0
2197 005302 005140 COM -(R0) ;TRY TO COMPLEMENT USING MODE 4
2198 005304 100004 BPL SOP4B
2199 005306 005200 INC R0 ;MOVE POINTER
2200 005310 005200 INC R0
2201 005312 005240 INC -(R0)
2202 005314 001404 BEQ TS64
2203 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < = -
2204 : CONDITIONAL BRANCH INST. AND < = -
2205 : REPLACE THE MOVE INSTRUCTION < = -
2206 : WHICH FOLLOWS W/ 756 < = -
2207 005316 SOP4B: MOV #125,-(R2) ;MOVE TO MAILBOX # ***** 125 *****
2208 005316 012742 000125 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2209 005322 005242 HALT ;CHECK CUMMULATIVE RESULT OF ABOVE INST.
2210 005324 000000 ; OR SEQUENCE ERROR
2211 :
2212 :
2213 :*****
2214 :
2215 : THIS TEST VERIFIES MODE 5 SINGLE OPERAND INSTRUCTIONS. IT
2216 : USES LOCATION 0 AS ITS TARGET DATA. A TABLE LOCATED AT LOC. 372
2217 : THRU 374 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
2218 : INSTRUCTIONS UNDER TEST.
2219 : R0 IS SET TO 376. (THE START OF THE ADDRESS TABLE) +2.
2220 : AND A CLR INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR
2221 : LOC. 0. THEN R0 IS INCREMENTED BY TWO AND TWO OTHER MODE 3
2222 : INSTRUCTIONS OPERATE ON LOC. 0 TO VERIFY THE DATA RESULTS OF
2223 : THE TEST. THE PROPER DECREMENTING OF THE REGISTER IS ALSO
2224 : VERIFIED IN THIS MANNER.
2225 : IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
2226 : (LOC. 372 THRU 374) HAS THE PROPER VALUES (0).
2227 :
2228 :*****

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2231 005326 005212
2232 005330 022712 000064
2233 005334 001025
2234 005336 012700 000370
2235 005342 005020
2236 005344 005020
2237 005346 005020
2238 005350 005010
2239 005352 005000
2240 005354 005020
2241 005356 105400
2242 005360 005050
2243 005362 001404
2244
2245
2246
2247
2248 005364 012742 000126
2249 005370 005242
2250 005372 000000
2251 005374 005200
2252 005376 005200
2253 005400 005150
2254 005402 100002
2255 005404 005250
2256 005406 001404
2257
2258
2259
2260
2261 005410
2262 005410 012742 000127
2263 005414 005242
2264 005416 000000
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2278 005420 005212
2279 005422 022712 000065
2280 005426 001020
2281 005430 005000
2282 005432 105100
2283 005434 005200
2284 005436 005060 177400

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:TEST 64 TEST MODE 5 USING SOP INSTS
:*****
TS64: INC (R2) ;UPDATE TEST NUMBER
CMP #64,(R2) ;SEQUENCE ERROR?
BNE TS65-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #370,R0 ;CLEAR LOCATION 370-376
CLR (R0)+ ;370
CLR (R0)+ ;372
CLR (R0)+ ;374
CLR (R0) ;376
R0 ;SET R0=376 (LOW BYTE)
CLR (R0)+
NEGB R0
CLR @-(R0) ;TRY TO CLEAR LOC 0 W/MODE 5
BEQ SOP5A

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 764 <--
MOV #126,-(R2) ;MOVE TO MAILBOX # ***** 126 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CLR DID NOT SET Z-BIT
SOP5A: INC R0 ;RESET R0
INC R0
COM @-(R0) ;TRY TO COMPLEMENT LOC. 0 W/MODE 5
BPL SOP5B
INC @-(R0) ;TRY TO INCREMENT LOC. 0 W/MODE 5
BEQ TS65

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 752 <--
SOP5B: MOV #127,-(R2) ;MOVE TO MAILBOX # ***** 127 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;TEST CUMULATIVE RESULT OF ABOVE INSTS
; OR SEQUENCE ERROR

:*****
: THIS TEST VERIFIES MODE 6 SINGLE OPERAND INSTRUCTIONS. IT
: USES LOCATION 0 AS ITS TARGET DATA. R0 IS SET TO 400 USING
: PREVIOUSLY TESTED INSTRUCTIONS AND A MODE 6 CLR INSTRUCTION IS
: EXECUTED ON LOC. 0 USING R0 AND A -400 OFFSET. COM AND INC
: INSTRUCTIONS ARE THEN USED TO VERIFY THE DATA.
:*****
:TEST 65 TEST MODE 6 USING SOP INSTS
:*****
TS65: INC (R2) ;UPDATE TEST NUMBER
CMP #65,(R2) ;SEQUENCE ERROR?
BNE TS66-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;SET R0=400
COMB R0
INC R0
CLR -400(R0) ;TRY TO CLEAR LOCATION 0 W/MODE 6

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2285 005442 001404          BEQ      SOP6A          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2286                                     ;          CONDITIONAL BRANCH INST. AND <====
2287                                     ;          REPLACE THE MOVE INSTRUCTION <====
2288                                     ;          WHICH FOLLOWS W/ 771 <====
2289                                     ;          ***** 130 *****
2290 005444 012742 000130    MOV      #130,-(R2)    ;MOVE TO MAILBOX # ***** 130 *****
2291 005450 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
2292 005452 000000          HALT                    ;CLR DID NOT SET Z-BIT
2293 005454 005160 177400    SOP6A:  COM      -400(R0) ;TRY TO COMPLEMENT LOCATION 0 W/MODE 6
2294 005460 100003          BPL      SOP6B
2295 005462 005260 177400    INC      -400(R0)    ;TRY TO INCREMENT LOCATION 0 W/MODE 6
2296 005466 001404          BEQ      TS66
2297                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2298                                     ;          CONDITIONAL BRANCH INST. AND <====
2299                                     ;          REPLACE THE MOVE INSTRUCTION <====
2300                                     ;          WHICH FOLLOWS W/ 757 <====
2301 005470                                     SOP6B:
2302 005470 012742 000131    MOV      #131,-(R2)    ;MOVE TO MAILBOX # ***** 131 *****
2303 005474 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
2304 005476 000000          HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
2305                                     ; OR SEQUENCE ERROR
2306
2307 .....
2308 ;
2309 ; THIS TEST VERIFIES MODE 7 SINGLE OPERAND INSTRUCTIONS. IT USES
2310 ; THE POINTER TO LOC. 0 WHICH IS STORED AT LOC. 402.
2311 ; R0 IS SET TO 400 AND A MODE 7 CLR INSTRUCTION IS
2312 ; EXECUTED WITH A +2 OFFSET TO CLEAR LOC. 0.
2313 ; SEVERAL OTHER MODE 7 INSTRUCTIONS ARE THEN USED ON THE COMMON
2314 ; LOCATION TO VERIFY THE DATA RESULTS.
2315 ;
2316 .....
2317 ;TEST 66 TEST MODE 7 USING SOP INST.
2318 .....
2319 005500 005212          TS66:  INC      (R2)        ;UPDATE TEST NUMBER
2320 005502 022712 000066    CMP      #66,(R2)     ;SEQUENCE ERROR?
2321 005506 001021          BNE      TS67-10      ;BR TO ERROR HALT ON SEQ ERROR
2322 005510 005000          CLR      R0           ;SET R0=400
2323 005512 105100          COMB     R0
2324 005514 005200          INC      R0
2325 005516 005210          INC      (R0)         ;R0=1
2326 005520 005070 000002    CLR      @2(R0)       ;TRY TO CLEAR LOC. 0 W/MODE 7
2327 005524 001404          BEQ      SOP7A
2328                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
2329                                     ;          CONDITIONAL BRANCH INST. AND <--
2330                                     ;          REPLACE THE MOVE INSTRUCTION <--
2331                                     ;          WHICH FOLLOWS W/ 770 <--
2332 005526 012742 000132    MOV      #132,-(R2)    ;MOVE TO MAILBOX # ***** 132 *****
2333 005532 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
2334 005534 000000          HALT                    ;CLR DID NOT SET Z-BIT
2335 005536 005170 000002    SOP7A:  COM      @2(R0)  ;TRY TO COMPLEMENT LOC. 0 W/MODE 7
2336 005542 100003          BPL      SOP7B
2337 005544 005270 000002    INC      @2(R0)       ;TRY TO INCREMENT LOC. 0 W/MODE 7
2338 005550 001404          BEQ      TS67
2339                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
2340                                     ;          CONDITIONAL BRANCH INST. AND <--
  
```

```
2341                                     :                               <
2342                                     :                               <
2343 005552                               SOP7B:                               : REPLACE THE MOVE INSTRUCTION <
2344 005552 012742 000133                MOV   #133,-(R2)                : MOVE TO MAILBOX # ***** 133 ***** <
2345 005556 005242                        INC   -(R2)                    : SET MSGTYP TO FATAL ERROR <
2346 005560 000000                        HALT                               : TEST CUMMULATIVE RESULT OF ABOVE INSTS. <
2347                                     :                               : OR SEQUENCE ERROR <
2348                                     :                               <
2349                                     :                               <
2350                                     : ***** <
2351 :TEST 67                                TEST MODE 4 WITH NEGATE INSTRUCTION <
2352 005562 005212                               : ***** <
2353 005564 022712 000067                TS67:  INC   (R2)                : UPDATE TEST NUMBER <
2354 005570 001024                        CMP   #67,(R2)                : SEQUENCE ERROR? <
2355 005572 005000                        BNE  TS70-10                  : BR TO ERROR HALT ON SEQ ERROR <
2356 005574 005010                        CLR  R0 <
2357 005576 005120                        CLR  (R0) <
2358 005600 005440                        COM  (R0)+                    : LOC. 0=177777, R0 2 <
2359 005602 100403                        NEG  -(R0)                    : TRY NEGATE, LOC. 0-1 <
2360 005604 001402                        BMI  NEG40                    : (C=0001? <
2361 005606 102401                        BEQ  NEG40 <
2362 005610 103404                        BVS  NEG40 <
2363                                     :                               : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
2364                                     :                               : CONDITIONAL BRANCH INST. AND <
2365                                     :                               : REPLACE THE MOVE INSTRUCTION <
2366                                     :                               : WHICH FOLLOWS W/ 767 <
2367 005612                               NEG40:                               : <
2368 005612 012742 000134                MOV   #134,-(R2)                : MOVE TO MAILBOX # ***** 134 ***** <
2369 005616 005242                        INC   -(R2)                    : SET MSGTYP TO FATAL ERROR <
2370 005620 000000                        HALT                               : NEG DID NOT SET CC'S CORRECTLY <
2371 005622 005400                               NEG41:  NEG  R0                    : TST R0 WITH A NEG. <
2372 005624 001404                        BEQ  NEG42 <
2373                                     :                               : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
2374                                     :                               : CONDITIONAL BRANCH INST. AND <
2375                                     :                               : REPLACE THE MOVE INSTRUCTION <
2376                                     :                               : WHICH FOLLOWS W/ 761 <
2377 005626 012742 000135                MOV   #135,-(R2)                : MOVE TO MAILBOX # ***** 135 ***** <
2378 005632 005242                        INC   -(R2)                    : SET MSGTYP TO FATAL ERROR <
2379 005634 000000                        HALT                               : R0 NOT DECREMENTED PROPERLY <
2380 005636 005310                               NEG42:  DEC  (R0)                    : TEST DTA RESULT OF NEG <
2381 005640 001404                        BEQ  TS70 <
2382                                     :                               : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
2383                                     :                               : CONDITIONAL BRANCH INST. AND <
2384                                     :                               : REPLACE THE MOVE INSTRUCTION <
2385                                     :                               : WHICH FOLLOWS W/ 753 <
2386 005642 012742 000136                MOV   #136,-(R2)                : MOVE TO MAILBOX # ***** 136 ***** <
2387 005646 005242                        INC   -(R2)                    : SET MSGTYP TO FATAL ERROR <
2388 005650 000000                        HALT                               : DATA RESULT OF NEG INCORRECT <
2389                                     :                               : OR SEQUENCE ERROR <
2390                                     : ***** <
2391 :TEST 70                                TEST MODE 5 WITH NEGATE INSTRUCTION <
2392                                     : ***** <
2393 005652 005212                               : ***** <
2394 005654 022712 000070                TS70:  INC   (R2)                : UPDATE TEST NUMBER <
2395 005660 001031                        CMP   #70,(R2)                : SEQUENCE ERROR? <
2396 005662 005000                        BNE  TS71-10                  : BR TO ERROR HALT ON SEQ ERROR <
                                     : CL   R0                    : R0=0 <
```

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2397 005664 005010 CLR (R0) ;LOC. 0=0
2398 005666 105100 COMB R0 ;R0=377
2399 005670 005200 INC R0 ;R0=400
2400 005672 005010 CLR (R0) ;SET 400 = 0
2401 005674 005004 CLR R4 ;R4=0
2402 005676 005314 DEC (R4) ;LOC. 0=177777
2403 005700 005450 NEG @-(R0) ;TRY NEGATE: LOC. 0=1
2404 005702 100403 BMI NEG50 ;CC=0001?
2405 005704 001402 BEQ NEG50
2406 005706 102401 BVS NEG50
2407 005710 103404 BCS NEG51
2408 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
2409 ; CONDITIONAL BRANCH INST. AND <----
2410 ; REPLACE THE MOVE INSTRUCTION <----
2411 ; WHICH FOLLOWS W/ 763 <----
2412 005712 NEG50:
2413 005712 012742 000137 MOV #137, -(R2) ;MOVE TO MAILBOX # ***** 137 *****
2414 005716 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2415 005720 000000 HALT ;NEG DID NOT SET CC'S CORRECTLY
2416 005722 005314 NEG51: DEC (R4)
2417 005724 001404 BEQ NEG52
2418 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
2419 ; CONDITIONAL BRANCH INST. AND <----
2420 ; REPLACE THE MOVE INSTRUCTION <----
2421 ; WHICH FOLLOWS W/ 755 <----
2422 005726 012742 000140 MOV #140, -(R2) ;MOVE TO MAILBOX # ***** 140 *****
2423 005732 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2424 005734 000000 HALT ;DATA RESULT OF NEG INCORRECT
2425 005736 105100 NEG52: COMB R0
2426 005740 005300 DEC R0
2427 005742 001404 BEQ TS71
2428 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
2429 ; CONDITIONAL BRANCH INST. AND <----
2430 ; REPLACE THE MOVE INSTRUCTION <----
2431 ; WHICH FOLLOWS W/ 746 <----
2432 005744 012742 000141 MOV #141, -(R2) ;MOVE TO MAILBOX # ***** 141 *****
2433 005750 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2434 005752 000000 HALT ;REGISTER NOT DECREMENTED PROPERLY
2435 ; OR SEQUENCE ERROR
2436 ;*****
2437 ;TEST 71 TEST MODE 6 WITH NEGATE
2438 ;*****
2439 005754 005212 TS71: INC (R2) ;UPDATE TEST NUMBER
2440 005756 022712 000071 CMP #71, (R2) ;SEQUENCE ERROR?
2441 005762 001022 BNE TS72-10 ;BR TO ERROR HALT ON SEQ ERROR
2442 005764 005000 CLR R0 ;R0=0
2443 005766 005004 CLR R4 ;R4=0
2444 005770 105100 COMB R0 ;R0=377
2445 005772 005014 CLR (R4) ;LOC. 0=0
2446 005774 105024 CLRB (R4)+ ;LOC. 0=177777, R4 '
2447 005776 105114 COMB (R4) ;LOC. 0=177400
2448 006000 005460 177401 NEG -377(R0) ;LOC. 0=400
2449 006004 100403 BMI NEG60 ;CC=0001
2450 006006 001402 BEQ NEG60
2451 006010 102401 BVS NEG60
2452 006012 103404 BCS NEG61

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2453 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2454 ; CONDITIONAL BRANCH INST. AND <====
2455 ; REPLACE THE MOVE INSTRUCTION <====
2456 ; WHICH FOLLOWS W/ 763 <====
2457 006014
2458 006014 012742 000142 NEG60: MOV #142,-(R2) ;MOVE TO MAILBOX # ***** 142 *****
2459 006020 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2460 006022 000000 HALT ;NEG DID NOT SET CC'S CORRECTLY
2461 006024 105314 NEG61: DECB (R4)
2462 006026 001404 BEQ TS72
2463 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2464 ; CONDITIONAL BRANCH INST. AND <====
2465 ; REPLACE THE MOVE INSTRUCTION <====
2466 ; WHICH FOLLOWS W/ 755 <====
2467 006030 012742 000143 MOV #143,-(R2) ;MOVE TO MAILBOX # ***** 143 *****
2468 006034 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2469 006036 000000 HALT ;DATA RESULT OF NEG INCORRECT
2470 ; OR SEQUENCE ERROR
2471
2472 :*****
2473 :TEST 72 TEST MODE 7 W/ NEGATE
2474 :*****
2474 006040 005212 TS72: INC (R2) ;UPDATE TEST NUMBER
2475 006042 022712 000072 CMP #72,(R2) ;SEQUENCE ERROR?
2476 006046 001024 BNE TS73-10 ;BR TO ERROR HALT ON SEQ ERROR
2477 006050 005000 CLR R0 ;R0=0
2478 006052 005010 CLR (R0) ;LOC. 0=0
2479 006054 005110 COM (R0) ;LOC. 0=177777
2480 006056 105100 COMB R0 ;R0=377
2481 006060 105470 000005 NEGB @5(R0) ;R0+5=404, 404-1, LOC. 0-777
2482 006064 100403 BMI NEG70 ;CC=0001?
2483 006066 001402 BEQ NEG70
2484 006070 102401 BVS NEG70
2485 006072 103404 BCS NEG71
2486 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2487 ; CONDITIONAL BRANCH INST. AND <====
2488 ; REPLACE THE MOVE INSTRUCTION <====
2489 ; WHICH FOLLOWS W/ 765 <====
2490 006074
2491 006074 012742 000144 NEG70: MOV #144,-(R2) ;MOVE TO MAILBOX # ***** 144 *****
2492 006100 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2493 006102 000000 HALT ;NEG DID NOT SET CC'S CORRECTLY
2494 006104 105100 NEG71: COMB R0 ;R0=0
2495 006106 105120 COMB (R0)+ ;LOC. 0=400, R0-1
2496 006110 105310 DECB (R0) ;LOC. 0=0
2497 006112 005467 171662 NEG 0 ;USE NEG MODE 67 TO TST FOR ZERO
2498 006116 001404 BEQ TS73
2499 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
2500 ; CONDITIONAL BRANCH INST. AND <====
2501 ; REPLACE THE MOVE INSTRUCTION <====
2502 ; WHICH FOLLOWS W/ 753 <====
2503 006120 012742 000145 MOV #145,-(R2) ;MOVE TO MAILBOX # ***** 145 *****
2504 006124 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
2505 006126 000000 HALT ;DATA RESULT OF NEG WAS INCORRECT
2506 ; OR SEQUENCE ERROR
2507
2508 ;*****
```

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2509
2510
2511
2512
2513
2514
2515
2516
2517
2518
2519 006130 005212
2520 006132 022712 000073
2521 006136 001017
2522 006140 005027
2523 006142 177777
2524 006144 001404
2525
2526
2527
2528
2529 006146 012742 000146
2530 006152 005242
2531 006154 000000
2532 006156 005237 006142
2533 006162 005467 177754
2534 006166 100003
2535 006170 005277 000012
2536 006174 001405
2537
2538
2539
2540
2541 006176
2542 006176 012742 000147
2543 006202 005242
2544 006204 000000
2545
2546 006206 006142
2547
2548
2549
2550
2551
2552
2553
2554
2555
2556
2557
2558
2559 006210 005212
2560 006212 022712 000074
2561 006216 001010
2562 006220 005000
2563 006222 000277
2564 006224 000244
```

THIS TEST VERIFIES PROGRAM COUNTER ADDRESSING WITH SOP INSTRUCTIONS. CLR MODE 77 IS USED TO CLEAR THE LOCATION FOLLOWING THE INSTRUCTION (SOPX). THEN SINGLE OPERAND INSTRUCTIONS WITH MODES 37, 67, AND 77, USING INDIRECT POINTER SOPXAD ARE USED TO VERIFY THE DATA RESULTS OF THESE INSTRUCTIONS.

:TEST 73 TEST SOP INSTRUCTIONS MODES 2,3,6,7 WITH REGISTER 7

TS73: INC (R2) ;UPDATE TEST NUMBER
CMP #73,(R2) ;SEQUENCE ERROR?
BNE SOPB ;BR TO ERROR HALT ON SEQ ERROR
CLR (R7)+ ;CLEAR NEXT LOCATION: (SOPX)
SOPX: -1 ;USE MODE 27
BEQ SOPA

TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
CONDITIONAL BRANCH INST. AND <---
REPLACE THE MOVE INSTRUCTION <---
WHICH FOLLOWS W/ 774 <---

MOV #146,-(R2) ;MOVE TO MAILBOX # ***** 146 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
SOPA: HALT ;CLR DID NOT SET Z-BIT
INC @#SOPX ;INC SOPX W/MODE 37
NEG SOPX ;NEGATE SOPX W/MODE 67
BPL SOPB
INC @SOPXAD ;INC SOPX W/MODE 77
BEQ TS74

TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
CONDITIONAL BRANCH INST. AND <---
REPLACE THE MOVE INSTRUCTION <---
WHICH FOLLOWS W/ 760 <---

SOPB: MOV #147,-(R2) ;MOVE TO MAILBOX # ***** 147 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
SOPXAD: HALT ;INC DID NOT SET Z-BIT
SOPXAD: SOPX ;OR SEQUENCE ERROR
SOPXAD: SOPX ;INDIRECT ADDRESS OF SOPX

THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING INSTRUCTIONS USING MODE 0. R0 IS SET TO ZERO AND THE CONDITION CODES ARE SET TO THE COMPLEMENT OF THAT EXPECTED BY THE INSTRUCTION. A TST INSTRUCTION IS EXECUTED AND CONDITIONAL BRANCHES ARE USED TO TEST THE CONDITION CODES.

:TEST 74 TEST MODE 0 SOP NON-MODIFYING

TS74: INC (R2) ;UPDATE TEST NUMBER
CMP #74,(R2) ;SEQUENCE ERROR?
BNE TS75-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;INITIALIZE R0 0
SOPXAD: SCC ;SET CC=1011
CLZ

2565 006226 005700
2566 006230 02403
2567 006232 100402
2568 006234 103401
2569 006236 001404
2570
2571
2572
2573
2574 006240
2575 006240 012742 000150
2576 006244 005242
2577 006246 000000
2578
2579
2580
2581
2582
2583
2584
2585
2586
2587
2588
2589
2590
2591 006250 005212
2592 006252 022712 000075
2593 006256 001010
2594 006260 005000
2595 006262 105100
2596 006264 000277
2597 006266 000250
2598 006270 105700
2599 006272 102402
2600 006274 101401
2601 006276 100404
2602
2603
2604
2605
2606 006300
2607 006300 012742 000151
2608 006304 005242
2609 006306 000000
2610
2611
2612
2613
2614
2615
2616
2617
2618
2619
2620

TST R0 ;TRY TST W/ MODE 0
BVS SNMOA ;CHECK THAT CR=0100
BMI SNMOA
BCS SNMOA
BEQ TS75
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 767 <====
SNMOA:
MOV #150,-(R2) ;MOVE TO MAILBOX # ***** 150 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CONDITION CODES NOT SET PROPERLY
; OR SEQUENCE ERROR

: THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING BYTE INSTRUCTIONS WITH MODE 0.
: R0 IS SET TO 377 AND COMPLEMENT OF THE EXPECTED CONDITION CODES
: IS LOADED IN PSW. A TSTB INSTRUCTION IS EXECUTED AND THE RESULTS
: ARE CHECKED WITH SEVERAL CONDITIONAL BRANCH INSTRUCTIONS.
: THIS VERIFIES THAT THE PROPER BYTE WAS TESTED.

: TEST 75 TEST ODE 0 EVEN BYTE W/ SOP NON-MODIFYING

TS75: INC (R2) ;UPDATE TEST NUMBER
LMP #75,(R2) ;SEQUENCE ERROR?
BNE TS76-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;INITIALIZE
COMB R0 ;R0=377
SCC ;SET CC=0111
CLN
TSTB R0 ;TRY TST EVEN BYTE
BVS SNMBOA ;CHECK CC=1000
BLOS SNMBOA
BMI TS76
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 767 <
SNMBOA:
MOV #151,-(R2) ;MOVE TO MAILBOX # ***** 151 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CONDITION CODES NOT SET PROPERLY
; OR SEQUENCE ERROR

: THIS TEST VERIFIES SINGLE OPERAND INSTRUCTIONS WITH MODE 1.
: R0 IS USED TO POINT TO AND CLEAR LOC. 0. THE COMPLEMENT OF THE
: EXPECTED CONDITION CODES ARE LOADED IN THE PSW. A TST INSTRUCTION
: IS THEN EXECUTED ON LOC. 0 USING R0 AND CONDITIONAL BRANCHES TEST
: THE RESULTS.

2621
2622
2623 006310 005212
2624 006312 022712 000076
2625 006316 001011
2626 006320 005000
2627 006322 005010
2628 006324 000277
2629 006326 000244
2630 006330 005710
2631 006332 102403
2632 006334 103402
2633 006336 100401
2634 006340 001404
2635
2636
2637
2638
2639 006342
2640 006342 012742 000152
2641 006346 005242
2642 006350 000000
2643
2644
2645
2646
2647
2648
2649
2650
2651
2652
2653
2654
2655 006352 005212
2656 006354 022712 000077
2657 006360 001026
2658 006362 005000
2659 006364 005010
2660 006366 105110
2661 006370 000277
2662 006372 000250
2663 006374 105710
2664 006376 102402
2665 006400 101401
2666 006402 100404
2667
2668
2669
2670
2671 006404
2672 006404 012742 000153
2673 006410 005242
2674 006412 000000
2675 006414 005000
2676 006416 005200

```
:TEST 76          TEST MODE 1 SOP NON-MODIFYING
:*****
TS76:  INC      (R2)          ;UPDATE TEST NUMBER
      CMP      #76,(R2)      ;SEQUENCE ERROR?
      BNE     TS77-10        ;BR TO ERROR HALT ON SEQ ERROR
      CLR     R0             ;POINT TO LOC 0
      CLR     (R0)          ;CLEAR LOC 0
      SCC     ;INITIALIZE
      CLZ     ;CC=1011
      TST     (R0)          ;TRY TST W/ MODE 1
      BVS     SNM1A         ;CHECK CC=0100
      BCS     SNM1A
      BMI     SNM1A
      BEQ     TS77

      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
      ;          CONDITIONAL BRANCH INST. AND <--
      ;          REPLACE THE MOVE INSTRUCTION <--
      ;          WHICH FOLLOWS W/ 766 <-

SNM1A:  MOV     #152,-(R2)    ;MOVE TO MAILBOX # ***** 152 *****
      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      HALT    ;CC'S NOT SET PROPERLY
      ; OR SEQUENCE ERROR

:*****
      THIS TEST SETS LOCATION 0 TO 377 AND THEN USES R0 TO TEST
      ;THE EVEN BYTE AND THE ODD BYTE USING SOP BYTE INSTRUCTIONS WITH MODE 1.
      ;AGAIN, CONDITIONAL BRANCHES ARE USED TO VERIFY THE SETTING OF THE
      ;PROPER CONDITION CODE BITS.
:*****
:TEST 77          TEST MODE 1 BYTE INST. NON-MODIFYING
:*****
TS77:  INC      (R2)          ;UPDATE TEST NUMBER
      CMP      #77,(R2)      ;SEQUENCE ERROR?
      BNE     TS100-10       ;BR TO ERROR HALT ON SEQ ERROR
      CLR     R0             ;POINT TO LOC 0
      CLR     (R0)          ;CLEAR LOC 0
      COMB    (R0)          ;COMPLEMENT BYTE 0
      SCC     ;SET CC=0111
      CLN     ;
      TSTB    (R0)          ;TRY TST ON EVEN BYTE
      BVS     SNMB1A
      BLOS    SNMB1A
      BMI     SNMB1B

      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
      ;          CONDITIONAL BRANCH INST. AND < --
      ;          REPLACE THE MOVE INSTRUCTION < -
      ;          WHICH FOLLOWS W/ 766 <-

SNMB1A:  MOV     #153,-(R2)    ;MOVE TO MAILBOX # ***** 153 *****
      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      HALT    ;CC'S NOT CORRECT

SNMB1B:  CLR     R0
      INC     R0
```

```

2677 006420 000277          SCC          ;SET CC=1011
2678 006422 000244          CLZ
2679 006424 105710          TSTB      (R0)      ;TRY TO TST AN ODD BYTE
2680 006426 102403          BVS      SNMB1C    ;CHECK CC=0100
2681 006430 103402          BCS      SNMB1C
2682 006432 100401          BMI      SNMB1C
2683 006434 001404          BEQ      TS100
2684                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
2685                                     ;          CONDITIONAL BRANCH INST. AND <===
2686                                     ;          REPLACE THE MOVE INSTRUCTION <===
2687                                     ;          WHICH FOLLOWS W/ 751 <===
2688 006436
2689 006436 012742 000154    SNMB1C:  MOV      #154,-(R2)  ;MOVE TO MAILBOX # ***** 154 *****
2690 006442 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
2691 006444 000000          HALT
2692                                     ;CC'S NOT CORRECT
2693                                     ; OR SEQUENCE ERROR
2694
2695
2696
2697
2698
2699
2700
2701
2702
2703
2704 006446 005212          TS100:  INC      (R2)      ;UPDATE TEST NUMBER
2705 006450 022712 000100    CMP      #100,(R2)   ;SEQUENCE ERROR?
2706 006454 001020          BNE      TS101-10   ;BR TO ERROR HALT ON SEQ ERROR
2707 006456 005000          CLR      R0         ;INITIALIZE R0-0
2708 006460 005010          CLR      (R0)      ;CLEAR LOC 0
2709 006462 000277          SCC          ;SET CC=1011
2710 006464 000244          CLZ
2711 006466 005720          TST      (R0)+     ;TRY TST W/ MODE 2
2712 006470 102403          BVS      SNM2A     ;CHECK CC=0100
2713 006472 103402          BCS      SNM2A
2714 006474 100401          BMI      SNM2A
2715 006476 001404          BEQ      SNM2B
2716                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
2717                                     ;          CONDITIONAL BRANCH INST. AND <
2718                                     ;          REPLACE THE MOVE INSTRUCTION <-
2719                                     ;          WHICH FOLLOWS W/ 766 <
2720 006500
2721 006500 012742 000155    SNM2A:  MOV      #155,-(R2)  ;MOVE TO MAILBOX # ***** 155 *****
2722 006504 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
2723 006506 000000          HALT
2724 006510 005300          SNM2B:  DEC      R0         ;RESET R0
2725 006512 005300          DEC      R0
2726 006514 001404          BEQ      TS101
2727                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
2728                                     ;          CONDITIONAL BRANCH INST. AND <-
2729                                     ;          REPLACE THE MOVE INSTRUCTION <
2730                                     ;          WHICH FOLLOWS W/ 757 <
2731 006516 012742 000156    MOV      #156,-(R2)  ;MOVE TO MAILBOX # ***** 156 *****
2732 006522 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR

```

```
2733 006524 000000 HALT ;MODE 2 DID NOT INC REG CORRECTLY
2734 ; OR SEQUENCE ERROR
2735
2736
2737
2738
2739
2740
2741
2742
2743
2744
2745
2746
2747 006526 005212
2748 006530 022712 000101
2749 006534 001042
2750 006536 005000
2751 006540 005010
2752 006542 105110
2753 006544 000277
2754 006546 000250
2755 006550 105720
2756 006552 102402
2757 006554 101401
2758 006556 100404
2759
2760
2761
2762
2763 006560
2764 006560 012742 000157
2765 006564 005242
2766 006566 000000
2767 006570 005300
2768 006572 001404
2769
2770
2771
2772
2773 006574 012742 000160
2774 006600 005242
2775 006602 000000
2776 006604 005200
2777 006606 000277
2778 006610 000244
2779 006612 105720
2780 006614 102403
2781 006616 103402
2782 006620 100401
2783 006622 001404
2784
2785
2786
2787
2788 006624

*****
: THIS TEST VERIFIES MODE 2 SINGLE OPERAND NON-MODIFYING BYTE
: INSTRUCTIONS IT USES R0 TO POINT TO LOC. 0. WITH LOCATION 0
: SET TO 377, THE EVEN AND ODD BYTE IS TESTED WITH TSTB INSTRUCTIONS
: TO VERIFY THE CORRECT CC ARE SET. THE REGISTER IS CHCKED FOR
: PROPER INCREMENTING.
*****
: TEST 101 TEST MODE 2 - BYTE W/ SOP NON-MODIFYING
*****
TS101: INC (R2) ;UPDATE TEST NUMBER
CMP #101,(R2) ;SEQUENCE ERROR?
BNE TS102-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;CLEAR R0
CLR (R0) ;CLEAR LOC 0
COMB (R0) ;SET LUC 0=377
SCC ;SET CC=0111
CLN
TSTB (R0)+ ;TRY TST OF EVEN BYTE
BVS SNMB2A
BLOS SNMB2A
BMI SNMB2B
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <-
; WHICH FOLLOWS W/ 766 <- =
SNMB2A: MOV #157,-(R2) ;MOVE TO MAILBOX # ***** 157 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT SET CORRECTLY
SNMB2B: DEC R0 ;DECREMENT R0
BEQ SNMB2C
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <-
; WHICH FOLLOWS W/ 760 <-
SNMB2C: MOV #160,-(R2) ;MOVE TO MAILBOX # ***** 160 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MODE 2 DID NOT INC REG CORRECTLY
SNMB2C: INC R0 ;POINT TO ODD BYTE
SCC ;SET CC=1011
CLZ
TSTB (R0)+ ;TRY TST OF ODD BYTE
BVS SNMB2D
BCS SNMB2D
BMI SNMB2D
BEQ SNMB2E
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <-
; WHICH FOLLOWS W/ 744 .
SNMB2D:
```

```

2789 006624 012742 000161      MOV      #161,-(R2)      ;MOVE TO MAILBOX # ***** 161 *****
2790 006630 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
2791 006632 000000              HALT                    ;CC'S NOT CORRECT
2792 006634 005300      SNMB2E: DEC      R0
2793 006636 005300              DEC      R0
2794 006640 001404              BEQ      TS102

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=---
;          CONDITIONAL BRANCH INST. AND <=---
;          REPLACE THE MOVE INSTRUCTION <=---
;          WHICH FOLLOWS W/ 735 <=---

```

```

2798 006642 012742 000162      MOV      #162,-(R2)      ;MOVE TO MAILBOX # ***** 162 *****
2800 006646 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
2801 006650 000000              HALT                    ;RO DID NOT INCREMENT PROPERLY
2802                                     ; OR SEQUENCE ERROR

```

```

:*****

```

```

: THIS TEST VERIFIES MODE 3 SINGLE OPERAND NON-MODIFYING INSTRUCTIONS.
: A POINTER IN A TABLE AT LOC. 376 IS USED TO TEST LOCATION 0.
: THE CC'S AND THE REGISTER ARE CHECKED FOLLOWING THE
: TST MODE 3 INSTRUCTION.

```

```

:*****

```

```

2812 TEST 102 TEST MODE 3 W/ SOP NON-MODIFYING INSTS
2813

```

```

2814 006652 005212      TS102: INC      (R2)          ;UPDATE TEST NUMBER
2815 006654 022712 000102      CMP      #102,(R2)      ;SEQUENCE ERROR?
2816 006660 001022      BNE     TS103-10        ;BR TO ERROR HALT ON SEQ ERROR
2817 006662 005000      CLR      R0            ;R0=0
2818 006664 005010      CLR     (R0)           ;CLEAR LOC 0
2819 006666 105100      COMB    R0            ;R0=376
2820 006670 005300      DEC     R0
2821 006672 000277      SCC                    ;SET CC=1011
2822 006674 000244      CLZ
2823 006676 005730      TST     @(R0)+         ;TRY TST W/ MODE 3
2824 006700 102403      BVS     SNM3A          ;CHECK CC=0100
2825 006702 103402      BCS     SNM3A
2826 006704 100401      BMI     SNM3A
2827 006706 001404      BEQ     SNM3B

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
;          CONDITIONAL BRANCH INST. AND <
;          REPLACE THE MOVE INSTRUCTION <
;          WHICH FOLLOWS W/ 764 <

```

```

2832 006710
2833 006710 012742 000163      SNM3A: MOV      #163,-(R2)      ;MOVE TO MAILBOX # ***** 163 *****
2834 006714 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
2835 006716 000000              HALT                    ;CC'S NOT CORRECT
2836 006720 005300      SNM3B: DEC      R0
2837 006722 105100      COMB    R0            ;R0=377
2838 006724 001404      BEQ     TS103          ;R0=0

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
;          CONDITIONAL BRANCH INST. AND <
;          REPLACE THE MOVE INSTRUCTION <
;          WHICH FOLLOWS W/ 755 <

```

```

2843 006726 012742 000164      MOV      #164,-(R2)      ;MOVE TO MAILBOX # ***** 164 *****
2844 006732 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR

```

2845 006734 000000

HALT

;MODE 3 DID NOT INC REG CORRECTLY
; OR SEQUENCE ERROR

2846
2847
2848
2849

2850
2851
2852
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2857

: THIS TEST VERIFIES SOP NON-MODIFYING BYTE INSTRUCTIONS MODE 3
: LOC. 0 IS SET TO 377. TABLE AT LOC. 402-404 IS USED TO TEST
: BYTE 0 AND BYTE 1. THE REGISTER IS CHECKED FOR PROPER INCREMENTING AND
: THE CC'S ARE VERIFIED.
: THE TABLE AT LOC. 402-404 SHOULD CONTAIN 0 AND 1 BEFORE AND
: AFTER THE TEST IS RUN.

2858
2859

:TEST 103 TEST MODE 3 - BYTES W/ SOP NON-MODIFYING INSTS.

2860 006736 005212
2861 006740 022712 000103
2862 006744 001036
2863 006746 005000
2864 006750 005010
2865 006752 105110
2866 006754 105100
2867 006756 005200
2868 006760 005720
2869 006762 000277
2870 006764 000250
2871 006766 105730
2872 006770 102402
2873 006772 101401
2874 006774 100404

TS103: INC (R2) ;UPDATE TEST NUMBER
CMP #103,(R2) ;SEQUENCE ERROR?
BNE TS104-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;CLEAR LOC 0
COMB (R0) ;LOC. 0 =377
COMB R0
INC R0
TST (R0)+ ;R0=402
SCC ;CC=0111
CLN
TSTB @ (R0)+ ;TRY TST OF EVEN BYTE
BVS SNMB3A ;CHECK CC=1000
BLOS SNMB3A
BMI SNMB3B

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 763 <

2875
2876
2877
2878

2879 006776
2880 006776 012742 000165
2881 007002 005242
2882 007004 000000
2883 007006 000277
2884 007010 000244
2885 007012 105730
2886 007014 102403
2887 007016 103402
2888 007020 100401
2889 007022 001404

SNMB3A: MOV #165,-(R2) ;MOVE TO MAILBOX # ***** 165 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT
SNMB3B: SCC ;SET CC=1011
CLZ
TSTB @ (R0)+ ;TRY TST OF ODD BYTE
BVS SNMB3C ;CHECK CC=0100
BCS SNMB3C
BMI SNMB3C
BEQ SNMB3D

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 750 <

2890
2891
2892
2893

2894 007024
2895 007024 012742 000166
2896 007030 005242
2897 007032 000000
2898 007034 005720
2899 007036 005710
2900 007040 100404

SNMB3C: MOV #166,-(R2) ;MOVE TO MAILBOX # ***** 166 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT
SNMB3D: TST (R0)+ ;R0=410
TST (R0)
BMI TS104

D 5

2901
2902
2903
2904
2905 007042 C12742 000167
2906 007046 005242
2907 007050 000000
2908
2909

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 741 <====
: MOVE TO MAILBOX # ***** 167 *****
: SET MSGTYP TO FATAL ERROR
: TSTB DID NOT INCREMENT R0 CORRECTLY
: OR SEQUENCE ERROR

2910
2911
2912
2913
2914
2915
2916
2917

: THIS TEST VERIFIES MODE 4 SOP NON-MODIFYING INSTRUCTIONS.
: LOC. 0 IS SET TO -1 AND THE CC'S ARE SET TO THE COMPLEMENT OF THE
: EXPECTED RESULTS. R0 AND SET TO 2 AND A TST MODE 4 IS EXECUTED.
: THE CC'S ARE CHECKED WITH CONDITIONAL BRANCH INSTRUCTIONS AND THE REGISTER
: IS CHECKED FOR PROPER DECREMENTING.

2918
2919

: TEST 104 TEST MODE 4 W/ SOP NON-MODIFYING INSTS

2920 C07052 005212
2921 007054 022712 000104
2922 007060 001017
2923 007062 005000
2924 007064 005010
2925 007066 005120
2926 007070 000277
2927 007072 000244
2928 007074 005740
2929 007076 102402
2930 007100 101401
2931 007102 100404
2932

TS104: INC (R2) ; UPDATE TEST NUMBER
CMP #104,(R2) ; SEQUENCE ERROR?
BNE TS105-10 ; BR TO ERROR HALT ON SEQ ERROR
CLR R0 ; R0=0
CLR (R0) ; LOC 0=0
COM (R0)+ ; LOC 0=-1
SCC ; SET CC=1011
CLZ
TST -(R0) ; TRY TST W/ MODE 4
BVS SNM4A ; CHECK CC=0100
BLOS SNM4A
BMI SNM4B

2933
2934
2935

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 766 <

2936 007104
2937 007104 012742 000170
2938 007110 005242
2939 007112 000000
2940 007114 005700
2941 007116 001404
2942

SNM4A: MOV #170,-(R2) ; MOVE TO MAILBOX # ***** 170 *****
INC -(R2) ; SET MSGTYP TO FATAL ERROR
HALT ; CC'S NOT CORRECT
SNM4B: TST R0
BEQ TS105

2943
2944
2945

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 760 <

2946 007120 012742 000171
2947 007124 005242
2948 007126 000000
2949
2950

MOV #171,-(R2) ; MOVE TO MAILBOX # ***** 171 *****
INC -(R2) ; SET MSGTYP TO FATAL ERROR
HALT ; TST MODE 4 DID NOT DEC R0 CORRECTLY
: OR SEQUENCE ERROR

2951
2952
2953
2954
2955
2956

: THIS TEST VERIFIES MODE 5 SOP NON-MODIFYING INSTRUCTIONS.
: IT USES A POINTER AT LOC. 376 TO TEST LOC. 0. R0 IS SET
: TO 400, A TST MODE 5 INSTRUCTION IS EXECUTED AND THE CC'S CHECKED.
: R0 IS CHECKED TO INSURE PROPER DECREMENTING.

2957
2958
2959
2960
2961 007130 005212
2962 007132 022712 000105
2963 007136 001022
2964 007140 005000
2965 007142 005010
2966 007144 005110
2967 007146 105100
2968 007150 005200
2969 007152 000277
2970 007154 000250
2971 007156 005750
2972 007160 102402
2973 007162 101401
2974 007164 100404
2975
2976
2977
2978
2979 007166
2980 007166 012742 000172
2981 007172 005242
2982 007174 000000
2983 007176 005200
2984 007200 105100
2985 007202 001404
2986
2987
2988
2989
2990 007204 012742 000173
2991 007210 005242
2992 007212 000000
2993
2994
2995
2996
2997
2998
2999
3000
3001
3002
3003
3004
3005 007214 005212
3006 007216 022712 000106
3007 007222 001021
3008 007224 005000
3009 007226 005010
3010 007230 005110
3011 007232 105100
3012 007234 000277

```
*****  
: TEST 105 TEST MODE 5 W/ SOP NON-MODIFYING INSTS  
*****  
TS105: INC (R2) ;UPDATE TEST NUMBER  
CMP #105,(R2) ;SEQUENCE ERROR?  
BNE TS106-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR (R0) ;LOC 0=0  
COM (R0) ;LOC 0=-1  
COMB R0 ;R0=377  
INC R0 ;R0=400  
SCC ;SET CC=0111  
CLN  
TST @-(R0) ;TRY TST W/ MODE 5  
BVS SNM5A ;CHECK CC=1000  
BLOS SNM5A  
BMI SNM5B  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
: CONDITIONAL BRANCH INST. AND <  
: REPLACE THE MOVE INSTRUCTION <-  
: WHICH FOLLOWS W/ 764 <  
  
SNM5A: MOV #172,-(R2) ;MOVE TO MAILBOX # ***** 172 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CC'S NOT SET PROPERLY  
SNM5B: INC R0 ;R0=377  
COMB R0 ;R0=0  
BEQ TS106  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
: CONDITIONAL BRANCH INST. AND <  
: REPLACE THE MOVE INSTRUCTION <  
: WHICH FOLLOWS W/ 755 <  
  
MOV #173,-(R2) ;MOVE TO MAILBOX # ***** 173 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MODE 5 DID NOT DEC R0 CORRECTLY  
; OR SEQUENCE ERROR  
  
*****  
: THIS TEST VERIFIES MODE 6 SOP NON-MODIFYING INSTRUCTIONS.  
: R0 IS SET TO 377 AND A MODE 6 TST INSTRUCTION IS EXECUTED  
: USING R0 AND AN OFFSET OF -377. THE CC'S ARE CHECKED AS WELL  
: AS R0 TO INSURE IT WAS NOT ALTERED.  
*****  
: TEST 106 TEST MODE 6 W/ SOP NON-MODIFYING INSTS  
*****  
TS106: INC (R2) ;UPDATE TEST NUMBER  
CMP #106,(R2) ;SEQUENCE ERROR?  
BNE TS107-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR (R0) ;LOC 0=0  
COM (R0) ;LOC 0=-1  
COMB R0 ;R0=377  
SCC ;SET CC=0111
```



```
3013 007236 000250          CLN
3014 007240 005760 177401    TST      -377(R0)      ;TRY TST W/ MODE 6
3015 007244 102402          BVS      SNM6A        ;CHECK CC=1000
3016 007246 101401          BLOS     SNM6A
3017 007250 100404          BMI      SNM6B
3018                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
3019                               ;                               CONDITIONAL BRANCH INST. AND <====
3020                               ;                               REPLACE THE MOVE INSTRUCTION <====
3021                               ;                               WHICH FOLLOWS W/ 764 <====
3022 007252          SNM6A:
3023 007252 012742 000174    MOV      #174,-(R2)    ;MOVE TO MAILBOX # ***** 174 *****
3024 007256 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
3025 007260 000000          HALT
3026 007262 105100          SNM6B: COMB      R0    ;CC'S INCORRECT
3027 007264 001404          BEQ     TS107        ;RO-0
3028                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== =
3029                               ;                               CONDITIONAL BRANCH INST. AND <====
3030                               ;                               REPLACE THE MOVE INSTRUCTION <====
3031                               ;                               WHICH FOLLOWS W/ 756 <====
3032 007266 012742 000175    MOV      #175,-(R2)    ;MOVE TO MAILBOX # ***** 175 *****
3033 007272 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
3034 007274 000000          HALT
3035                               ;TST MODE 6 INCORRECTLY CHANGED RO
                               ; OR SEQUENCE ERROR
```

3036
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3043
3044
3045
3046
3047 007276 005212
3048 007300 022712 000107
3049 007304 001021
3050 007306 005000
3051 007310 005010
3052 007312 005110
3053 007314 105100
3054 007316 000277
3055 007320 000250
3056 007322 005770 000001
3057 007326 102402
3058 007330 101401
3059 007332 100404
3060
3061
3062
3063
3064 007334
3065 007334 012742 000176
3066 007340 005242
3067 007342 000000
3068 007344 105100
3069 007346 001404
3070
3071
3072
3073
3074 007350 012742 000177
3075 007354 005242
3076 007356 000000
3077

```
.....  
: THIS TEST VERIFIES MODE 7 SOP NON-MODIFYING INSTRUCTIONS.  
: IT USES A POINTER TO LOC. 0 STORED AT LOC. 400 TO TST LOC. 0.  
: RO IS SET TO 377 AND LOC. 0 IS TESTED THRU THE POINTER AT 400 USING  
: RO AND AN OFFSET OF 1.  
:.....  
: TEST 107 TEST MODE 7 W/ SOP NON-MODIFYING INSTS.  
:.....  
TS107: INC (R2) ;UPDATE TEST NUMBER  
CMP #107,(R2) ;SEQUENCE ERROR?  
BNE TS110-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;RO=0  
CLR (R0) ;LOC 0=0  
COM (R0) ;LOC 0=-1  
COMB R0 ;RO=377  
SCC ;CC=0111  
CLN  
TST @1(R0) ;TRY TST W/ MODE 7  
BVS SNM7A ;CHECK CC=1000  
BLOS SNM7A  
BMI SNM7B  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---  
: CONDITIONAL BRANCH INST. AND <---  
: REPLACE THE MOVE INSTRUCTION <---  
: WHICH FOLLOWS W/ 764 <---  
SNM7A: MOV #176,-(R2) ;MOVE TO MAILBOX # ***** 176 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CC'S NOT CORRECT  
SNM7B: COMB R0 ;RO=0  
BEQ TS110  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---  
: CONDITIONAL BRANCH INST. AND <---  
: REPLACE THE MOVE INSTRUCTION <---  
: WHICH FOLLOWS W/ 756 <---  
MOV #177,-(R2) ;MOVE TO MAILBOX # ***** 177 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;TST MODE 7 INCORRECTLY CHANGED RO  
: OR SEQUENCE ERROR
```

3078
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3088 007360 005212
3089 007362 022712 000110
3090 007366 001006
3091 007370 005000
3092 007372 005100
3093 007374 005004
3094 007376 060004
3095 007400 005204
3096 007402 001404
3097
3098
3099
3100
3101 007404 012742 000200
3102 007410 005242
3103 007412 000000
3104
3105
3106
3107
3108
3109
3110
3111
3112
3113 007414 005212
3114 007416 022712 000111
3115 007422 001006
3116 007424 005000
3117 007426 005004
3118 007430 005100
3119 007432 010004
3120 007434 005204
3121 007436 001404
3122
3123
3124
3125
3126 007440 012742 000201
3127 007444 005242
3128 007446 000000
3129
3130
3131
3132
3133

.....
: THIS TEST VERIFIES MODE 0 DOUBLE OPERAND INSTRUCTIONS. IT SETS
: DATA IN R0 AND R4 AND USES THE ADD INSTRUCTION TO TEST THE DOP
: MICROCODE.
:.....

: TEST 110 TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.
:.....
TS110: INC (R2) ;UPDATE TEST NUMBER
CMP #110,(R2) ;SEQUENCE ERROR?
BNE TS111-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
COM R0 ;R0=-1
CLR R4 ;R4=0
ADD R0,R4 ;TRY ADD: R4--1
INC R4 ;R4=0
BEQ TS111
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 771 <====
MOV #200,-(R2) ;MOVE TO MAILBOX # ***** 200 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ADD INST. FAILED W/ MODE 0
: OR SEQUENCE ERROR

.....
: THIS TEST VERIFIES THE MOVE INSTRUCTION WITH MODE 0 TO MODE 0.
:.....

: TEST 111 MOV MODE 0 TO MODE 0
:.....
TS111: INC (R2) ;UPDATE TEST NUMBER
CMP #111,(R2) ;SEQUENCE ERROR?
BNE TS112-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR R4 ;R4=0
COM R0 ;R0=-1
MOV R0,R4 ;TRY MOVE -1 TO R4
INC R4 ;INC R4
BEQ TS112
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
: CONDITIONAL BRANCH INST. AND <=
: REPLACE THE MOVE INSTRUCTION <=
: WHICH FOLLOWS W/ 771 <=
MOV #201,-(R2) ;MOVE TO MAILBOX # ***** 201 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MOVE FAILED MODE 0 TO MODE 0
: OR SEQUENCE ERROR

.....
: THIS TEST VERIFIES THE SUBTRACT INSTRUCTION WITH MODE 0,0.
:.....

```
3134  
3135  
3136  
3137  
3138 007450 005212  
3139 007452 022712 000112  
3140 007456 001016  
3141 007460 005000  
3142 007462 005004  
3143 007464 005204  
3144 007466 160400  
3145 007470 100003  
3146 007472 001402  
3147 007474 102401  
3148 007476 103404  
3149  
3150  
3151  
3152  
3153 007500  
3154 007500 012742 000202  
3155 007504 005242  
3156 007506 000000  
3157 007510 005200  
3158 007512 001404  
3159  
3160  
3161  
3162  
3163 007514 012742 000203  
3164 007520 005242  
3165 007522 000000  
3166
```

```
.....  
:TEST 112 TEST SUB MODE 0,0  
.....  
TS112: INC (R2) ;UPDATE TEST NUMBER  
CMP #112,(R2) ;SEQUENCE ERROR?  
BNE TS113-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR R4 ;R4=0  
INC R4 ;R4=1  
SUB R4,R0 ;TRY SUB 0,0 R0--1  
BPL SUB0 ;CC=1001  
BEQ SUB0  
BVS SUB0  
BCS SUB0A  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=====  
: CONDITIONAL BRANCH INST. AND <=====  
: REPLACE THE MOVE INSTRUCTION <=====  
: WHICH FOLLOWS W/ 767 <=====  
  
SUB0: MOV #202,-(R2) ;MOVE TO MAILBOX # ***** 202 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CONDITION CODE FAILED ON SUB  
  
SUB0A: INC R0  
BEQ TS113  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=====  
: CONDITIONAL BRANCH INST. AND <=====  
: REPLACE THE MOVE INSTRUCTION <=====  
: WHICH FOLLOWS W/ 761 <=====  
  
MOV #203,-(R2) ;MOVE TO MAILBOX # ***** 203 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;DATA RESULT OF SUB FAILED  
; OR SEQUENCE ERROR
```

3167
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3175
3176
3177
3178
3179 007524 005212
3180 007526 022712 000113
3181 007532 001051
3182 007534 005000
3183 007536 010004
3184 007540 001404
3185
3186
3187
3188
3189 007542 012742 000204
3190 007546 005242
3191 007550 000000
3192 007552 005200
3193 007554 005100
3194 007556 005104
3195 007560 040004
3196 007562 005304
3197 007564 001404
3198
3199
3200
3201
3202 007566 012742 000205
3203 007572 005242
3204 007574 000000
3205 007576 050004
3206 007600 005204
3207 007602 005204
3208 007604 001404
3209
3210
3211
3212
3213 007606 012742 000206
3214 007612 005242
3215 007614 000000
3216 007616 005000
3217 007620 105100
3218 007622 005004
3219 007624 005104
3220 007626 040004
3221 007630 060004
3222 007632 005204

```
.....  
: THIS TEST QUICKLY VERIFIES THE REMAINING DOP MODIFYING INSTRUCTIONS  
: WITH MODE 0,0 TO PROVIDE A BASELINE FOR SUBSEQUENT TESTS.  
: SINGLE OPERAND INSTRUCTIONS ARE USED TO SET UP DATA IN R0 AND R4  
: BEFORE EACH OF THE SEVERAL DOP MODIFYING INSTRUCTIONS ARE USED AND  
: VERIFIED.  
:.....  
: TEST 113 TEST ALL THE DOP INSTRUCTIONS W/ SOURCE MODE 0,0  
:.....  
TS113: INC (R2) ;UPDATE TEST NUMBER  
CMP #113,(R2) ;SEQUENCE ERROR?  
BNE TS114-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
MOV R0,R4 ;TRY MOVE MODE 0,0  
BEQ DOP0A  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----  
: CONDITIONAL BRANCH INST. AND <----  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 774 <----  
MOV #204,-(R2) ;MOVE TO MAILBOX # ***** 204 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;Z-BIT NOT SET  
DOP0A: INC R0 ;R0=1  
COM R0 ;R0=177776  
COM R4 ;R4=177777  
BIC R0,R4 ;TRY BIC: R4-1  
DEC R4 ;R4=0  
BEQ DOP0B  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----  
: CONDITIONAL BRANCH INST. AND <----  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 762 <----  
MOV #205,-(R2) ;MOVE TO MAILBOX # ***** 205 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;BIC CLEAR RESULT INCORRECT  
DOP0B: BIS R0,R4 ;TRY BIS: R4=177777  
INC R4  
INC R4 ;R4=0  
BEQ DOP0C  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----  
: CONDITIONAL BRANCH INST. AND <----  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 752 <----  
MOV #206,-(R2) ;MOVE TO MAILBOX # ***** 206 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF BIS INCORRECT  
DOP0C: CLR R0 ;R0=0  
COMB R0 ;R0=377  
CLR R4 ;R4=0  
COM R4 ;R4=177777  
COM R4 ;R4=177400  
BIC R0,R4 ;TRY ADD: R4=177777  
ADD R0,R4  
INC R4 ;R4=0
```

3223	007634	001404		BEQ	DOP0D				
3224									
3225									
3226									
3227									
3228	007636	012742	000207	MOV	#207,-(R2)				
3229	007642	005242		INC	-(R2)				
3230	007644	000000		HALT					
3231	007646	160004		DOP0D: SUB	R0,R4				
3232	007650	105404		NEGB	R4				
3233	007652	005204		INC	R4				
3234	007654	001404		BEQ	TS114				
3235									
3236									
3237									
3238									
3239	007656	012742	000210	MOV	#210,-(R2)				
3240	007662	005242		INC	-(R2)				
3241	007664	000000		HALT					
3242									
3243									

 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
 ; CONDITIONAL BRANCH INST. AND <=
 ; REPLACE THE MOVE INSTRUCTION <----
 ; WHICH FOLLOWS W/ 736 <----
 ; MOVE TO MAILBOX # ***** 207 *****
 ; SET MSGTYP TO FATAL ERROR
 ; RESULT OF ADD INCORRECT
 ; 177401=R4
 ; R4=177777
 ; RD=0

 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
 ; CONDITIONAL BRANCH INST. AND <----
 ; REPLACE THE MOVE INSTRUCTION <----
 ; WHICH FOLLOWS W/ 726 <----
 ; MOVE TO MAILBOX # ***** 210 *****
 ; SET MSGTYP TO FATAL ERROR
 ; RESULT OF SUB INCORRECT
 ; OR SEQUENCE ERROR

3244
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3250
3251
3252 007666 005212
3253 007670 022712 000114
3254 007674 001024
3255 007676 005000
3256 007700 005010
3257 007702 105110
3258 007704 005220
3259 007706 005400
3260 007710 060037 000000
3261 007714 100403
3262 007716 001402
3263 007720 102401
3264 007722 103404
3265
3266
3267
3268
3269 007724
3270 007724 012742 000211
3271 007730 005242
3272 007732 000000
3273 007734 105137 000000
3274 007740 005337 000000
3275 007744 001404
3276
3277
3278
3279
3280 007746 012742 000212
3281 007752 005242
3282 007754 000000
3283

```
.....  
: THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND INSTRUCTIONS. IT SETS  
: DATA IN R0 AND LOCATION 0 AND OF-RATES UPON IT USING DOP INSTRUCTIONS.  
:.....  
: TEST 114 TEST MODE 0,X DOUBLE-OPERAND INSTRUCTIONS  
:.....  
TS114: INC (R2) ;UPDATE TEST NUMBER  
CMP #114,(R2) ;SEQUENCE ERROR?  
BNE TS115-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR (R0) ;LOC. 0=0  
COMB (R0) ;LOC. 0=377  
INC (R0)+ ;LOC. 0=400 R0=2  
NEG R0 ;R0=-2  
ADD R0,@#0 ;TRY ADD 0,3; LOC. 0=376  
BMI DOP03A ;CC=0001?  
BEQ DOP03A  
BVS DOP03A  
BCS DOP03B  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 764 <====  
  
DOP03A: MOV #211,-(R2) ;MOVE TO MAILBOX # ***** 211 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CC'S NOT SET CORRECTLY  
DOP03B: COMB @#0 ;LOC. 0=1  
DEC @#0 ;LOC. 0=0  
BEQ TS115  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== -  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <== =  
: WHICH FOLLOWS W/ 753 <====  
  
MOV #212,-(R2) ;MOVE TO MAILBOX # ***** 212 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;DATA RESULT INCORRECT  
; OR SEQUENCE ERROR
```

3284
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3291
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3293 007756 005212
3294 007760 022712 000115
3295 007764 001042
3296 007766 005000
3297 007770 005004
3298 007772 005204
3299 007774 020400
3300 007776 003004
3301
3302
3303
3304
3305 010000 012742 000213
3306 010004 005242
3307 010006 000000
3308 010010 020004
3309 010012 002404
3310
3311
3312
3313
3314 010014 012742 000214
3315 010020 005242
3316 010022 000000
3317 010024 005200
3318 010026 020400
3319 010030 001404
3320
3321
3322
3323
3324 010032 012742 000215
3325 010036 005242
3326 010040 000000
3327 010042 005000
3328 010044 005100
3329 010046 005004
3330 010050 030004
3331 010052 001404
3332
3333
3334
3335
3336 010054 012742 000216
3337 010060 005242
3338 010062 000000
3339 010064 005304

```
*****
: THIS TEST VERIFIES MODE 0,0 DOP NON-MODIFYING INSTRUCTIONS.
: R0 AND R4 ARE PRESET TO 0 AND 1 RESPECTIVELY. COMPARE INSTRUCTIONS ARE
: THEN EXECUTED AND CHECKED. FIRST R4 IS COMPARED TO R0 THEN R0 TO R4.
*****
: TEST 115 TEST DOP NON-MODIFYING INST. W/ SOURCE MODE 0,0
*****
TS115: INC (R2) ;UPDATE TEST NUMBER
CMP #115,(R2) ;SEQUENCE ERROR?
BNE TS116-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR R4 ;R4=0
INC R4 ;R4=1
CMP R4,R0 ;TRY COMPARE R4 TO R0
BGT DNM1

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND < --
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 772 <
MOV #213,-(R2) ;MOVE TO MAILBOX # ***** 213 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT FOR CMP
DNM1: CMP R0,R4 ;TRY COMPARE R0 TO R4
BLT DNM2

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION < -
: WHICH FOLLOWS W/ 764 <
MOV #214,-(R2) ;MOVE TO MAILBOX # ***** 214 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT FOR CMP
DNM2: INC R0 ;R0=1
CMP R4,R0 ;TRY COMPARE R4=1 TO R0=1
BEQ DNM3

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 755 <
MOV #215,-(R2) ;MOVE TO MAILBOX # ***** 215 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT (Z=1) FOR CMP
DNM3: CLR R0 ;R0=0
COM R0 ;R0=17777
CLR R4 ;R4=0
BIT R0,R4 ;TRY BIT R0 TO R4
BEQ DNM4

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
: CONDITIONAL BRANCH INST. AND <==
: REPLACE THE MOVE INSTRUCTION <==
: WHICH FOLLOWS W/ 744 <==
MOV #216,-(R2) ;MOVE TO MAILBOX # ***** 216 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S NOT CORRECT FOR BIT
DNM4: DEC R4 ;R4=17777
```


3340 010066 030004
3341 010070 100404
3342
3343
3344
3345
3346 010072 012742 000217
3347 010076 005242
3348 010100 000000
3349
3350
3351
3352
3353
3354
3355
3356
3357
3358 010102 005212
3359 010104 022712 000116
3360 010110 001022
3361 010112 005000
3362 010114 005010
3363 010116 005110
3364 010120 005200
3365 010122 020037 000000
3366 010126 100403
3367 010130 001402
3368 010132 102401
3369 010134 103404
3370
3371
3372
3373
3374 010136
3375 010136 012742 000220
3376 010142 005242
3377 010144 000000
3378 010146 005300
3379 010150 001002
3380 010152 005210
3381 010154 001404
3382
3383
3384
3385
3386 010156
3387 010156 012742 000221
3388 010162 005242
3389 010164 000000
3390

BIT R0,R4 :TRY BIT AGAIN
BMI TS116
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <===
: REPLACE THE MOVE INSTRUCTION <- -
: WHICH FOLLOWS W/ 735 <---
MOV #217,-(R2) :MOVE TO MAILBOX # ***** 217 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :CC'S NOT CORRECT FOR BIT
: OR SEQUENCE ERROR

: THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND NON-MODIFYING INSTRUCTIONS.
: IT SETS DATA IN R0 AND LOCATION 0 AND COMPARES THEM USING DOPNM INSTRUCTIONS.

: TEST 116 TEST MODE 0,X DOUBLE-OPERAND NON-MODIFYING INSTS.

TS116: INC (R2) :UPDATE TEST NUMBER
CMP #116,(R2) :SEQUENCE ERROR?
BNE TS117-10 :BR TO ERROR HALT ON SEG ERROR
CLR R0 :R0=0
CLR (R0) :LOC. 0-0
COM (R0) :LOC. 0=177777
INC R0 :R0=1
CMP R0,#0 :TRY CMP MODE 0,3
BMI DNMO3A :CC=0001
BEQ DNMO3A
BVS DNMO3A
BCS DNMO3B

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <- -
: WHICH FOLLOWS W/ 765 <---

DNMO3A: MOV #220,-(R2) :MOVE TO MAILBOX # ***** 220 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :CC'S NOT SET CORRECTLY
DNMO3B: DEC R0
BNE DNMO3C
INC (R0)
BEQ TS117

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <- -
: WHICH FOLLOWS W/ 755 <---

DNMO3C: MOV #221,-(R2) :MOVE TO MAILBOX # ***** 221 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :DATA INCORRECTLY MODIFIED BY CMP
: OR SEQUENCE ERROR

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3391
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3398
3399
3400
3401 010166 005212
3402 010170 022712 000117
3403 010174 001007
3404 010176 005000
3405 010200 005100
3406 010202 005004
3407 010204 005014
3408 010206 005214
3409 010210 061400
3410 C10212 001404
3411
3412
3413
3414
3415 010214 C12742 000222
3416 010220 005242
3417 010222 000000
3418

```

```

:*****
:
:      THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS.  R0 IS SET TO -1
:AND LOC 0 TO 1.  R4 IS THEN CLEARED AND USED TO POINT TO LOC 0.
:IN THE ADD MODE 1 INSTRUCTION, LOC 0 IS ADDED TO R0 AND THE
:RESULTS VERIFIED.
:*****
:TEST 117      TEST MODE 1 W/ DOP INST.
:*****
TS117:  INC      (R2)          ;UPDATE TEST NUMBER
        CMP      #117,(R2)    ;SEQUENCE ERROR?
        BNE     TS120-10     ;BR TO ERROR HALT ON SEQ ERROR
        CLR     R0           ;R0=0
        COM     R0           ;R0=177777
        CLR     R4           ;R4=0
        CLR     (R4)         ;LOC 0=0
        INC     (R4)         ;LOC 0=1
        ADD     (R4),R0      ;TRY ADD SOURCE MODE 1
        BEQ     TS120
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
:           CONDITIONAL BRANCH INST. AND <====
:           REPLACE THE MOVE INSTRUCTION <====-
:           WHICH FOLLOWS W/ 770 < ==
:MOVE TO MAILBOX # ***** 222 *****
:SET MSGTYP TO FATAL ERROR
:RESULT OF ADD INCORRECT
: OR SEQUENCE ERROR

```

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3419
3420
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3426
3427
3428
3429 010224 005212
3430 010226 022712 000120
3431 010232 001007
3432 010234 005000
3433 010236 005010
3434 010240 005110
3435 010242 005004
3436 010244 151004
3437 010246 105104
3438 010250 001404
3439
3440
3441
3442
3443 010252 012742 000223
3444 010256 005242
3445 010260 000000
3446

```

```

:*****
:
:      THIS TEST VERIFIES MODE 1 DOP BYTE INSTRUCTIONS WHICH ADDRESS
:      EVEN BYTES.  LOC. 0 IS SET TO -1 AND R4 IS CLEARED.  THEN R4 IS
:      SET TO -1 USING A BISB THRU R0 WITH MODE 1.
:
:*****
:TEST 120      TEST MODE 1 - EVEN BYTE W/ DOP INSTS.
:*****
TS120:  INC      (R2)          ;UPDATE TEST NUMBER
        CMP      #120,(R2)    ;SEQUENCE ERROR?
        BNE     TS121-10     ;BR TO ERROR HALT ON SEQ ERROR
        CLR     R0           ;R0=0
        CLR     (R0)         ;LOC. 0=0
        COM     (R0)         ;LOC. 0=177777
        CLR     R4           ;R4=0
        BISB    (R0),R4      ;TRY MODE 1- EVEN BYTE W/ DOP
        COM     R4           ;R4=0
        BEQ     TS121
:
:      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
:      ;      CONDITIONAL BRANCH INST. AND <====
:      ;      REPLACE THE MOVE INSTRUCTION <= =-
:      ;      WHICH FOLLOWS W/ 770 <-- =-
:
:      ;MOVE TO MAILBOX # ***** 223 *****
:      ;SET MSGTYP TO FATAL ERROR
:      ;RESULT OF BISB IS INCORRECT
:      ; OR SEQUENCE ERROR

```

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3447
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3452
3453
3454
3455
3456
3457
3458 010262 005212
3459 010264 022712 000121
3460 010270 001007
3461 010272 005000
3462 010274 005010
3463 010276 005110
3464 010300 005004
3465 010302 105104
3466 010304 121004
3467 010306 001404
3468
3469
3470
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3472 010310 012742 000224
3473 010314 005242
3474 010316 000000
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:*****
:      THIS TEST VERIFIES MODE 1 DOP NON-MODIFYING INSTRUCTIONS
:WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO -1 AND R0 IS CLEARED
:AND USED AS THE ADDRESSING REGISTER.  R4 IS SET TO 377 AND A
:MODE 1,0 CMPB INSTRUCTION IS USED THE RESULTS VERIFIED.
:*****
:TEST 121      TEST MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING INST.
:*****
TS121:  INC      (R2)          ;UPDATE TEST NUMBER
        CMP      #121,(R2)    ;SEQUENCE ERROR?
        BNE     TS122-10     ;BR TO ERROR HALT ON SEQ ERROR
        CLR     R0           ;R0=0
        CLR     (R0)         ;LOC 0=0
        COM     (R0)         ;LOC 0=177777
        CLR     R4           ;R4=0
        COMB    R4           ;R4=377
        CMPB   (R0),R4      ;TRY MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING
        BEQ     TS122
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < -
:          CONDITIONAL BRANCH INST. AND <
:          REPLACE THE MOVE INSTRUCTION <
:          WHICH FOLLOWS W/ 770 <
:
:MOVE TO MAILBOX # ***** 224 *****
:SET MSGTYP TO FATAL ERROR
:RESULT OF CMPB INCORRECT
: OR SEQUENCE ERROR

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010320 005212
010322 022712 000122
010326 001020
010330 005000
010332 005010
010334 105110
010336 005110
010340 005004
010342 005104
010344 111004
010346 005704
010350 001404

010352 012742 000225
010356 005242
010360 000000
010362 005110
010364 111004
010366 100404

010370 012742 000226
010374 005242
010376 000000

```
.....
:
: THIS TEST VERIFIES MODE 1,0 MOVB INSTRUCTIONS
: WHICH ADDRESS EVEN BYTES. LOC. 0 IS SET TO 177400, R0 IS CLEARED AND
: R4 IS SET TO -1. MOVB ARE USED TO MOVE BYTE 0 TO R4. THIS
: VERIFIES THAT THE PROPER BYTE WAS SELECTED AND THAT THE SIGN-X-TEND
: FUNCTION WITH MODE 0.
: THEN LOC. 0 IS COMPLEMENTED AND THE SAME PROCEDURE EXERCISES
: THE LOGIC FOR COMPLEMENTARY DATA.
: THIS TEST EXERCISES UNIQUE MICROCODE.
:
:.....
:TEST 122 TEST MOV INSTRUCTION MODE 1,0 EVEN BYTE
:.....
TS122: INC (R2) ;UPDATE TEST NUMBER
CMP #122,(R2) ;SEQUENCE ERROR?
BNE TS123-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;LOC 0=0
COMB (R0) ;LOC 0=177400
COM (R0)
CLR R4 ;R4=0
COM R4 ;R4-177777
MOVB (R0),R4 ;R4=0
TST R4 ;CHECK SIGN OF WORD
BEQ DOP1

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 766 <====
;
MOV #225,-(R2) ;MOVE TO MAILBOX # ***** 225 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MOVB SHOULD SIGN X-TEND
DOP1: COM (R0) ;LOC 0=177777
MOVB (R0),R4 ;DO MOVB W/ EVEN BYTE
BMI TS123

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 757 <====
;
MOV #226,-(R2) ;MOVE TO MAILBOX # ***** 226 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MOVB SHOULD SIGN X-TEND
; OR SEQUENCE ERROR
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3532 010400 005212
3533 010402 022712 000123
3534 010406 001010
3535 010410 005000
3536 010412 005010
3537 010414 005004
3538 010416 005204
3539 010420 105114
3540 010422 151410
3541 010424 005210
3542 010426 001404
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3547 010430 012742 000227
3548 010434 005242
3549 010436 000000
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:*****
: THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS WHICH REFERENCE
: ODD BYTES. LOC. 0 IS SET TO 177400. R0 IS SET TO 0 AND R4 IS
: SET TO 1. THE BISB INSTRUCTION USES THE DATA IN BYTE 1 TO SET BYTE 0.
: THE RESULT IS CHECKED BY INCREMENTING THE WORD (LOC. 0) TO ZERO.
:*****
:TEST 123 TEST MODE 1-ODD BYTE W/ DOP INSTS.
:*****
TS123: INC (R2) ;UPDATE TEST NUMBER
CMP #123,(R2) ;SEQUENCE ERROR?
BNE TS124-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;LOC. 0=0
CLR R4 ;R4=0
INC R4 ;R4=1
COMB (R4) ;LOC. 0=177400
BISB (R4),(R0) ;TRY TO BIS LOW ORDER BITS W/ MODE 1
INC (R0) ;CHECK RESULT
BEQ TS124
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 767 <====
; MOVE TO MAILBOX # ***** 227 *****
; SET MSGTYP TO FATAL ERROR
; RESULT OF BISB INCORRECT
; OR SEQUENCE ERROR

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010440 005212
010442 022712 000124
010446 001015
010450 005000
010452 005010
010454 005110
010456 012004
010460 005204
010462 001404

010464 012742 000230
010470 005242
010472 000000
010474 005300
010476 005300
010500 001404

010502 012742 000231
010506 005242
010510 000000

```

*****
THIS TEST VERIFIES MODE 2 DOP INSTRUCTIONS. LOC. 0 IS SET TO -1.
:RO IS CLEARED AND USED AS THE MODE 2 ADDRESSING REGISTER TO MOVE LOC. 0
:TO R7. THE DATA RESULTS ARE VERIFIED AND THE INCREMENTING OF THE REGISTER
:IS CHECKED.
*****
TEST 124 TEST MODE 2 W/ DOP INSTS.
*****
TS124: INC (R2) ;UPDATE TEST NUMBER
CMP #124,(R2) ;SEQUENCE ERROR?
BNE TS125-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;LOC. 0=0
COM (R0) ;LOC. 0=177777
MOV (R0)+,R4 ;TRY MOVE MODE 2,0
INC R4 ;CHECK R4
BEQ DOP2
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== -
; CONDITIONAL BRANCH INST. AND <= --
; REPLACE THE MOVE INSTRUCTION <-- -
; WHICH FOLLOWS W/ 771 <---
; MOVE TO MAILBOX # ***** 230 *****
; SET MSGTYP TO FATAL ERROR
; RESULT OF MOV INST INCORRECT
; TEST R0 AFTER MODE 2
DOP2: DEC R0
DEC R0
BEQ TS125
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== -
; CONDITIONAL BRANCH INST. AND <= --
; REPLACE THE MOVE INSTRUCTION <-- -
; WHICH FOLLOWS W/ 762 <---
; MOVE TO MAILBOX # ***** 231 *****
; SET MSGTYP TO FATAL ERROR
; REGISTER NOT INCREMENTED IN MODE 2
; OR SEQUENCE ERROR

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010512 005212
010514 022712 000125
010520 001016
010522 005000
010524 010010
010526 005110
010530 142010
010532 105737 000001
010536 001404

010540 012742 000232
010544 005242
010546 000000
010550 105137 000000
010554 001404

010556 012742 000233
010562 005242
010564 000000

```
.....  
: THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH ADDRESS  
: EVEN BYTES. LOC. 0 IS SET TO -1. R0 IS CLEARED AND USED AS THE  
: ADDRESSING REGISTER IN A TEST WHICH TRIES TO CLEAR BYTE 1 USING  
: BYTE 0 DATA AND A BICB. UNIQUE IN THIS TEST IS USE OF THE  
: SAME ADDRESSING REGISTER FOR BOTH SOURCE AND DESTINATION. THE SOURCE AND  
: DESTINATION IS CHECKED TO INSURE PROPER FUNCTIONING.  
:.....  
: TEST 125 TEST MODE 2 - EVEN BYTE W/ DOP INST.  
:.....  
TS125: INC (R2) ;UPDATE TEST NUMBER  
CMP #125,(R2) ;SEQUENCE ERROR?  
BNE TS126-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
MOV R0,(R0) ;LOC. 0=0  
COM (R0) ;LOC. 0=177777  
BICB (R0)+,(R0) ;TRY TO CLEAR BYTE 1 FROM BYTE 0 W/ BICB  
TSTB @#1 ;CHECK RESULT  
BEQ DOPB2A  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----  
: CONDITIONAL BRANCH INST. AND <----  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 770 <----  
MOV #232,-(R2) ;MOVE TO MAILBOX # ***** 232 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;BICB DESTINATION INCORRECT  
DOPB2A: COMB @#0 ;CHECK BICB SOURCE  
BEQ TS126  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----  
: CONDITIONAL BRANCH INST. AND <----  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 761 <----  
MOV #233,-(R2) ;MOVE TO MAILBOX # ***** 233 *****  
INL -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;BICB SOURCE INCORRECTLY CHANGED  
: OR SEQUENCE ERROR
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3638 010566 005212
3639 010570 022712 000126
3640 010574 001017
3641 010576 005000
3642 010600 005004
3643 010602 005010
3644 010604 005110
3645 010606 105120
3646 010610 112004
3647 010612 005204
3648 010614 001404
3649
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3653 010616 012742 000234
3654 010622 005242
3655 010624 000000
3656 010626 005740
3657 010630 005700
3658 010632 001404
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3663 010634 012742 000235
3664 010640 005242
3665 010642 000000
3666

```
.....  
: THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH REFERENCE  
: ODD BYTES. R0 IS SET TO 1, LOC. 0 IS SET TO 177400, AND R4 IS CLEARED.  
: A MODE 2 MOV B USES R0 TO MOVE BYTE 1 TO R4. AN INCREMENT  
: IS USED TO CHECK THAT THE PROPER BYTE WAS MOVED AND SIGN X-TENDED.  
:.....  
: TEST 126 TEST MODE 2 - ODD BYTE W/ DOP INST.  
:.....  
TS126: INC (R2) ;UPDATE TEST NUMBER  
CMP #126,(R2) ;SEQUENCE ERROR?  
BNE TS127-10 ;BR 0 ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR R4 ;R4=0  
CLR (R0) ;LOC. 0=0  
COM (R0) ;LOC. 0=177777  
COMB (R0)+ ;LOC 0=177400; R0=1  
MOVB (R0)+,R4 ;TRY DOP MODE 2 W/ ODD BYTE  
INC R4 ;CHECK RESULT OF MOV B  
BEQ DOPB2B  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 767 <====  
MOV #234,-(R2) ;MOVE TO MAILBOX # ***** 234 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF MOV B INCORRECT  
DOPB2B: TST -(R0) ;BUMP R0 DOWN BY 2  
TST R0 ;CHECK R0  
BEQ TS127  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <----  
: WHICH FOLLOWS W/ 760 <----  
MOV #235,-(R2) ;MOVE TO MAILBOX # ***** 235 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MODE 2 BYTE DID NOT INCREMENT REG. CORRECTLY  
: OR SEQUENCE ERROR
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010644 005212
 010646 022712 000127
 010652 001011
 010654 012737 052525 000000
 010662 012700 125252
 010666 053700 000000
 010672 005200
 010674 001404

 010676 012742 000236
 010702 005242
 010704 000000

 010706 005212
 010710 022712 000130
 010714 001011
 010716 012737 052652 000000
 010724 005000
 010726 153700 000000
 010732 022700 000252
 010736 001404

 010740 012742 000237
 010744 005242
 010746 000000

 THIS TEST VERIFIES MODE 3 DOUBLE-OPERAND INSTRUCTIONS.
 :LOC. 0 IS LOADED WITH ALTERNATING ZEROES AND ONES; AND RO IS LOADED
 :WITH ALTERNATING ONES AND ZEROES. A MODE 3 BIS IS USED TO SET RO
 :TO -1 BY USING LOC. 0 AS THE SOURCE TO BIS THE ZEROES IN RO. THE
 :RESULT IS TESTED BY INCREMENTING RO AND CHECKING FOR ZERO.

 :TEST 127 TEST MODE 3 W/ DOP INSTS.

 TS127: INC (R2) ;UPDATE TEST NUMBER
 CMP #127,(R2) ;SEQUENCE ERROR?
 BNE TS130-10 ;BR TO ERROR HALT ON SEQ ERROR
 MOV #052525,@#0 ;MOVE 52525 TO LOC. 0
 MOV #125252,@#0 ;SET ALT. ONE AND ZERO IN RO
 BIS @#0,RO ;TRY TO SET ALL OTHER BITS W/ MODE 3
 INC RO ;TEST RESULT
 BEQ TS130
 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
 : CONDITIONAL BRANCH INST. AND <---
 : REPLACE THE MOVE INSTRUCTION <---
 : WHICH FOLLOWS W/ 766 <---
 MOV #236,-(R2) ;MOVE TO MAILBOX # ***** 236 *****
 INC -(R2) ;SET MSGTYP TO FATAL ERROR
 HALT ;BIS W/ MODE 3 INCORRECT RESULT
 ; OR SEQUENCE ERROR

 THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS WHICH
 :ADDRESS EVEN BYTES. BYTE 0 IS SET TO ALTERNATING 1'S AND 0'S; BYTE 1,
 :ALTERNATING 0'S AND 1'S. RO IS CLEARED AND A BISB IS USED TO
 :SET THE LOW BYTE OF RO TO 252.

 :TEST 130 TEST MODE 3 - EVEN BYTE W/ DOP INSTS.

 TS130: INC (R2) ;UPDATE TEST NUMBER
 CMP #130,(R2) ;SEQUENCE ERROR?
 BNE TS131-10 ;BR TO ERROR HALT ON SEQ ERROR
 MOV #52652,@#0 ;MOVE 1'S AND 0' PATTERN TO LOC. 0
 CLR RO ;RO=0
 BISB @#0,RO ;TRY RO=252 W/ MODE 3 - EVEN BYTE
 CMP #252,RO ;BISB W/ EVEN BYTE SUCCESSFUL?
 BEQ TS131
 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
 : CONDITIONAL BRANCH INST. AND <---
 : REPLACE THE MOVE INSTRUCTION <---
 : WHICH FOLLOWS W/ 766 <---
 MOV #237,-(R2) ;MOVE TO MAILBOX # ***** 237 *****
 INC -(R2) ;SET MSGTYP TO FATAL ERROR
 HALT ;BISB W/ MODE 3 - EVEN BYTE FAILED
 ; OR SEQUENCE ERROR

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3730 010750 005212
3731 010752 022712 000131
3732 010756 001011
3733 010760 012737 052652 000000
3734 010766 005000
3735 010770 153700 000001
3736 010774 022700 000125
3737 011000 001404
3738
3739
3740
3741
3742 011002 012742 000240
3743 011006 005242
3744 011010 000000
3745
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3748
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3750 011012 005212
3751 011014 022712 000132
3752 011020 001017
3753 011022 005000
3754 011024 105100
3755 011026 000263
3756 011030 132700 000200
3757 011034 001403
3758 011036 102402
3759 011040 103001
3760 011042 100404
3761
3762
3763
3764
3765 011044
3766 011044 012742 000241
3767 011050 005242
3768 011052 000000
3769 011054 105100
3770 011056 001404
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3775 011060 012742 000242

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:*****
:
: THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS
: WHICH ADDRESS ODD BYTES. THE SAME PROCEDURE USED IN PREVIOUS
: TEST IS USED HERE. THIS TIME BYTE 1 IS USED AS THE SOURCE BYTE.
: THE EXPECTED RESULT IS: R0 = 125.
:
:*****
:TEST 131 TEST MODE 3 - ODD BYTE W/ DOP INSTS.
:*****
TS131: INC (R2) ;UPDATE TEST NUMBER
CMP #131,(R2) ;SEQUENCE ERROR?
BNE TS132-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #52652,@#0 ;MOVE 1'S AND 0'S PATTERN TO LOC 0
CLR R0 ;R0=0
BISB @#1,R0 ;TRY R0=152 W/ MODE 3 - ODD BYTE
CMP #125,R0 ;R0=125?
BEQ TS132
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 766 <---
MOV #240,-(R2) ;MOVE TO MAILBOX # ***** 240 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;BISB W/ MODE 3 - ODD BYTE FAILED
; OR SEQUENCE ERROR
:
:*****
:TEST 132 TEST DEST. MODE 0-BYTE W/ DOP NON-MODIFYING MST
:*****
TS132: INC (R2) ;UPDATE TEST NUMBER
CMP #132,(R2) ;SEQUENCE ERROR?
BNE TS133-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
COMB R0 ;R0=377
+SEC!SEV ;SET C AND V BITS
BITB #200,R0 ;TRY DOPNM DEST. MODE 0-BYTE
BEQ DNMB0A ;BR TO ERROR IF Z BIT SET
BVS DNMB0A ;BR TO ERROR IF V BIT SET
BCC DNMB0A ;BR TO ERROR IF C BIT CLEAR.
BMI DNMB0B
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 766 <---
DNMB0A: MOV #241,-(R2) ;MOVE TO MAILBOX # ***** 241 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CC'S INCORRECT
DNMB0B: COMB R0 ;CHECK DESTINATION DATA
BEQ TS133
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 760 <---
MOV #242,-(R2) ;MOVE TO MAILBOX # ***** 242 *****

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3776 011064 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
3777 011066 000000          HALT                    ;DEST. DATA MODIFIED
3778                                     ; OR SEQUENCE ERROR
3779
3780 :*****
3781 :TEST 133      TEST DEST. MODE 1 W/ DOP NON-MODIFYING INST
3782 :*****
3783 011070 005212          TS133: INC    (R2)          ;UPDATE TEST NUMBER
3784 011072 022712 000133    CMP    #133,(R2)       ;SEQUENCE ERROR?
3785 011076 001017          BNE   TS134-10        ;BR TO ERROR HALT ON SEQ ERROR
3786 011100 005000          CLR   R0              ;R0=0
3787 011102 005010          CLR   (R0)            ;LOC. 0=0
3788 011104 000241          CLC                    ;CLEAR C BIT
3789 011106 032710 177777    BIT   #177777,(R0)    ;TRY DOPNM DEST. MODE 1
3790 011112 100403          BMI   DNM1A           ;BR TO ERROR IF N BIT SET
3791 011114 102402          BVS   DNM1A           ;BR TO ERROR IF V BIT SET
3792 011116 103401          BCS   DNM1A           ;BR TO ERROR IF C BIT SET
3793 011120 001404          BEQ   DNM1B
3794                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
3795                                     ; CONDITIONAL BRANCH INST. AND <
3796                                     ; REPLACE THE MOVE INSTRUCTION <-
3797                                     ; WHICH FOLLOWS W/ 766 <-
3798 011122
3799 011122 012742 000243    DNM1A: MOV   #243,-(R2)     ;MOVE TO MAILBOX # ***** 243 *****
3800 011126 005242          INC   -(R2)           ;SET MSGTYP TO FATAL ERROR
3801 011130 000000          HALT                    ;COND. CODES INCORRECT
3802 011132 005710          DNM1B: TST   (R0)      ;CHECK TEST DATA
3803 011134 001404          BEQ   TS134
3804                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
3805                                     ; CONDITIONAL BRANCH INST. AND <-
3806                                     ; REPLACE THE MOVE INSTRUCTION <
3807                                     ; WHICH FOLLOWS W/ 760 <
3808 011136 012742 000244    MOV   #244,-(R2)     ;MOVE TO MAILBOX # ***** 244 *****
3809 011142 005242          INC   -(R2)           ;SET MSGTYP TO FATAL ERROR
3810 011144 000000          HALT                    ;DESTINATION DATA MODIFIED
3811                                     ; OR SEQUENCE ERROR
3812
3813 :*****
3814 :TEST 134      TEST DEST. MODE 2 W/ DOP NON-MODIFYING INST.
3815 :*****
3816 011146 005212          TS134: INC   (R2)      ;UPDATE TEST NUMBER
3817 011150 022712 000134    CMP   #134,(R2)       ;SEQUENCE ERROR?
3818 011154 001027          BNE   TS135-10        ;BR TO ERROR HALT ON SEQ ERROR
3819 011156 005000          CLR   R0              ;R0=0
3820 011160 005010          CLR   (R0)            ;LOC. 0=0
3821 011162 052710 125252    BIS   #125252,(R0)    ;LOC. 0=125252
3822 011166 032720 077777    BIT   #77777,(R0)+   ;TRY DOPNM INST W/ MODE 2
3823 011172 102402          BVS   DNM2A           ;BR TO ERROR IF V BIT SET
3824 011174 001401          BEQ   DNM2A           ;BR TO ERROR IF Z-BIT SET
3825 011176 100004          BPL   DNM2B
3826                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
3827                                     ; CONDITIONAL BRANCH INST. AND <
3828                                     ; REPLACE THE MOVE INSTRUCTION <
3829                                     ; WHICH FOLLOWS W/ 766 <-
3830 011200
3831 011200 012742 000245    DNM2A: MOV   #245,-(R2) ;MOVE TO MAILBOX # ***** 245 *****
```



```
3888 011326 005200
3889 011330 132720 000201
3890 011334 001402
3891 011336 102401
3892 011340 100004
3893
3894
3895
3896
3897 011342
3898 011342 012742 000252
3899 011346 005242
3900 011350 000000
3901 011352 005300
3902 011354 005300
3903 011356 001404
3904
3905
3906
3907
3908 011360 012742 000253
3909 011364 005242
3910 011366 000000
3911 011370 022710 052652
3912 011374 001404
3913
3914
3915
3916
3917 011376 012742 000254
3918 011402 005242
3919 011404 000000
3920
3921
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3925
3926 011406 005212
3927 011410 022712 000136
3928 011414 001050
3929 011416 005000
3930 011420 005010
3931 011422 052710 125125
3932 011426 105100
3933 011430 005200
3934 011432 005010
3935 011434 000263
3936 011436 132730 000201
3937 011442 001403
3938 011444 102402
3939 011446 103001
3940 011450 100004
3941
3942
3943

DNMB2C: INC R0 ;R0=1
BITB #201,(R0)+ ;TRY DOPNM INST. W/MODE 2-ODD BYTE
BEQ DNMB2D ;BR TO ERROR IF Z-BIT SET
BVS DNMB2D ;BR TO ERROR IF V-BIT SET
BPL DNMB2E

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 744 <====

DNMB2D:
MOV #252,-(R2) ;MOVE TO MAILBOX # ***** 252 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;COND. CODES INCORRECT
DNMB2E: DEC R0 ;DEC R0 TO CHECK IT.
DEC R0
BEQ DNMB2F

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 735 <====

MOV #253,-(R2) ;MOVE TO MAILBOX # ***** 253 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEST. REGISTER NOT INCREMENTED BY 1
DNMB2F: CMP #52652,(R0) ;CHECK DEST. DATA IS UNMODIFIED
BEQ TS136

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 726 <====

MOV #254,-(R2) ;MOVE TO MAILBOX # ***** 254 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEST. DATA WAS MODIFIED.
; OR SEQUENCE ERROR

*****
;TEST 136 TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.
*****
TS136: INC (R2) ;UPDATE TEST NUMBER
CMP #136,(R2) ;SEQUENCE ERROR?
BNE TS137-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;LOC. 0=0
BIS #125125,(R0) ;LOC. 0=125125
COMB R0 ;R0=377
INC R0 ;R0=400
CLR (R0) ;LOC. 400=0
+SEC!SEV ;C-BIT=V-BIT=1
BITB #201,@(R0)+ ;TRY DOPNM W/MODE 3-EVEN BYTE
BEQ DNMB3A ;BR TO ERROR IF Z BIT SET
BVS DNMB3A ;BR TO ERROR IF V BIT SET
BCC DNMB3A ;BR TO ERROR IF C BIT CLEAR
BPL DNMB3B

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
```

```
3944          : WHICH FOLLOWS W/ 761 <===
3945 011452    :
3946 011452 012742 000255  DNMB3A: MOV #255,-(R2) :MOVE TO MAILBOX # ***** 255 *****
3947 011456 005242          : INC -(R2) :SET MSGTYP TO FATAL ERROR
3948 011460 000000          : HALT :COND. CODES INCORRECT
3949 011462 022700 000402  DNMB3B: CMP #402,R0 :CHECK DEST. REGISTER INC. BY 2 AND INC BY 2 AGAIN
3950 011466 001404          : BEQ DNMB3C
3951          : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
3952          : CONDITIONAL BRANCH INST. AND <====
3953          : REPLACE THE MOVE INSTRUCTION <====
3954          : WHICH FOLLOWS W/ 752 <====
3955 011470 012742 000256  DNMB3C: MOV #256,-(R2) :MOVE TO MAILBOX # ***** 256 *****
3956 011474 005242          : INC -(R2) :SET MSGTYP TO FATAL ERROR
3957 011476 000000          : HALT :DEST. REGISTER NOT INCREMENTED BY 2
3958 011500 005200          : DNMB3C: INC RC :RO=404
3959 011502 005200          : INC R0
3960 011504 132730 000201  DNMB3C: BITB #201,(R0)+ :TRY DOPNM DEST MODE 3-BYTE(ODD)
3961 011510 001402          : BEQ DNMB3D :BR TO ERROR IF Z BIT SET
3962 011512 102401          : BVS DNMB3D :BR TO ERROR IF V BIT SET
3963 011514 100404          : BMI DNMB3E
3964          : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
3965          : CONDITIONAL BRANCH INST. AND <====
3966          : REPLACE THE MOVE INSTRUCTION <====
3967          : WHICH FOLLOWS W/ 737 <====
3968 011516          :
3969 011516 012742 000257  DNMB3D: MOV #257,-(R2) :MOVE TO MAILBOX # ***** 257 *****
3970 011522 005242          : INC -(R2) :SET MSGTYP TO FATAL ERROR
3971 011524 000000          : HALT :COND. CODES INCORRECT
3972 011526 005004          : DNMB3E: CLR R4 :R4=0
3973 011530 022714 125125  DNMB3E: CMP #125125,(R4) :CHECK DEST. DATA
3974 011534 001404          : BEQ TS137
3975          : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
3976          : CONDITIONAL BRANCH INST. AND <====
3977          : REPLACE THE MOVE INSTRUCTION <====
3978          : WHICH FOLLOWS W/ 727 <====
3979 011536 012742 000260  DNMB3E: MOV #260,-(R2) :MOVE TO MAILBOX # ***** 260 *****
3980 011542 005242          : INC -(R2) :SET MSGTYP TO FATAL ERROR
3981 011544 000000          : HALT :DEST. DATA MODIFIED
3982          : OR SEQUENCE ERROR
3983
3984 *****
3985 :TEST 137 TEST DEST. MODE 4 W/DOP NON-MODIFYING INST.
3986 *****
3987 011546 005212          : TS137: INC (R2) :UPDATE TEST NUMBER
3988 011550 022712 000137  DNMB3E: CMP #137,(R2) :SEQUENCE ERROR?
3989 011554 001033          : BNE TS140-10 :BR TO ERROR HALT ON SEQ ERROR
3990 011556 005000          : CLR R0 :R0=0
3991 011560 005010          : CLR (R0) :LOC. 0=0
3992 011562 052710 125252  DNMB3E: BIS #125252,(R0) :LOC. 0=125125
3993 011566 052700 000002  DNMB3E: BIS #2,R0 :R0=2
3994 011572 000277          : SCC :SET ALL COND. CODE BITS
3995 011574 032740 020000  DNMB3E: BIT #2000,-(R0) :TRY DOPNM W/ MODE 4
3996 011600 100403          : BMI DNMB4A :BR TO ERROR IF N-BIT SET
3997 011602 102402          : BVS DNMB4A :BR TO ERROR IF V-BIT SET
3998 011604 103001          : BCC DNMB4A :BR TO ERROR IF C-BIT CHAR
3999 011606 001004          : BNE DNMB4B
```

```
4000 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4001 ; CONDITIONAL BRANCH INST. AND <====
4002 ; REPLACE THE MOVE INSTRUCTION <====
4003 ; WHICH FOLLOWS W/ 762 <====
4004 011610 DNM4A:
4005 011610 012742 000261 MOV #261,-(R2) ;MOVE TO MAILBOX # ***** 261 *****
4006 011614 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4007 011616 000000 HALT ;COND. CODES INCORRECT
4008 011620 005700 DNM4B: TST R0 ;CHECK DEST. REGISTER
4009 011622 001404 BEQ DNM4C
4010 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4011 ; CONDITIONAL BRANCH INST. AND <====
4012 ; REPLACE THE MOVE INSTRUCTION <====
4013 ; WHICH FOLLOWS W/ 754 <====
4014 011624 012742 000262 MOV #262,-(R2) ;MOVE TO MAILBOX # ***** 262 *****
4015 011630 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4016 011632 000000 HALT ;DEST. REGISTER NOT DECREMENTED BY 2
4017 011634 022737 125252 000000 DNM4C: CMP #125252,@#0 ;CHECK DEST. DATA
4018 011642 001404 BEQ TS140
4019 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4020 ; CONDITIONAL BRANCH INST. AND <====
4021 ; REPLACE THE MOVE INSTRUCTION <====
4022 ; WHICH FOLLOWS W/ 744 <====
4023 011644 012742 000263 MOV #263,-(R2) ;MOVE TO MAILBOX # ***** 263 *****
4024 011650 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4025 011652 000000 HALT ;DEST. DATA MODIFIED
4026 ; OR SEQUENCE ERROR
4027
4028
4029 :*****
4030 :TEST 140 TEST DEST. MODE 4-BYTE W/ DOP NON-MODIFYING INST.
4031 :*****
4031 011654 005212 TS140: INC (R2) ;UPDATE TEST NUMBER
4032 011656 022712 000140 CMP #140,(R2) ;SEQUENCE ERROR?
4033 011662 001051 BNE TS141-10 ;BR TO ERROR HALT ON SEQ ERROR
4034 011664 005000 CLR R0 ;R0=0
4035 011666 005010 CLR (R0) ;LOC. 0=0
4036 011670 052710 052652 BIS #52652,(R0) ;LOC. 0=52652
4037 011674 052700 000002 BIS #2,R0 ;R0=2
4038 011700 000257 CCC ;COND. CODES=0
4039 011702 132740 000201 BITB #201,-(R0) ;TRY DOPNM INST W/MODE 4 ODD BYTE
4040 011706 102403 BVS DNM34A ;BR TO ERROR IF V BIT SET
4041 011710 001402 BEQ DNM34A ;BR TO ERROR IF Z BIT SET
4042 011712 103401 BCS DNM34A ;BR TO ERROR IF C BIT SET
4043 011714 001004 BNE DNM34B
4044 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4045 ; CONDITIONAL BRANCH INST. AND <====
4046 ; REPLACE THE MOVE INSTRUCTION <====
4047 ; WHICH FOLLOWS W/ 762 <====
4048 DNM34A:
4049 011716 012742 000264 MOV #264,-(R2) ;MOVE TO MAILBOX # ***** 264 *****
4050 011722 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4051 011724 000000 HALT ;COND. CODES INCORRECT
4052 011726 022700 000001 DNM34B: CMP #1,R0 ;CHECK DEST. REGISTER
4053 011732 001404 BEQ DNM34C
4054 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4055 ; CONDITIONAL BRANCH INST. AND <====
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4056
4057
4058 011734 012742 000265      MOV    #265,-(R2)      ; REPLACE THE MOVE INSTRUCTION <====
4059 011740 005242              INC    -(R2)          ; WHICH FOLLOWS W/ 753          <====
4060 011742 000000              HALT                               ; MOVE TO MAILBOX # ***** 265 *****
4061 011744 132740 000201      DNMB4C: BITB #201,-(R0) ; SET MSGTYP TO FATAL ERROR
4062 011750 001401              BEQ   DNMB4D          ; DEST REG. NOT DECREMENTED BY 1
4063 011752 100404              BMI   DNMB4E         ; TRY DOPNM INST. W/MODE 4 EVEN BYTE
4064
4065
4066
4067
4068 011754
4069 011754 012742 000266      DNMB4D: MOV    #266,-(R2) ; MOVE TO MAILBOX # ***** 266 *****
4070 011760 005242              INC    -(R2)          ; SET MSGTYP TO FATAL ERROR
4071 011762 000000              HALT                               ; COND. CODES INCORRECT
4072 011764 005700              DNMB4E: TST   R0       ; CHECK DEST. REGISTER
4073 011766 001404              BEQ   DNMB4F         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4074
4075
4076
4077
4078 011770 012742 000267      MOV    #267,-(R2)      ; REPLACE THE MOVE INSTRUCTION <====
4079 011774 005242              INC    -(R2)          ; WHICH FOLLOWS W/ 735          <====
4080 011776 000000              HALT                               ; MOVE TO MAILBOX # ***** 267 *****
4081 012000 022710 052652      DNMB4F: CMP    #52652,(R0) ; SET MSGTYP TO FATAL ERROR
4082 012004 001404              BEQ   TS141          ; DEST. REG. NOT DECREMENTED BY 1
4083
4084
4085
4086
4087 012006 012742 000270      MOV    #270,-(R2)      ; CHECK DESTINATION DATA
4088 012012 005242              INC    -(R2)          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4089 012014 000000              HALT                               ; CONDITIONAL BRANCH INST. AND <====
4090
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4095 012016 005212              TS141: INC    (R2)      ; UPDATE TEST NUMBER
4096 012020 022712 000141      CMP    #141,(R2)      ; SEQUENCE ERROR?
4097 012024 001034              BNE   TS142-10        ; BR TO ERROR HALT ON SEQ ERROR
4098 012026 005000              CLR   R0              ; R0=0
4099 012030 005010              CLR   (R0)           ; LOC 0=0
4100 012032 052710 100000      BIS    #100000,(R0)   ; LOC. 0=100000
4101 012036 052700 000402      BIS    #402,R0       ; R0=2
4102 012042 000277              SCC                               ; SET ALL COND. CODE BITS
4103 012044 032750 100000      BIT    #100000,a-(R0) ; TRY DOPNM W/MODE 5
4104 012050 102403              BVS   DNMB5A         ; BR TO ERROR IF V-BIT SET
4105 012052 103002              BCC   DNMB5A         ; BR TO ERROR IF C-BIT CLEAR
4106 012054 001401              BEQ   DNMB5A         ; BR TO ERROR IF Z-BIT SET
4107 012056 100404              BMI   DNMB5B
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4110
4111

```

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T141 TEST DEST MODE 5 W/DOP NON-MODIFYING INST.

SEQ 0082

```

4112 012060
4113 012060 012742 000271
4114 012064 005242
4115 012066 000000
4116 012070 022700 000400
4117 012074 001404
4118
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4122 012076 012742 000272
4123 012102 005242
4124 012104 000000
4125 012106 022737 100000 000000
4126 012114 001404
4127
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4131 012116 012742 000273
4132 012122 005242
4133 012124 000000
4134
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4139 012126 005212
4140 012130 022712 000142
4141 012134 001033
4142 012136 005000
4143 012140 005010
4144 012142 052710 000001
4145 012146 005100
4146 012150 032760 000001 000001
4147 012156 001403
4148 012160 102402
4149 012162 103001
4150 012164 100004
4151
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4155 012166
4156 012166 012742 000274
4157 012172 005242
4158 012174 000000
4159 012176 022700 177777
4160 012202 001404
4161
4162
4163
4164
4165 012204 012742 000275
4166 012210 005242
4167 012212 000000

```

```

DNM5A:
MOV #271,-(R2) ;MOVE TO MAILBOX # ***** 271 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;COND. CODES INCORRECT
DNM5B:
CMP #400,R0 ;CHECK DEST. REGISTER
BEQ DNM5C
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 753 <---
MOV #272,-(R2) ;MOVE TO MAILBOX # ***** 272 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEST. REGISTER NOT DECREMENTED BY 2
DNM5C:
CMP #100000,@#0 ;CHECK DESTINATION DATA
BEQ TS142
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 743 <---
MOV #273,-(R2) ;MOVE TO MAILBOX # ***** 273 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEST. DATA INCORRECTLY MODIFIED
; OR SEQUENCE ERROR

:*****
:TEST 142 TEST DEST. MODE 6 W/DOP NON-MODIFYING INST.
:*****
TS142:
INC (R2) ;UPDATE TEST NUMBER
CMP #142,(R2) ;SEQUENCE ERROR?
BNE TS143-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
CLR (R0) ;LOC> 0=0
BIS #1,(R0) ;LOC. 0=1
COM R0 ;R0=-1 (C-BIT-1)
BIT #1,(R0) ;TRY DOPNM W/MODE 6
BEQ DNM6A ;BR TO ERROR IF Z-BIT SET
BVS DNM6A ;BR TO ERROR IF V-BIT SET
BCC DNM6A ;BR TO ERROR IF C-BIT CLEAR
BPL DNM6B
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 763 <---
DNM6A:
MOV #274,-(R2) ;MOVE TO MAILBOX # ***** 274 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;COND CODES INCORRECT
DNM6B:
CMP #-1,R0 ;CHECK DEST. REGISTER
BEQ DNM6C
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 754 <---
MOV #275,-(R2) ;MOVE TO MAILBOX # ***** 275 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEST. REGISTER MODIFIED

```

```
4168 012214 022737 000001 000000 DNM6C: CMP #1,@#0 ;CHECK DEST. DATA
4169 012222 001404 BEQ TS143 ;
4170 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
4171 ; CONDITIONAL BRANCH INST. AND <===
4172 ; REPLACE THE MOVE INSTRUCTION <===
4173 ; WHICH FOLLOWS W/ 744 <===
4174 012224 012742 000276 MOV #276,-(R2) ;MOVE TO MAILBOX # ***** 276 *****
4175 012230 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4176 012232 000000 HALT ;DEST. DATA MODIFIED
4177 ; OR SEQUENCE ERROR
4178
4179
4180
4181
```

:TEST 143 TEST DEST MODE 7 W/DOP NON-MODIFYING INST.

```
4182 012234 005212 TS143: INC (R2) ;UPDATE TEST NUMBER
4183 012236 022712 000143 CMP #143,(R2) ;SEQUENCE ERROR?
4184 012242 001034 BNE TS144-10 ;BR TO ERROR HALT ON SEQ ERROR
4185 012244 005000 CLR R0 ;R0=0
4186 012246 005010 CLR (R0) ;LOC. 0=0 C-BIT=0
4187 012250 052710 125125 BIS #125125,(R0) ;LOC. 0=125125
4188 012254 052700 000001 BIS #1,R0 ;R0=1
4189 012260 132770 000125 000403 BITB #125,@403(R0) ;TRY DOPNM W/MODE 7
4190 012266 102403 BVS DNM7A ;BR TO ERROR IF V-BIT SET
4191 012270 100402 BMI DNM7A ;BR TO ERROR IF N-BIT SET
4192 012272 103401 BCS DNM7A ;BR TO ERROR IF C-BIT SET
4193 012274 001404 BEQ DNM7B
```

```
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 762 <--
```

```
4198 012276 DNM7A:
4199 012276 012742 000277 MOV #277,-(R2) ;MOVE TO MAILBOX # ***** 277 *****
4200 012302 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4201 012304 000000 HALT ;COND. CODES INCORRECT
4202 012306 022700 000001 DNM7B: CMP #1,R0 ;CHECK DEST. REGISTER
4203 012312 001404 BEQ DNM7C
```

```
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 753 <---
```

```
4208 012314 012742 000300 MOV #300,-(R2) ;MOVE TO MAILBOX # ***** 300 *****
4209 012320 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4210 012322 000000 HALT ;DESTINATION REGISTER MODIFIED
4211 012324 022737 125125 000000 DNM7C: CMP #125125,@#0 ;CHECK DEST. DATA
4212 012332 001404 BEQ TS144
```

```
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 743 <--
```

```
4217 012334 012742 000301 MOV #301,-(R2) ;MOVE TO MAILBOX # ***** 301 *****
4218 012340 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4219 012342 000000 HALT ;DEST. DATA INCORRECT
4220 ; OR SEQUENCE ERROR
4221
4222
4223
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THIS TEST VERIFIES THE MOV DESTINATION MODE 1 INSTRUCTION.
DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED TO LOC. 0
USING MOV SRC MODE 0, DEST. MODE 1.

TEST 144 TEST MOV DESTINATION MODE 1

```
TS144: INC (R2) ;UPDATE TEST NUMBER
        CMP #144,(R2) ;SEQUENCE ERROR?
        BNE TS145-10 ;BR TO ERROR HALT ON SEQ ERROR
        CLR R0 ;R0=0
        CLR (R0) ;LOC. 0=0
        COM R0 ;R0=-1
        CLR R4 ;R4 POINTS TO LOC. 0
        MOV R0,(R4) ;TRY MOVE MODE 0,1
        BVS MDM1A ;BR TO ERROR IF V SET
        BEQ MDM1A ;BR TO ERROR IF Z SET
        BMI MDM1B
```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
; CONDITIONAL BRANCH INST. AND
; REPLACE THE MOVE INSTRUCTION
; WHICH FOLLOWS W/ 767

```
MDM1A: MOV #302,-(R2) ;MOVE TO MAILBOX # ***** 302 *****
        INC -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT ;CONDITION CODE NOT CORRECT
MDM1B: TST R4
        BEQ TS145
```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
; CONDITIONAL BRANCH INST. AND
; REPLACE THE MOVE INSTRUCTION
; WHICH FOLLOWS W/ 761

```
MOV #303,-(R2) ;MOVE TO MAILBOX # ***** 303 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DESTINATION REGISTER INCORRECTLY ALTERED
; OR SEQUENCE ERROR
```

THIS TEST VERIFIES THE MOV DESTINATION MODE 2 INSTRUCTION.
DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED
TO LOCATION 0 USING MOV SRC MODE 0, DEST. MODE 1.

TEST 145 TEST MOV DESTINATION MODE 2

```
TS145: INC (R2) ;UPDATE TEST NUMBER
        CMP #145,(R2) ;SEQUENCE ERROR?
        BNE TS146-10 ;BR TO ERROR HALT ON SEQ ERROR
        CLR R0 ;R0=0
        CLR R1 ;R1=0
        CLR (R0) ;LOC. 0=0
        COM (R0) ;LOC. 0= 1
        MOV R1,(R0)+ ;TRY MOVE MODE 0,2
        BMI MDM2A ;BR TO ERROR IF N SET
        BVS MDM2A ;BR TO ERROR IF V SET
```

```

4280 012446 001404          BEQ      MDM2B          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <== ==
4281                                     ;                                     <====
4282                                     ;                                     <====
4283                                     ;                                     <====
4284                                     ;                                     <====
4285 012450          MDM2A:  MOV      #304,-(R2)  ;MOVE TO MAILBOX # ***** 304 *****
4286 012450 012742 00C304  INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4287 012454 005242          HALT     ;CC'S INCORRECT
4288 012456 000000          MDM2B:  DEC      R0
4289 012460 005300          DEC      R0
4290 012462 005300          BEQ      MDM2D
4291 012464 001404          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <== ==
4292                                     ;                                     <====
4293                                     ;                                     <====
4294                                     ;                                     <====
4295                                     ;                                     <====
4296 012466          MDM2C:  MOV      #305,-(R2)  ;MOVE TO MAILBOX # ***** 305 *****
4297 012466 012742 000305  INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4298 012472 005242          HALT     ;DESTINATION REGISTER NOT INCREMENTED PROPERLY
4299 012474 000000          MDM2D:  TST      @#0
4300 012476 005737 000000  BEQ      TS146
4301 012502 001404          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <== ==
4302                                     ;                                     <====
4303                                     ;                                     <====
4304                                     ;                                     <====
4305                                     ;                                     <====
4306 012504 012742 000306  MOV      #306,-(R2)  ;MOVE TO MAILBOX # ***** 306 *****
4307 012510 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4308 012512 000000          HALT     ;DESTINATION DATA INCORRECT
4309                                     ; OR SEQUENCE ERROR
4310
4311 .....
4312 :
4313 :   THIS TEST VERIFIES DESTINATION MODE 2 W/MOVB INSTS. TWO DIFFERENT MOVB
4314 : INSTRUCTIONS ARE USED TO MOVE A TEST PATTERN FIRST TO BYTE 0 THEN TO BYTE 1.
4315 :
4316 .....
4317 : TEST 146   TEST MOV-BYTE DESTINATION MODE 2
4318 .....
4319 TS146:  INC      (R2)          ;UPDATE TEST NUMBER
4320 012516 022712 000146  CMP      #146,(R2)   ;SEQUENCE ERROR?
4321 012522 001046          BNE     TS147-10     ;BR TO ERROR HALT ON SEQ ERROR
4322 012524 005000          CLR     R0          ;R0=0
4323 012526 005010          CLR     (R0)        ;LOC. 0=0
4324 012530 112720 000125  MOVB   #125,(R0)+   ;TRY DESTINATION MODE 2 W/EVEN BYTE
4325 012534 102402          BVS    MBDM2A       ;BR TO ERROR IF V SET
4326 012536 001401          BEQ    MBDM2A       ;BR TO ERROR IF Z SET
4327 012540 100004          BPL    MBDM2B
4328                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <== ==
4329                                     ;                                     <====
4330                                     ;                                     <====
4331                                     ;                                     <====
4332 012542          MBDM2A:  MOV      #307,-(R2)  ;MOVE TO MAILBOX # ***** 307 *****
4333 012542 012742 000307  INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4334 012546 005242          HALT     ;CC'S INCORRECT
4335 012550 000000

```

```

4336 012552 022700 000001      MBDM2B: CMP      #1,R0
4337 012556 001404              BEQ      MBDM2C
4338                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
4339                               ; CONDITIONAL BRANCH INST. AND <====
4340                               ; REPLACE THE MOVE INSTRUCTION <---=
4341                               ; WHICH FOLLOWS W/ 761 <----
4342 012560 012742 000310      MOV      #310,-(R2) ;MOVE TO MAILBOX # ***** 310 *****
4343 012564 005242              INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4344 012566 000000              HALT                    ;REGISTER NOT INCREMENTED BY ONE
4345 012570 112720 000252      MBDM2C: MOVVB   #252,(R0)+ ;TRY DESTINATION MODE 2 W/ODD BYTE
4346 012574 102402              BVS     MBDM2D
4347 012576 001401              BEQ     MBDM2D
4348 012600 100404              BMI     MBDM2E
4349                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
4350                               ; CONDITIONAL BRANCH INST. AND <====
4351                               ; REPLACE THE MOVE INSTRUCTION <---=
4352                               ; WHICH FOLLOWS W/ 750 <----
4353 012602                          MBDM2D:
4354 012602 012742 000311      MOV      #311,-(R2) ;MOVE TO MAILBOX # ***** 311 *****
4355 012606 005242              INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4356 012610 000000              HALT                    ;CC'S NOT SET CORRECT
4357 012612 022700 00C002      MBDM2E: CMP      #2,R0
4358 012616 001404              BEQ     MBDM2F
4359                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
4360                               ; CONDITIONAL BRANCH INST. AND <====
4361                               ; REPLACE THE MOVE INSTRUCTION <---=
4362                               ; WHICH FOLLOWS W/ 741 <----
4363 012620 012742 000312      MOV      #312,-(R2) ;MOVE TO MAILBOX # ***** 312 *****
4364 012624 005242              INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4365 012626 000000              HALT                    ;REGISTER NOT INCREMENTED BY ONE
4366 012630 022737 125125 000000 MBDM2F: CMP      #125125,@#0 ;CHECK DATA
4367 012636 001404              BEQ     TS147
4368                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---=
4369                               ; CONDITIONAL BRANCH INST. AND <====
4370                               ; REPLACE THE MOVE INSTRUCTION <---=
4371                               ; WHICH FOLLOWS W/ 731 <----
4372 012640 012742 000313      MOV      #313,-(R2) ;MOVE TO MAILBOX # ***** 313 *****
4373 012644 005242              INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4374 012646 000000              HALT                    ;DESTINATION DATA INCORRECT
4375                               ; OR SEQUENCE ERROR

```

```

*****
: THIS TEST VERIFIES MOV DESTINATION MODE 3. R0 IS USED TO PICK UP
: AN ADDRESS AT LOC. 400. LOC 400 POINTS TO LOC. 0 THE EFFECTIVE DEST. ADDR.. ALSO, MOVVB
: INST. ARE USED W/ EVEN AND ODD BYTES TO CHECK MOV BYTES INST AND MODE 37 DESTINATIONS.
: *****
: TEST 147      TEST MOV(B) DESTINATION MODE 3
: *****
TS147:  INC      (R2)          ;UPDATE TEST NUMBER
        CMP      #147,(R2)   ;SEQUENCE ERROR?
        BNE     TS150-10    ;BR TO ERROR HALT ON SEQ ERROR
        MOV     #400,R0      ;R0=400
        CLR     (R0)         ;LOC. 400 POINTS TO LOC. 0
        CLR     @#0          ;LOC. 0=0
        MOV     #125252,@(R0)+ ;TRY MOV DESTINATION MODE 2

```

```

4385 012650 005212
4386 012652 022712 000147
4387 012656 001057
4388 012660 012700 000400
4389 012664 005010
4390 012666 005037 000000
4391 012672 012730 125252

```

```
4392 012676 102402      BVS      MDM3A      ;BR TO ERROR IF V SET
4393 012700 001401      BEQ      MDM3A      ;BR TO ERROR IF Z SET
4394 012702 100404      BMI      MDM3B
4395                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4396                                     ;          CONDITIONAL BRANCH INST. AND <----
4397                                     ;          REPLACE THE MOVE INSTRUCTION <====
4398                                     ;          WHICH FOLLOWS W/ 765 <====
4399 012704      MDM3A:
4400 012704 012742 000314      MOV      #314,-(R2) ;MOVE TO MAILBOX # ***** 314 *****
4401 012710 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4402 012712 000000      HALT                                     ;CC'S INCORRECT
4403 012714 022700 000402      MDM3B:  CMP      #402,R0 ;CHECK DEST. MODE REGISTER
4404 012720 001404      BEQ      MDM3C
4405                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4406                                     ;          CONDITIONAL BRANCH INST. AND <====
4407                                     ;          REPLACE THE MOVE INSTRUCTION <====
4408                                     ;          WHICH FOLLOWS W/ 756 <====
4409 012722 012742 000315      MOV      #315,-(R2) ;MOVE TO MAILBOX # ***** 315 *****
4410 012726 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4411 012730 000000      HALT                                     ;REGISTER NOT INCREMENTED BY 2
4412 012732 022737 125252 000000 MDM3C:  CMP      #125252,@#0 ;CHECK DESTINATION DATA
4413 012740 001404      BEQ      MDM3D
4414                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4415                                     ;          CONDITIONAL BRANCH INST. AND <----
4416                                     ;          REPLACE THE MOVE INSTRUCTION <---
4417                                     ;          WHICH FOLLOWS W/ 746 <---
4418 012742 012742 000316      MOV      #316,-(R2) ;MOVE TO MAILBOX # ***** 316 *****
4419 012746 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4420 012750 000000      HALT                                     ;DESTINATION DATA INCORRECT
4421 012752 112737 000125 000000 MDM3D:  MOVB   #125,@#0 ;TRY MOV B DESTINATION MODE Z EVEN BYTE
4422 012760 022737 125125 000000      CMP      #125125,@#0 ;CHECK DATA
4423 012766 001404      BEQ      MDM3E
4424                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4425                                     ;          CONDITIONAL BRANCH INST. AND <----
4426                                     ;          REPLACE THE MOVE INSTRUCTION <---
4427                                     ;          WHICH FOLLOWS W/ 733 <---
4428 012770 012742 000317      MOV      #317,-(R2) ;MOVE TO MAILBOX # ***** 317 *****
4429 012774 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4430 012776 000000      HALT                                     ;DESTINATION DATA INCORRECT
4431 013000 112737 000525 000001 MDM3E:  MOVB   #525,@#1 ;TRY MOV B DESTINATION MODE 2 ODD BYTE
4432 013006 022737 052525 000000      CMP      #52525,@#0 ;CHECK DATA
4433 013014 001404      BEQ      TS150
4434                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4435                                     ;          CONDITIONAL BRANCH INST. AND <----
4436                                     ;          REPLACE THE MOVE INSTRUCTION <---
4437                                     ;          WHICH FOLLOWS W/ 720 <---
4438 013016 012742 000320      MOV      #320,-(R2) ;MOVE TO MAILBOX # ***** 320 *****
4439 013022 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
4440 013024 000000      HALT
4441
4442
4443
4444
4445
4446
4447
```

.....
: THIS TEST VERIFIES THE MOV DESTINATION MODE 4 INSTRUCTION.
: SOP INSTRUCTIONS ON R0 ARE USED TO CLEAR TARGET LOCATION 0.
: R4 IS USED AS THE MODE 4 ADDRESSING REGISTER, AND
: CONDITIONAL BRANCHES ARE USED TO VERIFY THE DATA.

```
4448  
4449  
4450  
4451  
4452 013026 005212  
4453 013030 022712 000150  
4454 013034 001026  
4455 013036 005000  
4456 013040 005010  
4457 013042 012704 000002  
4458 013046 012744 012345  
4459 013052 102402  
4460 013054 001401  
4461 013056 100004  
4462  
4463  
4464  
4465  
4466 013060  
4467 013060 012742 000321  
4468 013064 005242  
4469 013066 000000  
4470 013070 005704  
4471 013072 001404  
4472  
4473  
4474  
4475  
4476 013074 012742 000322  
4477 013100 005242  
4478 013102 000000  
4479 013104 022710 012345  
4480 013110 001404  
4481  
4482  
4483  
4484  
4485 013112 012742 000323  
4486 013116 005242  
4487 013120 000000  
4488  
4489  
4490  
4491  
4492  
4493  
4494  
4495  
4496  
4497  
4498  
4499  
4500  
4501 013122 005212  
4502 013124 022712 000151  
4503 013130 001046
```

```
.....  
:TEST 150 TEST MOV DESTINATION MODE 4  
.....  
TS150: INC (R2) ;UPDATE TEST NUMBER  
CMP #150,(R2) ;SEQUENCE ERROR?  
BNE TS151-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR (R0) ;LOC 0=0  
MOV #2,R4 ;R4=2  
MOV #12345,-(R4) ;TRY MOV DEST. MODE 4  
BVS MDM4A ;BR TO ERROR IF V-BIT SET  
BEQ MDM4A ;BR TO ERROR IF Z-BIT SET  
BPL MDM4B  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
; CONDITIONAL BRANCH INST. AND <====  
; REPLACE THE MOVE INSTRUCTION <====  
; WHICH FOLLOWS W/ 766 <====  
MDM4A: MOV #321,-(R2) ;MOVE TO MAILBOX # ***** 321 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;CC'S NOT CORRECT  
MDM4B: TST R4 ;CHECK DECREMENTING OF MODE 4 REG.  
BEQ MDM4C  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--  
; CONDITIONAL BRANCH INST. AND <--  
; REPLACE THE MOVE INSTRUCTION <--  
; WHICH FOLLOWS W/ 760 <--  
MOV #322,-(R2) ;MOVE TO MAILBOX # ***** 322 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;DESTINATION MODE REGISTER NOT DECREMENTED BY 2  
MDM4C: CMP #12345,(R0) ;CHECK DESTINATION DATA  
BEQ TS151  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--  
; CONDITIONAL BRANCH INST. AND <=  
; REPLACE THE MOVE INSTRUCTION <=  
; WHICH FOLLOWS W/ 751 <=  
MOV #323,-(R2) ;MOVE TO MAILBOX # ***** 323 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;DESTINATION DATA INCORRECT  
; OR SEQUENCE ERROR  
.....  
: THIS TEST VERIFIES THE MOV(B) DESTINATION MODE 4 INSTRUCTION  
: ON BOTH ODD AND EVEN BYTES. SOP INSTRUCTIONS ON R4 ARE  
: USED TO CLEAR TARGET LOCATION 0. R0 IS USED AS THE MODE 4  
: ADDRESSING REGISTER, AND CMP AND CONDITIONAL BRANCH  
: INSTRUCTIONS ARE USED TO VERIFY THE DATA.  
:.....  
:TEST 151 TEST MOV(B) DESTINATION MODE 4  
.....  
TS151: INC (R2) ;UPDATE TEST NUMBER  
CMP #151,(R2) ;SEQUENCE ERROR?  
BNE TS152-10 ;BR TO ERROR HALT ON SEQ ERROR
```



```
4504 013132 005004 CLR R4 ;R4=0
4505 013134 005014 CLR (R4) ;LOC. 0=0
4506 013136 012700 000002 MOV #2,R0 ;R0 = 2
4507 013142 112740 125125 MOV8 #125125,-(R0) ;TRY MOV8 DEST. MODE 4-ODD BYTE
4508 013146 020027 000001 CMP R0,#1 ;CHECK THAT DEST. REG. WAS DECREMENTED
4509 013152 001404 BEQ MBDM4A
4510 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4511 ; CONDITIONAL BRANCH INST. AND <---
4512 ; REPLACE THE MOVE INSTRUCTION <---
4513 ; WHICH FOLLOWS W/ 766 <---
4514 013154 012742 000324 MOV #324,-(R2) ;MOVE TO MAILBOX # ***** 324 *****
4515 013160 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4516 013162 000000 HALT ;DESTINATION REG. NOT DECREMENTED BY 1
4517 013164 021427 052400 MBDM4A: CMP (R4),#52400 ;CHECK DEST. DATA
4518 013170 001404 BEQ MBDM4B
4519 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4520 ; CONDITIONAL BRANCH INST. AND <---
4521 ; REPLACE THE MOVE INSTRUCTION <---
4522 ; WHICH FOLLOWS W/ 757 <---
4523 013172 012742 000325 MOV #325,-(R2) ;MOVE TO MAILBOX # ***** 325 *****
4524 013176 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4525 013200 000000 HALT ;DEST. DATA NOT CORRECT
4526 013202 112740 125125 MBDM4B: MOV8 #125125,-(R0) ;TRY MOV8 DEST. MODE 4--EVEN BYTE
4527 013206 102402 BVS MBDM4C ;BR. TO ERROR IF V-BIT SET
4528 013210 001401 BFQ MBDM4C ;BR TO ERROR IF Z-BIT SET
4529 013212 100004 BPL MBDM4D
4530 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4531 ; CONDITIONAL BRANCH INST. AND <---
4532 ; REPLACE THE MOVE INSTRUCTION <---
4533 ; WHICH FOLLOWS W/ 746 <---
4534 013214 MBDM4C:
4535 013214 012742 000326 MOV #326,-(R2) ;MOVE TO MAILBOX # ***** 326 *****
4536 013220 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4537 013222 000000 HALT ;COND. CODES INCORRECT
4538 013224 005700 MBDM4D: TST R0 ;CHECK MODE 4 DEST. REGISTER
4539 013226 001404 BEQ MBDM4E
4540 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4541 ; CONDITIONAL BRANCH INST. AND <---
4542 ; REPLACE THE MOVE INSTRUCTION <---
4543 ; WHICH FOLLOWS W/ 740 <---
4544 013230 012742 000327 MOV #327,-(R2) ;MOVE TO MAILBOX # ***** 327 *****
4545 013234 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4546 013236 000000 HALT ;DESTINATION REG NOT DECREMENTED BY 1
4547 013240 021427 052525 MBDM4E: CMP (R4),#52525 ;CHECK DEST. DATA
4548 013244 001404 BEQ TS152
4549 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
4550 ; CONDITIONAL BRANCH INST. AND <---
4551 ; REPLACE THE MOVE INSTRUCTION <---
4552 ; WHICH FOLLOWS W/ 731 <---
4553 013246 012742 000330 MOV #330,-(R2) ;MOVE TO MAILBOX # ***** 330 *****
4554 013252 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4555 013254 000000 HALT ;DESTINATION DATA INCORRECT
4556 ; OR SEQUENCE ERROR
4557
4558 ; *****
4559 ;
```

```

4560 : THIS TEST VERIFIES THE MOV DESTINATION MODE 5 AND THE MOV8
4561 : DESTINATION MODE 5 - EVEN BYTE INSTRUCTIONS. R4 IS A
4562 : POINTER TO TARGET LOCATION 0 AND R0 IS SETUP TO
4563 : POINT TO LOCATION 376 FOR THE MOV, AND LOCATION 404 FOR
4564 : THE MOV8 INSTRUCTIONS. CMP INSTRUCTIONS ARE USED TO VERIFY
4565 : PROPER ADDRESSING AND DATA.
4566 :
4567 : *****
4568 : TEST 152 TEST MOV DESTINATION MODE 5
4569 : *****
4570 TS152: INC (R2) ;UPDATE TEST NUMBER
4571 CMP #152,(R2) ;SEQUENCE ERROR?
4572 BNE TS153-10 ;BR TO ERROR HALT ON SEQ ERROR
4573 CLR R4 ;R4=0
4574 CLR (R4) ;LOC. 0 = 0
4575 MOV #400,R0 ;R0=400
4576 MOV #4321,@-(R0) ;TRY MOV DEST. MODE 5
4577 BVS MDM5A ;BR TO ERROR IF V-BIT SET
4578 BEQ MDM5A ;BR TO ERROR IF Z-BIT SET
4579 BPL MDM5B
4580 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== =
4581 ; CONDITIONAL BRANCH INST. AND < ==-
4582 ; REPLACE THE MOVE INSTRUCTION <==
4583 ; WHICH FOLLOWS W/ 766 <==--
4584 MDM5A:
4585 MOV #331,-(R2) ;MOVE TO MAILBOX # ***** 331 *****
4586 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4587 HALT ;COND. CODES INCORRECT
4588 MDM5B: CMP #376,R0 ;CHECK MODE 5 REG. WAS DECREMENTED
4589 BEQ MDM5C
4590 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < -
4591 ; CONDITIONAL BRANCH INST. AND <==--
4592 ; REPLACE THE MOVE INSTRUCTION <==
4593 ; WHICH FOLLOWS W/ 757 <==--
4594 MOV #332,-(R2) ;MOVE TO MAILBOX # ***** 332 *****
4595 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4596 HALT ;MODE 5 REGISTER NOT DECREMENTED BY 2
4597 MDM5C: CMP #4321,(R4) ;CHECK DEST. DATA
4598 BEQ MDM5D
4599 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
4600 ; CONDITIONAL BRANCH INST. AND < ==-
4601 ; REPLACE THE MOVE INSTRUCTION <==
4602 ; WHICH FOLLOWS W/ 750 <==--
4603 MOV #333,-(R2) ;MOVE TO MAILBOX # ***** 333 *****
4604 INC -(R2) ;SET MSGTYP TO FATAL ERROR
4605 HALT ;DEST. DATA INCORRECT
4606 MDM5D: MOV #406,R0 ;R0=406
4607 MOV8 #377,@-(R0) ;TRY MOV DEST. MODE 5 --EVEN BYTE
4608 CMP #404,R0 ;CHECK MODE 5 REG.
4609 BEQ MDM5E
4610 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4611 ; CONDITIONAL BRANCH INST. AND <====
4612 ; REPLACE THE MOVE INSTRUCTION <====
4613 ; WHICH FOLLOWS W/ 735 <====
4614 MOV #334,-(R2) ;MOVE TO MAILBOX # ***** 334 *****
4615 INC -(R2) ;SET MSGTYP TO FATAL ERROR

```

4616 013400 000000
 4617 013402 022714 177721
 4618 013406 001404
 4619
 4620
 4621
 4622
 4623 013410 012742 000335
 4624 013414 005242
 4625 013416 000000
 4626
 4627
 4628
 4629
 4630
 4631
 4632
 4633
 4634
 4635
 4636
 4637
 4638
 4639 013420 005212
 4640 013422 022712 000153
 4641 013426 001054
 4642 013430 005000
 4643 013432 005010
 4644 013434 005200
 4645 013436 012760 052525 177777
 4646 013444 102402
 4647 013446 001401
 4648 013450 100004
 4649
 4650
 4651
 4652
 4653 013452
 4654 013452 012742 000336
 4655 013456 005242
 4656 013460 000000
 4657 013462 022700 000001
 4658 013466 001404
 4659
 4660
 4661
 4662
 4663 013470 012742 000337
 4664 013474 005242
 4665 013476 000000
 4666 013500 022737 052525 000000
 4667 013506 001404
 4668
 4669
 4670
 4671

```

MDM5E: HALT                ;MODE 5 REGISTER NOT DECREMENTED BY 2
        CMP                #177721,(R4) ;CHECK DEST. DATA
        BEQ                TS153
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---==
;          CONDITIONAL BRANCH INST. AND <===
;          REPLACE THE MOVE INSTRUCTION <====
;          WHICH FOLLOWS W/ 726 <----
        MOV                #335,-(R2) ;MOVE TO MAILBOX # ***** 335 *****
        INC                -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT               ;DEST. DATA INCORRECT
; OR SEQUENCE ERROR

```

```

:*****
:
: THIS TEST VERIFIES THE MOV DESTINATION MODE 6 AND MOV B - EVEN BYTE
: DESTINATION MODE 6 INSTRUCTIONS. R0 IS USED TO SETUP TARGET LOC.0
: FOR BOTH TESTS. PATTERNS OF ONES AND ZEROES ARE MOVED INTO LOC.0
: BY MODE 6 INSTRUCTIONS, AND CMP INSTRUCTIONS ARE USED TO VERIFY
: PROPER ADDRESSING AND DATA.
:*****

```

TEST 153 TEST MOV DESTINATION MODE 6

```

TS153: INC                (R2) ;UPDATE TEST NUMBER
        CMP                #153,(R2) ;SEQUENCE ERROR?
        BNE                TS154-10 ;BR TO ERROR HALT ON SEQ ERROR
        CLR                R0 ;R0=0
        CLR                (R0) ;LOC. 0=0
        INC                R0 ;R0=1
        MOV                #052525,-1(R0) ;TRY MOV DEST. MODE 6
        BVS                MDM6A ;BR TO ERROR IF V-BIT SET
        BEQ                MDM6A ;BR TO ERROR IF Z-BIT SET
        BPL                MDM6B
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
;          CONDITIONAL BRANCH INST. AND <
;          REPLACE THE MOVE INSTRUCTION < -
;          WHICH FOLLOWS W/ 766 <
MDM6A: MOV                #336,-(R2) ;MOVE TO MAILBOX # ***** 336 *****
        INC                -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT               ;COND. CODES INCORRECT
MDM6B: CMP                #1,R0 ;CHECK DEST. REGISTER UNALTERED
        BEQ                MDM6C
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < -
;          CONDITIONAL BRANCH INST. AND <==
;          REPLACE THE MOVE INSTRUCTION <==
;          WHICH FOLLOWS W/ 757 <==
        MOV                #337,-(R2) ;MOVE TO MAILBOX # ***** 337 *****
        INC                -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT               ;DEST. REGISTER INCORRECTLY ALTERED
MDM6C: CMP                #52525,@#0 ;CHECK DEST. DATA
        BEQ                MDM6D
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
;          CONDITIONAL BRANCH INST. AND <--
;          REPLACE THE MOVE INSTRUCTION < - =
;          WHICH FOLLOWS W/ 747 <

```

```

4672 013510 012742 000340      MOV      #340,-(R2)      ;MOVE TO MAILBOX # ***** 340 *****
4673 013514 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
4674 013516 000000              HALT                    ;DEST. DATA INCORRECT
4675 013520 012700 000002      MDM6D: MOV      #2,R0      ;R0=2
4676 013524 112760 000377 177777  MOVB     #377,-1(R0)    ;TRY MOVB DEST. MODE 6
4677 013532 022700 000002      CMP      #2,R0         ;CHECK DEST. REGISTER UNALTERED
4678 013536 001404              BEQ      MDM6E         ;
4679                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4680                                ;          CONDITIONAL BRANCH INST. AND <====
4681                                ;          REPLACE THE MOVE INSTRUCTION <====
4682                                ;          WHICH FOLLOWS W/ 733 <====
4683 013540 012742 C00341      MOV      #341,-(R2)    ;MOVE TO MAILBOX # ***** 341 *****
4684 013544 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
4685 013546 000000              HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
4686 013550 022737 177525 000000  MDM6E: CMP      #177525,@#0 ;CHECK DEST. DATA
4687 013556 001404              BEQ      TS154         ;
4688                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4689                                ;          CONDITIONAL BRANCH INST. AND <====
4690                                ;          REPLACE THE MOVE INSTRUCTION <====
4691                                ;          WHICH FOLLOWS W/ 723 <====
4692 013560 012742 000342      MOV      #342,-(R2)    ;MOVE TO MAILBOX # ***** 342 *****
4693 013564 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
4694 013566 000000              HALT                    ;DEST. DATA INCORRECT
4695                                ; OR SEQUENCE ERROR

```

```

*****
:
: THIS TEST VERIFIES THE MOV DESTINATION MODE 7 AND MOVB - ODD BYTE
: DESTINATION MODE 7 INSTRUCTIONS. R4 POINTS TO TARGET LOC.0 AND R0
: IS USED AS THE MODE 7 ADDRESSING REGISTER. CMP INSTRUCTIONS ARE
: USED TO VERIFY PROPER ADDRESSING AND DATA.
:
*****

```

```

:TEST 154 TEST MOV DESTINATION MODE 7
*****

```

```

4706 013570 005212              TS154: INC      (R2)      ;UPDATE TEST NUMBER
4707 013572 022712 000154      CMP      #154,(R2)     ;SEQUENCE ERROR?
4708 013576 001053              BNE     TS155-10      ;BR TO ERROR HALT ON SEQ ERROR
4709 013600 005004              CLR     R4            ;R4=0
4710 013602 005014              CLR     (R4)          ;LOC.0=0
4711 013604 012700 000403      MOV     #403,R0       ;R0=403
4712 013610 012770 070707 177777  MOV     #70707,@-1(R0) ;TRY MOV W/DEST MODE 7
4713 013616 102402              BVS     MDM7A         ;BR. TO ERROR IF V-BIT SET
4714 013620 001401              BEQ     MDM7A         ;BR. TO ERROR IF Z-BIT SET
4715 013622 100004              BPL     MDM7B         ;
4716                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4717                                ;          CONDITIONAL BRANCH INST. AND <====
4718                                ;          REPLACE THE MOVE INSTRUCTION <====
4719                                ;          WHICH FOLLOWS W/ 765 <====
4720
4721 013624              MDM7A:
4722 013624 012742 000343      MOV     #343,-(R2)    ;MOVE TO MAILBOX # ***** 343 *****
4723 013630 005242              INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
4724 013632 000000              HALT                    ;COND. CODES INCORRECT
4725 013634 022700 000403      MDM7B: CMP     #403,R0   ;CHECK DEST. REGISTER
4726 013640 001404              BEQ     MDM7C         ;
4727                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====

```

```

4728                                     ;          CONDITIONAL BRANCH INST. AND <====
4729                                     ;          REPLACE THE MOVE INSTRUCTION <====
4730                                     ;          WHICH FOLLOWS W/ 756 <====
4731 013642 012742 000344                MOV    #344,-(R2)      ;MOVE TO MAILBOX # ***** 344 *****
4732 013646 005242                       INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
4733 013650 000000                       HALT                                ;DEST. REGISTER INCORRECTLY ALTERED
4734 013652 022737 070707 000000 MDM7C:  CMP    #70707,@#0    ;CHECK DEST. DATA
4735 013660 001404                       BEQ    MDM7D
4736                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4737                                     ;          CONDITIONAL BRANCH INST. AND <====
4738                                     ;          REPLACE THE MOVE INSTRUCTION <====
4739                                     ;          WHICH FOLLOWS W/ 746 <====
4740 013662 012742 000345                MOV    #345,-(R2)      ;MOVE TO MAILBOX # ***** 345 *****
4741 013666 005242                       INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
4742 013670 000000                       HALT                                ;DEST. DATA INCORRECT
4743 013672 112770 107070 000001 MDM7D:  MOVB   #107070,@1(R0) ;TRY MOVB W/DEST MODE 7--ODD BYTE
4744 013700 022700 000403                CMP    #403,R0        ;CHECK MODE 7 DEST. REG.
4745 013704 001404                       BEQ    MDM7E
4746                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
4747                                     ;          CONDITIONAL BRANCH INST. AND <====
4748                                     ;          REPLACE THE MOVE INSTRUCTION <====
4749                                     ;          WHICH FOLLOWS W/ 734 <====
4750 013706 012742 000346                MOV    #346,-(R2)      ;MOVE TO MAILBOX # ***** 346 *****
4751 013712 005242                       INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
4752 013714 000000                       HALT                                ;DEST. DATA INCORRECT
4753 013716 022737 034307 000000 MDM7E:  CMP    #34307,@#0    ;CHECK DEST. DATA
4754 013724 001404                       BEQ    TS155
4755                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
4756                                     ;          CONDITIONAL BRANCH INST. AND <
4757                                     ;          REPLACE THE MOVE INSTRUCTION <
4758                                     ;          WHICH FOLLOWS W/ 724 <
4759 013726 012742 000347                MOV    #347,-(R2)      ;MOVE TO MAILBOX # ***** 347 *****
4760 013732 005242                       INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
4761 013734 000000                       HALT                                ;DESTINATION DATA INCORRECT
4762                                     ; OR SEQUENCE ERROR
4763
4764 ;*****
4765 ;
4766 ;          THIS TEST VERIFIES MODE 4 DOUBLE OPERAND INSTRUCTIONS.
4767 ;THE TEST USES MODE 4 ADDRESSING WITH REGISTER 0 TO MOVE THRU A
4768 ;TABLE OF OPERANDS. THE TABLE OF OPERANDS AND THE WORK LOCATION IS
4769 ;STORED FOLLOWING THE TEST CODE. A SERIES OF 5 DOP INSTRUCTIONS UTILIZES
4770 ;THE DATA IN THE TABLE TO CYCLE THE WORK LOCATION THRU A SET OF
4771 ;VALUE. THE DATA HAS BEEN CHOSEN TO INSURE THAT NO SINGLE ERROR WILL
4772 ;GO UNDETECTED. WORD AND BYTE INSTRUCTION ACCESSING BOTH EVEN AND
4773 ;ODD ADDRESSES ARE USED IN THE TEST. THE LISTING SHOWS THE
4774 ;EXPECTED INTERMEDIATE RESULT AS EACH INSTRUCTION IS EXECUTED.
4775 ;
4776 ;*****
4777 ;TEST 155 TEST MODE 4 W/ DOP INSTS.
4778 ;*****
4779 013736 005212                TS155: INC    (R2)          ;UPDATE TEST NUMBER
4780 013740 022712 000155        CMP    #155,(R2)      ;SEQUENCE ERROR?
4781 013744 001015                BNE   DOP4           ;BR TO ERROR HALT ON SEQ ERROR
4782 013746 012700 014020        MOV    #TBL1,R0      ;INITIALIZE R0
4783 013752 014037 014020        MOV    -(R0),@#TBL1 ;TBL1=125252

```

4784 013756 064037 014020
 4785 013762 144037 014020
 4786 013766 154037 014021
 4787 013772 024037 014020
 4788 013776 001411
 4789
 4790
 4791
 4792
 4793 014000
 4794 014000 012742 000350
 4795 014004 005242
 4796 014006 000000
 4797
 4798
 4799 014010 125252
 4800 014012 052652
 4801 014014 053125
 4802 014016 125252
 4803 014020 000000
 4804
 4805
 4806
 4807
 4808
 4809
 4810
 4811
 4812
 4813
 4814
 4815
 4816
 4817 014022 005212
 4818 014024 022712 000156
 4819 014030 001015
 4820 014032 012700 014106
 4821 014036 015037 014020
 4822 014042 065037 014020
 4823 014046 145037 014020
 4824 014052 155037 014021
 4825 014056 025037 014020
 4826 014062 001411
 4827
 4828
 4829
 4830
 4831 014064
 4832 014064 012742 000351
 4833 014070 005242
 4834 014072 000000
 4835
 4836 014074 014010
 4837 014076 014012
 4838 014100 014013
 4839 014102 014014

```

ADD      -(R0),@#TBL1      ;TBL1=000377
BICB     -(R0),@#TBL1      ;TBL1=000252
B.SB     -(R0),@#TBL1+1    ;TBL1=125252
CMP      -(R0),@#TBL1      ;CHECK RESULT
BEQ      TS156
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
;          CONDITIONAL BRANCH INST. AND <---
;          REPLACE THE MOVE INSTRUCTION <---
;          WHICH FOLLOWS W/ 762 <---
DOP4:
MOV      #350,-(R2)        ;MOVE TO MAILBOX # ***** 350 *****
INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
HALT     ;RESULT OF MODE 4 INSTS. INCORRECT
; OR SEQUENCE ERROR

125252
52652
53125
125252
TBL1:    0

```

```

:*****
:
: THIS TEST VERIFIES MODE 5 DOUBLE OPERAND INSTRUCTIONS.
: THE TEST USES AN ADDRESS TABLE STORED FOLLOWING THE TEST CODE.
: THIS TABLE IS SIMPLY A TABLE OF ADDRESS POINTERS WHICH ADDRESS
: THE DATA TABLE USED IN THE PREVIOUS TEST. THE TEST IS IDENTICAL TO
: THE PREVIOUS TEST EXCEPT THE DATA IS REFERENCED USING THIS ADDRESS
: TABLE AND MODE 5 ADDRESSING. (SEE PREVIOUS TEST).
:*****

```

```

:TEST 156 TEST MODE 5 W/ DOP INSTS.
:*****
TS156:  INC      (R2)          ;UPDATE TEST NUMBER
        CMP      #156,(R2)    ;SEQUENCE ERROR?
        BNE     DOP5         ;BR TO ERROR HALT ON SEQ ERROR
        MOV     #TBL2+2,R0    ;INITIALIZE R0
        MOV     @-(R0),@#TBL1 ;TBL1=125252
        ADD     @-(R0),@#TBL1 ;TBL1=000377
        BICB    @-(R0),@#TBL1 ;TBL1=000252
        BISB    @-(R0),@#TBL1+1 ;TBL1=125252
        CMP     @-(R0),@#TBL1 ;CHECK RESULT
        BEQ     TS157
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
;          CONDITIONAL BRANCH INST. AND <
;          REPLACE THE MOVE INSTRUCTION <
;          WHICH FOLLOWS W/ 762 <

```

```

DOP5:
MOV      #351,-(R2)        ;MOVE TO MAILBOX # ***** 351 *****
INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
HALT     ;RESULT OF MODE 5 INSTS. INCORRECT
; OR SEQUENCE ERROR

TBL1-10
TBL1-6
TBL1-5
TBL1-4

```

CKDB-D DCF11-AA CPU DIAG.
CKDBD.P11 24-NOV-80 11:07

MACY11 30A(1052) 14-JAN-81 11:46 E 8 PAGE 95
i156 TEST MODE 5 W/ DOP INSTS.

4840 014'04 0140'6

TBL2: TBL1-2

```

4841
4842
4843
4844
4845
4846
4847
4848
4849
4850
4851
4852
4853
4854 014106 005212
4855 014110 022712 000157
4856 014114 001022
4857 014116 012700 014014
4858 014122 016037 000002 014020
4859 014130 066037 000000 014020
4860 014136 146037 177777 014020
4861 014144 156037 177776 014021
4862 014152 026037 177774 014020
4863 014160 001404
4864
4865
4866
4867
4868 014162 012742 000352
4869 014166 005242
4870 014170 000000
4871
4872
4873
4874
4875
4876
4877
4878
4879
4880
4881
4882
4883
4884
4885 014172 005212
4886 014174 022712 000160
4887 014200 001022
4888 014202 012700 014100
4889 014206 017037 000004 014020
4890 014214 067037 000002 014020
4891 014222 147037 000000 014020
4892 014230 157037 177776 014021
4893 014236 027037 177774 014020
4894 014244 001404
4895
4896

```

```

.....
: THIS TEST VERIFIES MODE 6 DOUBLE OPERAND INSTRUCTIONS.
: IT USES THE SAME DATA AS THAT USED IN THE MODE 4 TESTS.
: THIS TIME THE DATA IS ACCESSED USING MODE 6. RO IS SET
: TO POINT TO THE MIDDLE OF THE TABLE. THE TABLE IS ACCESSED FROM
: BOTTOM TO TOP BY VARYING THE OFFSET IN THE MODE 6 INSTRUCTIONS.
: THE DATA RESULTS ARE IDENTICAL TO THOSE EXPECTED IN THE MODE 4
: TESTS.
.....

```

```

: TEST 157 TEST MODE 6 W/ DOP INSTS.
.....

```

```

TS157: INC (R2) ;UPDATE TEST NUMBER
CMP #157,(R2) ;SEQUENCE ERROR?
BNE TS160-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #TBL1-4,RO ;INITIALIZE RO
MOV 2(R0),@#TBL1 ;TBL1=125252
ADD 0(R0),@#TBL1 ;TBL1=000377
BICB -1(R0),@#TBL1 ;TBL1=000252
BISB -2(R0),@#TBL1+1 ;TBL1=125252
CMP -4(R0),@#TBL1 ;CHECK RESULT
BEQ TS160

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 755 <
MOV #352,-(R2) ;MOVE TO MAILBOX # ***** 352 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;RESULT OF MODE 6 INSTS. INCORRECT
; OR SEQUENCE ERROR

```

```

.....
: THIS TEST VERIFIES MODE 7 DOUBLE OPERAND INSTRUCTIONS.
: THIS TEST USES THE SAME ADDRESS TABLE AND DATA TABLE USED BY
: THE MODE 5 TESTS. THIS TIME THE DATA IS ACCESSED USING MODE 7.
: RO IS SET TO POINT TO THE MIDDLE OF THE ADDRESS TABLE IN THE MODE 5
: TEST. THE TABLE IS ACCESSED FROM BOTTOM TO TOP BY VARYING THE OFFSET
: IN THE MODE 7 INSTRUCTIONS. THE DATA RESULTS ARE IDENTICAL TO
: THOSE EXPECTED IN THE MODE 5 TESTS.
.....

```

```

: TEST 160 TEST MODE 7 W/ DOP INSTS.
.....

```

```

TS160: INC (R2) ;UPDATE TEST NUMBER
CMP #160,(R2) ;SEQUENCE ERROR?
BNE TS161-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #TBL2-4,RO ;INITIALIZE RO
MOV @4(R0),@#TBL1 ;TBL1=125252
ADD @2(R0),@#TBL1 ;TBL1=000377
BICB @0(R0),@#TBL1 ;TBL1=000252
BISB @-2(R0),@#TBL1+1 ;TBL1=125252
CMP @-4(R0),@#TBL1 ;CHECK RESULT
BEQ TS161

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <

```



```
4897                                     :  
4898                                     :  
4899 014246 012742 000353             MOV #353,-(R2)           : REPLACE THE MOVE INSTRUCTION  
4900 014252 005242                       INC -(R2)                : WHICH FOLLOWS W/ 755  
4901 014254 000000                       HALT                     : MOVE TO MAILBOX # ***** 353 *****  
4902                                     : SET MSGTYP TO FATAL ERROR  
4903                                     : RESULT OF MODE 7 INSTS INCORRECT  
4904                                     : OR SEQUENCE ERROR  
4905                                     :  
4906                                     : *****  
4907                                     : THIS TEST VERIFIES THE ROTATE MODE 0 INSTRUCTIONS.  
4908 :RO IS LOADED WITH A DATA PATTERN, THE C-BIT IS LOADED, AND  
4909 :AN ROL INSTRUCTION IS EXECUTED WITH MODE 0. THE OPERATION IS CHECKED  
4910 :BY TESTING THE RESULTING DATA AND THE STATE OF THE C AND V BITS.  
4911 :NEXT, THE SAME PROCEDURE IS EXECUTED TO TEST MODE 0 BYTE INSTRUCTIONS.  
4912                                     :  
4913 : *****  
4914 :TEST 161 TEST ROTATE INSTRUCTIONS OF MODE 0  
4915 : *****  
4916 TS161: INC (R2) ;UPDATE TEST NUMBER  
4917 CMP #161,(R2) ;SEQUENCE ERROR?  
4918 BNE TS162-10 ;BR TO ERROR HALT ON SEQ ERROR  
4919 MOV #125252,R0 ;INITIALIZE DATA  
4920 SEC ;SET C-BIT  
4921 ROL R0 ;TRY ROL W/ MODE 0  
4922 BVC R0A ;CC=0011  
4923 BCC R0A  
4924 CMP #052525,R0 ;CHECK DATA  
4925 BEQ R0B  
4926 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  
4927 : CONDITIONAL BRANCH INST. AND  
4928 : REPLACE THE MOVE INSTRUCTION  
4929 : WHICH FOLLOWS W/ 766  
4930 R0A: MOV #354,-(R2) ;MOVE TO MAILBOX # ***** 354 *****  
4931 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
4932 HALT ;ROL MODE 0 FAILED  
4933 R0B: MOV #125252,R0 ;INITIALIZE DATA  
4934 SEC ;SET C-BIT  
4935 ROLB R0 ;TRY ROL W/ MODE 0 EVEN BYTE  
4936 BVC R0C ;CC=0011  
4937 BCC R0C  
4938 CMP #125125,R0 ;CHECK DATA  
4939 BEQ TS162  
4940 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  
4941 : CONDITIONAL BRANCH INST. AND  
4942 : REPLACE THE MOVE INSTRUCTION  
4943 : WHICH FOLLOWS W/ 751  
4944 R0C: MOV #355,-(R2) ;MOVE TO MAILBOX # ***** 355 *****  
4945 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
4946 HALT ;ROLB MODE 0 FAILED  
4947 : OR SEQUENCE ERROR
```

4948
4949
4950
4951
4952
4953
4954
4955
4956
4957
4958
4959
4960
4961 014352 005212
4962 014354 022712 000162
4963 014360 001051
4964 014362 005000
4965 014364 012710 052525
4966 014370 000241
4967 014372 006110
4968 014374 102005
4969 014376 103404
4970 014400 023727 000000 125252
4971 014406 001404
4972
4973
4974
4975
4976 014410
4977 014410 012742 000356
4978 014414 005242
4979 014416 000000
4980 014420 000261
4981 014422 012710 125252
4982 014426 106110
4983 014430 102005
4984 014432 103004
4985 014434 022737 125125 000000
4986 014442 001404
4987
4988
4989
4990
4991 014444
4992 014444 012742 000357
4993 014450 005242
4994 014452 000000
4995 014454 012710 125252
4996 014460 005000
4997 014462 005200
4998 014464 000261
4999 014466 106110
5000 014470 102005
5001 014472 103004
5002 014474 022737 052652 000000
5003 014502 001404

```
.....  
: THIS TEST VERIFIES THE ROTATE MODE 1 INSTRUCTIONS.  
: THE DATA TO BE ROTATED IS IN LOC 0. R0 IS USED AS THE  
: ADDRESSING REGISTER. THE C-BIT IS LOADED AND AN ROL IS EXECUTED.  
: THE RESULTS ARE CHECKED BY COMPARING THE DATA RESULTS AND TESTING  
: THE C AND V BITS. THIS PROCEDURE IS THEN REPEATED TWICE MORE  
: TO TEST THE BYTE ROTATES. FIRST ON BYTE 0, THEN ON BYTE 1.  
.....  
: TEST 162 TEST ROTATE INSTRUCTIONS W/ MODE 1  
.....  
TS162: INC (R2) ;UPDATE TEST NUMBER  
CMP #162,(R2) ;SEQUENCE ERROR?  
BNE TS163-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;POINT TO LOC. 0  
MOV #52525,(R0) ;INITIALIZE DATA  
CLC ;CLEAR C-BIT  
ROL (R0) ;TRY ROL W/ MODE 1  
BVC ROT1A ;CC=1010  
BCS ROT1A  
CMP @R0,#125252 ;CHECK RESULT  
BEQ ROT1B  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
: CONDITIONAL BRANCH INST. AND <  
: REPLACE THE MOVE INSTRUCTION <  
: WHICH FOLLOWS W/ 764 <  
ROT1A: MOV #356,-(R2) ;MOVE TO MAILBOX # ***** 356 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;ROL MODE 1 FAILED  
ROT1B: SEC  
MOV #125252,(R0) ;INITIALIZE DATA  
ROLB (R0) ;TRY ROLB W/ MODE 1 EVEN BYTE  
BVC ROT1C ;CC=1011  
BCC ROT1C  
CMP #125125,@R0 ;TEST RESULT  
BEQ ROT1D  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==  
: CONDITIONAL BRANCH INST. AND <==  
: REPLACE THE MOVE INSTRUCTION <==  
: WHICH FOLLOWS W/ 746 <==  
ROT1C: MOV #357,-(R2) ;MOVE TO MAILBOX # ***** 357 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;ROLB W/ MODE 1 EVEN BYTE FAILED  
ROT1D: MOV #125252,(R0)  
CLR R0 ;POINT TO ODD BYTE  
INC R0  
SEC ;SET C-BIT  
ROLB (R0) ;TRY ROLB W/ MODE 1 ODD BYTE  
BVC ROT1E ;CC=0011  
BCC ROT1E  
CMP #052652,@R0 ;CHECK DATA  
BEQ TS163
```

```
5004 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
5005 ; CONDITIONAL BRANCH INST. AND <===
5006 ; REPLACE THE MOVE INSTRUCTION <===
5007 ; WHICH FOLLOWS W/ 726 <===
5008 ROT1E:
5009 014504 MOV #360,-(R2) ;MOVE TO MAILBOX # ***** 360 *****
5010 014510 INC -(R2) ;SET MSGTYP TO FATAL ERROR
5011 014512 HALT ;ROLB W/ MODE 1 ODD BYTE FAILED
5012 ; OR SEQUENCE ERROR
5013
5014
5015
5016
5017
5018
5019
5020
5021
5022
5023
5024 014514 005212 TS163: INC (R2) ;UPDATE TEST NUMBER
5025 014516 022712 000163 CMP #163,(R2) ;SEQUENCE ERROR?
5026 014522 001057 BNE TS164-10 ;BR TO ERROR HALT ON SEQ ERROR
5027 014524 005000 CLR R0 ;POINT TO LOC 0
5028 014526 012710 173737 MOV #173737,(R0) ;INITIALIZE DATA
5029 014532 000241 CLC ;CLEAR C-BIT
5030 014534 006120 ROL (R0)+ ;TRY ROL W/ MODE 2
5031 014536 103007 BCC ROT2A ;CHECK C-BIT
5032 014540 022737 167676 000000 CMP #167676,@#0 ;CHECK DATA
5033 014546 001003 BNE ROT2A ;BRANCH IF RESULT INCORRECT
5034 014550 005300 DEC R0 ;TEST R0
5035 014552 005300 DEC R0
5036 014554 001404 BEQ ROT2B
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5041 ROT2A:
5042 014556 MOV #361,-(R2) ;MOVE TO MAILBOX # ***** 361 *****
5043 014562 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
5044 014564 000000 HALT ;ROL W/ MODE 2 FAILED
5045 014566 005000 ROT2B: CLR R0 ;POINT TO LOC 0
5046 014570 012710 004040 MOV #4040,(R0) ;INITIALIZE DATA
5047 014574 000241 CLC ;CLEAR C-BIT
5048 014576 106120 ROLB (R0)+ ;TRY ROLB W/ MODE 2 EVEN BYTE
5049 014600 103406 BCS ROT2C ;CHECK C-BIT
5050 014602 022737 004100 000000 CMP #4100,@#0 ;CHECK DATA
5051 014610 001002 BNE ROT2C ;BRANCH IF DATA INCORRECT
5052 014612 005300 DEC R0 ;CHECK R0
5053 014614 001404 BEQ ROT2D
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5058 ROT2C:
5059 014616 MOV #362,-(R2) ;MOVE TO MAILBOX # ***** 362 *****
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5060 014622 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5061 014624 000000          HALT                    ;ROLB W/ MODE 2 EVEN BYTE FAILED
5062 014626 005000          ROT2D: CLR      R0          ;POINT TO LOC 0
5063 014630 012710 004040    MOV      #4040,(R0)    ;INITIALIZE DATA
5064 014634 005200          INC      R0            ;POINT TO ODD BYTE OF DATA
5065 014636 000261          SEC                    ;SET C-BIT
5066 014640 106120          ROLB     (R0)+         ;TRY ROL W/ MODE 2 ODD BYTE
5067 014642 103407          BCS     ROT2E         ;CHECK C-BIT
5068 014644 022737 010440 000000' CMP      #10440,a#0    ;CHECK DATA
5069 014652 001003          BNE     R0^2E        ;BRANCH IF DATA INCORRECT
5070 014654 005300          DEC     R0            ;CHECK R0
5071 014656 005300          DEC     R0
5072 014660 001404          BEQ     TS164
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5077 014662
5078 014662 012742 000363    ROT2E: MOV      #363,-(R2)  ;MOVE TO MAILBOX # ***** 363 *****
5079 014666 005242          INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
5080 014670 000000          HALT                    ;ROLB W/ MODE 2 ODD BYTE FAILED
5081
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 720 <---
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014672 005212
014674 022712 000164
014700 001051
014702 012737 052525 000000
014710 000261
014712 006137 000000
014716 103404
014720 022737 125253 000000
C14726 001404

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014730 012742 000364
014734 005242
014736 000000
014740 012737 125252 000000
014746 000241
014750 106137 000000
014754 103004
014756 023727 000000 125124 4\$:
014764 001404

014766
014766 012742 000365
014772 005242
C14774 000000
014776 012737 125252 000000
015004 000261
015006 106137 000001
015012 103004
015014 022737 052652 000000
015022 001404

015024
015024 012742 000366
015030 005242
015032 000000

```
.....
: THIS TEST VERIFIES MODE 3 ROTATE INSTRUCTIONS.
: THIS TEST USES THE SAME PROCEDURES AS IN THE OTHER ROTATE
: TESTS. THE DATA IS STORED IN LOC. 0 AND IS ADDRESSED USING
: MODE 37. BYTE ADDRESSING IS ALSO CHECKED FOR EVEN AND ODD BYTES.
:
: TEST 164 TEST ROTATE INSTRUCTIONS /W MODE 3
:
: TS164: INC (R2) ;UPDATE TEST NUMBER
: CMP #164,(R2) ;SEQUENCE ERROR?
: BNE TS165-10 ;BR TO ERROR HALT ON SEQ ERROR
: MOV #52525,@#0 ;INITIALIZE DATA IN LOC 0
: SEC ;SET C-BIT
: ROL @#0 ;TRO ROL W/ MODE 3
: BCS ROT3A ;CHECK C-BIT
: CMP #125253,@#0 ;CHECK DATA
: BEQ ROT3B
:
: ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
: ; CONDITIONAL BRANCH INST. AND <====
: ; REPLACE THE MOVE INSTRUCTION <====
: ; WHICH FOLLOWS W/ 764 <====
:
: ROT3A: MOV #364,-(R2) ;MOVE TO MAILBOX # ***** 364 *****
: INC -(R2) ;SET MSGTYP TO FATAL ERROR
: HALT ;ROL W/ MODE 3 FAILED
: ROT3B: MOV #125252,@#0 ;INITIALIZE DATA
: CLC ;CLEAR C-BIT
: ROLB @#0 ;TRY ROL W/ MODE 3 EVEN BYTE
: BCC ROT3C ;CHECK C-BIT
: CMP @#0,#125124 ;CHECK DATA
: BEQ ROT3D
:
: ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: ; CONDITIONAL BRANCH INST. AND <====
: ; REPLACE THE MOVE INSTRUCTION <====
: ; WHICH FOLLOWS W/ 745 <====
:
: ROT3C: MOV #365,-(R2) ;MOVE TO MAILBOX # ***** 365 *****
: INC -(R2) ;SET MSGTYP TO FATAL ERROR
: HALT ;ROL W/ MODE 3 EVEN BYTE FAILED
: ROT3D: MOV #125252,@#0 ;INITIALIZE DATA IN LOC. 0
: SEC ;SET C-BIT
: ROLB @#1 ;TRY ROL W/ MODE 3 ODD BYTE
: BCC ROT3E ;CHECK C-BIT
: CMP #052652,@#0 ;CHECK DATA
: BEQ TS165
:
: ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: ; CONDITIONAL BRANCH INST. AND <====
: ; REPLACE THE MOVE INSTRUCTION <====
: ; WHICH FOLLOWS W/ 726 <====
:
: ROT3E: MOV #366,-(R2) ;MOVE TO MAILBOX # ***** 366 *****
: INC -(R2) ;SET MSGTYP TO FATAL ERROR
: HALT ;ROL W/ MODE 3 ODD BYTE FAILED
```

; OR SEQUENCE ERROR

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015034 005212
015036 022712 000165
015042 001016
015044 012737 070707 000000
015052 012700 000002
015056 000261
015060 006140
015062 103406
015064 022737 161617 000000
015072 001002
015074 005700
015076 001404

015100
015100 012742 000367
015104 005242
015106 000000

015110 005212
015112 022712 000166
015116 001021
015120 012737 015172 000000
015126 012700 000002
015132 012767 107070 000032
015140 000241
015142 006150

: THIS TEST VERIFIES MODE 4 ROTATE INSTRUCTIONS. THE DATA IS
: STORED IN LOC. 0. R0 IS SET TO 2 AND THE CARRY IS SET. AN ROL MODE 4
: IS USED TO ROTATE LOCATION 0 USING R0. THE DATA IS CHECKED
: AND THE C AND V BITS ARE TESTED. THE PROPER DECREMENTING OF
: R0 IS VERIFIED.
: *****

: TEST 165 TEST MODE 4 W/ ROTATE INSTRUCTIONS
: *****

TS165: INC (R2) ;UPDATE TEST NUMBER
CMP #165,(R2) ;SEQUENCE ERROR?
BNE TS166-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #070707,@#0 ;INITIALIZE DATA IN LOC. 0
MOV #2,R0 ;INITIALIZE R0 AS POINTER
SEC ;SET C-BIT
ROL -(R0) ;TRY ROL W/ MODE 4
BCS ROT4 ;CHECK C-BIT
CMP #161617,@#0 ;CHECK DATA
BNE ROT4 ;BRANCH IF DATA INCORRECT
TST R0 ;CHECK MODE 4 REGISTER
BEQ TS166

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <-
: REPLACE THE MOVE INSTRUCTION <-
: WHICH FOLLOWS W/ 761 <-

ROT4: MOV #367,-(R2) ;MOVE TO MAILBOX # ***** 367 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ROL MODE 4 FAILED
; OR SEQUENCE ERROR

: THIS TEST VERIFIES MODE 5 ROTATE INSTRUCTIONS.
: THE DATA IS STORED IN A WORK LOCATION (ROTX) AT THE END OF THE
: TEST CODE. LOC. 0 IS LOADED WITH THE ADDRESS OF THE DATA (ROTX).
: R0 IS SET TO 2. THE CARRY IS CLEARED AND A MODE 5 ROL
: IS EXECUTED USING R0 AS AN ADDRESSING REGISTER. THE DATA IS
: CHECKED, THE C AND V BITS TESTED, AND R0 CHECKED FOR PROPER
: DECREMENTING.
: *****

: TEST 166 TEST MODE 5 W/ ROTATE INSTRUCTIONS
: *****

TS166: INC (R2) ;UPDATE TEST NUMBER
CMP #166,(R2) ;SEQUENCE ERROR?
BNE ROT5 ;BR TO ERROR HALT ON SEQ ERROR
MOV #ROTX,@#0 ;MOVE POINTER TO LOC. 0
MOV #2,R0 ;SET MODE 5 REG. TO LOC. 0
MOV #107070,ROTX ;INITIALIZE DATA
CLC ;CLEAR C-BIT
ROL @-(R0) ;TRY ROL W/ MODE 5

```

5194 015144 103006          BCC    ROT5      :CHECK C-BIT
5195 015146 022737 016160 015172  CMP    #016160,@#ROTX :CHECK DATA
5196 015154 001002          BNE    ROT5      :BRANCH IF DATA INCORRECT
5197 015156 005700          TST    R0        :CHECK MODE 5 REGISTER
5198 015160 001405          BEQ    TS167
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5203 015162
5204 015162 012742 000370  ROT5:  MOV    #370,-(R2)  :MOVE TO MAILBOX # ***** 370 *****
5205 015166 005242          INC    -(R2)      :SET MSGTYP TO FATAL ERROR
5206 015170 000000          HALT
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5208 015172 000000  ROTX:  0
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5220 015174 005212          TS167: INC    (R2)      :UPDATE TEST NUMBER
5221 015176 022712 000167  CMP    #167,(R2)  :SEQUENCE ERROR?
5222 015202 001013          BNE    TS170-10   :BR TO ERROR HALT ON SEQ ERROR
5223 015204 012737 125252 015172  MOV    #125252,@#ROTX :INITIALIZE DATA
5224 015212 000261          SEC
5225 015214 006167 177752  ROL    ROTX      :SET C-BIT
5226 015220 103004          ROL    ROTX      :TRY ROL W/ MODE 6
5227 015222 022737 052525 015172  BCC    ROT6      :CHECK C-BIT
5228 015230 001404          CMP    #52525,@#ROTX :CHECK DATA
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5233 015232
5234 015232 012742 000371  ROT6:  MOV    #371,-(R2)  :MOVE TO MAILBOX # ***** 371 *****
5235 015236 005242          INC    -(R2)      :SET MSGTYP TO FATAL ERROR
5236 015240 000000          HALT
5237

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```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <-
; WHICH FOLLOWS W/ 756 <=

```

```

:*****
:
: THIS TEST VERIFIES MODE 6 ROTATE INSTRUCTIONS.
: IT USES THE SAME PROCEDURE AS THE ABOVE TEST EXCEPT THE
: ROTATE INSTRUCTION USES MODE 6 ADDRESSING WITH REGISTER 7.
: THE DATA IS STILL OPERATED ON IN LOC. ROTX (SEE PREVIOUS TEST).
:*****

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:TEST 167 TEST MODE 6 W/ ROTATE INSTRUCTIONS
:*****

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; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 764 <

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015242 005212
015244 022712 000170
015250 001016
015252 012737 052525 015172
015260 012737 015172 015316
015266 000241
015270 006177 000022
015274 103404
015276 023727 015172 125252
015304 001405

015306
015306 012742 000372
015312 005242
015314 000000

015316 000000

015320 005212
015322 022712 000171
015326 001013
015330 012700 177400
015334 000300
015336 100404

015340 012742 000373
015344 005242
015346 000000

```
*****
: THIS TEST VERIFIES MODE 7 ROTATE INSTRUCTIONS.
: THE DATA IS SET IN LOC. ROTX, (SEE PREVIOUS TEST). THE ROL INSTRUCTION
: ADDRESSES IT INDIRECTLY USING MODE 7 AND INDIRECT ADDRESS LOCATION
: (ROTXAD) FOLLOWING THE TEST CODE.
*****
: TEST 170 TEST MODE 7 W/ ROTATE INSTRUCTIONS
*****
TS170: INC (R2) ;UPDATE TEST NUMBER
      CMP #170,(R2) ;SEQUENCE ERROR?
      BNE ROT7 ;BR TO ERROR HALT ON SEQ ERROR
      MOV #52525,@#ROTX ;INITIALIZE DATA
      MOV #ROTX,@#ROTXAD ;INITIALIZE ADDRESS POINTER
      CLC ;CLEAR C-BIT
      ROL @ROTXAD ;TRY ROL W/ MODE 7
      BCS ROT7 ;CHECK C-BIT
      CMP @#ROTX,#125252 ;CHECK DATA
      BEQ TS171
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
      ; CONDITIONAL BRANCH INST. AND <====
      ; REPLACE THE MOVE INSTRUCTION <====
      ; WHICH FOLLOWS W/ 761 <====

ROT7: MOV #372,-(R2) ;MOVE TO MAILBOX # ***** 372 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;ROL W/ MODE 7 FAILED
      ; OR SEQUENCE ERROR

ROTXAD: 0

*****
: THIS TEST VERIFIES MODE 0 SWAB INSTRUCTION. RO IS SET TO
: 177400. A SWAB MODE 0 IS EXECUTED AND THE CONDITIONAL BRANCH
: IS USED TO CHECK THE SIGN OF THE RESULT. ALSO, A COMPARISON
: IS MADE TO CHECK THE DATA RESULTS.
*****
: TEST 171 TEST MODE 0 W/ SWAB INST.
*****
TS171: INC (R2) ;UPDATE TEST NUMBER
      CMP #171,(R2) ;SEQUENCE ERROR?
      BNE TS172-10 ;BR TO ERROR HALT ON SEQ ERROR
      MOV #177400,RO ;MOVE TEST PATTERN TO RO
      SWAB RO ;TRY SWAB MODE 0
      BMI SBO
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==--
      ; CONDITIONAL BRANCH INST. AND <====
      ; REPLACE THE MOVE INSTRUCTION <--==
      ; WHICH FOLLOWS W/ 773 < ---
      ; MOVE TO MAILBOX # ***** 373 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;SWAB DID NOT SET CC'S CORRECT
```


5294 015350 022700 000377
5295 015354 001404

SBO: CMP #377,R0 ;CHECK RESULT
BEQ TS172

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 764 <====
; MOVE TO MAILBOX # ***** 374 *****
; SET MSGTYP TO FATAL ERROR
; RESULT OF SWAB MODE 0 FAILED
; OR SEQUENCE ERROR

5300 015356 012742 000374
5301 015362 005242
5302 015364 000000

MOV #374,-(R2)
INC -(R2)
HALT

: THIS TEST VERIFIES MODE 1 SWAB INSTRUCTION. THE TEST
: PATTERN IS MOVED TO LOC 0. R0 IS CLEARED AND USED AS THE ADDRESSING
: REGISTER IN THE MODE 1 SWAB. THE DATA RESULTS ARE CHECKED WITH
: A COMPARE.
:

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: TEST 172 TEST MODE 1 W/ SWAB INST

5315 015366 005212
5316 015370 022712 000172
5317 015374 001011
5318 015376 012737 125652 000000
5319 015404 005000
5320 015406 000310
5321 015410 022737 125253 000000
5322 015416 001404

TS172: INC (R2) ;UPDATE TEST NUMBER
CMP #172,(R2) ;SEQUENCE ERROR?
BNE TS173-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #125652,@#0 ;MOVE TEST PATTERN TO LOC. 0
CLR R0 ;R0=0
SWAB (R0) ;TRY SWAB MODE 1
CMP #125253,@#0 ;CHECK RESULT
BEQ TS173

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 766 <
; MOVE TO MAILBOX # ***** 375 *****
; SET MSGTYP TO FATAL ERROR
; RESULT OF SWAB MODE 1 FAILED
; OR SEQUENCE ERROR

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5327 015420 012742 000375
5328 015424 005242
5329 015426 000000
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5343 015430 005212
5344 015432 022712 000173
5345 015436 001020
5346 015440 012737 125152 000000
5347 015446 005000
5348 015450 000320
5349 015452 022737 065252 000000
5350 015460 001404
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5355 015462 012742 000376
5356 015466 005242
5357 015470 000000
5358 015472 162700 000002
5359 015476 001404
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5364 015500 012742 000377
5365 015504 005242
5366 015506 000000
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5380 015510 005212
5381 015512 022712 000174
5382 015516 001011
5383 015520 012737 000377 000000
5384 015526 000337 000000
5385 015532 022737 177400 000000
5386 015540 001404

```

```

:*****
:
: THIS TEST VERIFIES MODE 2 SWAB INSTRUCTION. THE TEST
: PATTERN IS MOVED TO LOC 0. R0 IS CLEARED AND USED AS THE MODE
: 2 ADDRESSING REGISTER. THE RESULTS ARE CHECKED WITH A COMPARE.
: R0 IS CHECKED FOR PROPER DECREMENTING.
:*****

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```

:TEST 173 TEST MODE 2 W/ SWAB INST
:*****

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TS173: INC (R2) ;UPDATE TEST NUMBER
CMP #173,(R2) ;SEQUENCE ERROR?
BNE TS174-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #125152,@#0 ;MOVE TEST PATTERN TO LOC. 0
CLR R0 ;R0=0
SWAB (R0)+ ;TRY SWAB MODE 2
CMP #65252,@#0 ;CHECK RESULT
BEQ SB2

```

```

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <== -
: CONDITIONAL BRANCH INST. AND <== =
: REPLACE THE MOVE INSTRUCTION <==--
: WHICH FOLLOWS W/ 766 <==--

```

```

MOV #376,-(R2) ;MOVE TO MAILBOX # ***** 376 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;RESULT OF SWAB MODE 0 FAILED
SB2: SUB #2,R0 ;CHECK EFFECT OF REG.
BEQ TS174

```

```

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--==
: CONDITIONAL BRANCH INST. AND <- -
: REPLACE THE MOVE INSTRUCTION <- --
: WHICH FOLLOWS W/ 757 <- --

```

```

MOV #377,-(R2) ;MOVE TO MAILBOX # ***** 377 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;REGISTER VALUE INCORRECT
; OR SEQUENCE ERROR

```

```

:*****
:
: THIS TEST VERIFIES MODE 3 SWAB INSTRUCTION. THE TEST
: PATTERN IS MOVED TO LOC 0. A MODE 3 SWAB INSTRUCTION IS EXECUTED
: USING R7 AS THE ADDRESSING REGISTER. A COMPARE VERIFIES THE
: DATA RESULTS.
:*****

```

```

:TEST 174 TEST MODE 3 W/SWAB INST.
:*****

```

```

TS174: INC (R2) ;UPDATE TEST NUMBER
CMP #174,(R2) ;SEQUENCE ERROR?
BNE TS175-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #377,@#0 ;MOVE TEST PATTERN TO LOC. 0
SWAB @#0 ;TRY SWAB W/ MODE 3
CMP #177400,@#0 ;CHECK RESULT
BEQ TS175

```

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T174 TEST MODE 3 W/SWAB INST.

D 9

SEQ 0107

5387
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5391 015542 012742 000400
5392 015546 005242
5393 015550 000000
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MOV #400,-(R2)
INC -(R2)
HALT

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 766 <====
: MOVE TO MAILBOX # ***** 400 *****
: SET MSGTYP TO FATAL ERROR
: RESULT OF SWAB INCORRECT
: OR SEQUENCE ERROR

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015552 005212
015554 022712 000175
015560 001020
015562 012737 125652 000000
015570 012700 000002
015574 000340
015576 022737 125253 000000
015604 001404

015606 012742 000401
015612 005242
015614 000000
015616 005700
015620 001404

015622 012742 000402
015626 005242
015630 000000

```
.....
: THIS TEST VERIFIES MODE 4 SWAB INSTRUCTIONS. THE DATA
: IS MOVED TO LOC 0. R0 IS SET TO 2 AND USED AS THE MODE 4 ADDRESSING
: REGISTER. THE DATA IS CHECKED WITH A COMPARE AND R0 IS CHECKED
: FOR PROPER DECREMENTING.
:
:*****
: TEST 175 TEST MODE 4 W/ SWAB INST
:*****
TS175: INC (R2) ;UPDATE TEST NUMBER
CMP #175,(R2) ;SEQUENCE ERROR?
BNE TS176-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #125652,@#0 ;MOVE TEST PATTERN TO LOC. 0
MOV #2,R0 ;SET UP REGISTER POINTER
SWAB -(R0) ;TRY SWAB MODE 4
CMP #125253,@#0 ;CHECK RESULT
BEQ SB4
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 765 <
MOV #401,-(R2) ;MOVE TO MAILBOX # ***** 401 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;RESULT OF SWAB INCORRECT
SB4: TST R0 ;CHECK EFFECT ON REG.
BEQ TS176
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 757 <
MOV #402,-(R2) ;MOVE TO MAILBOX # ***** 402 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;REGISTER VALUE INCORRECT
; OR SEQUENCE ERROR
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015632 005212
015634 022712 000176
015640 001021
015642 012700 015720
015646 012767 125125 000040
015654 000350
015656 022767 052652 000030
015664 001404

015666 012742 000403
015672 005242
015674 000000
015676 020027 015716
015702 001406

015704
015704 012742 000404
015710 005242
015712 000000

015714 000000
015716 015714

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.....  
: THIS TEST VERIFIES MODE 5 SWAB INSTRUCTION. THE TEST USES  
: TWO LOCATIONS FOLLOWING THE TEST CODE. SB5X HOLDS THE DATA;  
: SB5XAD IS A POINTER TO THE DATA LOCATION. THE DATA IS MOVED TO  
: SB5X AND RO IS SET TO TWO PLUS THE ADDRESS OF SB5XAD. FOLLOWING  
: THE MODE 5 SWAB SB5X IS CHECKED FOR THE PROPER DATA. RO IS  
: CHECKED TO SEE THAT IT WAS DECREMENTED PROPERLY.  
:.....  
: TEST 176 TEST MODE 5 W/ SWAB INST.  
:.....  
S176: INC (R2) ;UPDATE TEST NUMBER  
CMP #176,(R2) ;SEQUENCE ERROR?  
BNE SB5 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #SB5XAD+2,RO ;SET UP POINTER TO WORK LOCATION  
MOV #125125,SB5X ;MOVE PATTERN TO WORK LOCATION  
SWAB @-(RO) ;TRY SWAB MODE 5  
CMP #52652,SB5X ;CHECK RESULT  
BEQ SB5A  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF TH; <-  
: CONDITIONAL BRANCH INST. AND <-  
: REPLACE THE MOVE INSTRUCTION <-  
: WHICH FOLLOWS W/ 765 <-  
  
MOV #403,-(R2) ;MOVE TO MAILBOX # ***** 403 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF SWAB INCORRECT  
SB5A: CMP RO,#SB5XAD ;CHECK RESULT OF REG.  
BEQ TS177  
  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-  
: CONDITIONAL BRANCH INST. AND <-  
: REPLACE THE MOVE INSTRUCTION <-  
: WHICH FOLLOWS W/ 756 <-  
  
SB5: MOV #404,-(R2) ;MOVE TO MAILBOX # ***** 404 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;REGISTER VALUE INCORRECT  
; OR SEQUENCE ERROR  
;WORK LOCATION  
SB5X: 0  
SB5XAD: SB5X
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5489 015722 022712 000177
5490 015726 001013
5491 015730 012767 125125 000030
5492 015736 012700 015760
5493 015742 000360 000006
5494 015746 022760 052652 000006
5495 015754 001405
5496
5497
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5500 015756
5501 015756 012742 000405
5502 015762 005242
5503 015764 000000
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5505 015766 000000
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```
.....  
: THIS TEST VERIFIES MODE 6 SWAB INSTRUCTION. THIS TEST  
: USES A WORK LOCATION (SB6X) FOLLOWING THE TEST CODE. TEST DATA  
: IS LOADED INTO THE WORK LOCATION. R0, THE ADDRESSING REGISTER  
: IS LOADED WITH 6 LESS THEN THE ADDRESS OF THE WORK LOCATION.  
: THE MODE 6 SWAB IS EXECUTED WITH A +6 OFFSET. THE DATA IS  
: VERIFIED WITH A COMPARE.  
: .....
```

```
TEST 177 TEST MODE 6 W/ SWAB INST.  
.....  
TS177: INC (R2) ;UPDATE TEST NUMBER  
CMP #177,(R2) ;SEQUENCE ERROR?  
BNE SB6 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #125125,SB6X ;MOVE PATTERN TO WORK LOCATION  
MOV #SB6X-6,R0 ;MOVE OFFSET POINTER TO R0  
SWAB 6(R0) ;TRY SWAB W/ MODE 6  
CMP #52652,6(R0) ;CHECK RESULT  
BEQ TS200  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 764 <====
```

```
SB6: MOV #405,-(R2) ;MOVE TO MAILBOX # ***** 405 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF SWAB INCORRECT  
; OR SEQUENCE ERROR  
SB6X: 0 ;WORK LOCATION
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*****  
: THIS TEST VERIFIES MODE 7 SWAB INSTRUCTION. THIS TEST  
: USES TWO LOCATIONS FOLLOWING THE TEST CODE: A WORK LOCATION  
: (SB7X) AND A POINTER TO THE WORK LOCATION (SB7XAD). DATA IS MOVED  
: TO THE WORK LOCATION. R0 IS LOADED WITH 72 LESS THAN THE ADDRESS  
: OF THE ADDRESS POINTER. THE DATA IS SWAB'ED USING A MODE 7  
: INSTRUCTION WITH AN OFFSET OF +72. THE DATA IS VERIFIED WITH A  
: COMPARE.  
*****  
: TEST 200 TEST MODE 7 W/ SWAB INST.  
*****  
TS200: INC (R2) ;UPDATE TEST NUMBER  
CMP #200,(R2) ;SEQUENCE ERROR?  
BNE SB7 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #177400,SB7X ;MOVE PATTERN TO WORK LOCATION  
MOV #SB7XAD-72,R0 ;MOVE OFFSET POINTER TO R0  
SWAB @72(R0) ;TRY SWAB MODE 7  
CMP @72(R0),#377 ;CHECK RESULTS  
BEQ TS201  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 764 <====  
SB7: MOV #406,-(R2) ;MOVE TO MAILBOX # ***** 406 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF SWAB INCORRECT  
: OR SEQUENCE ERROR  
SB7x: 0 ;WORK LOCATION  
SB7xAD: SB7X ;POINTER TO WORK LOCATION
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.....
: THIS TEST VERIFIES ALL LEGAL MODES OF THE JMP INSTRUCTION.
: BECAUSE OF THE NATURE OF THE INSTRUCTION UNDER TEST, THIS TEST
: UTILIZES SEVERAL DIFFERENT TECHNIQUES. THE CODE IS NOT EXECUTED
: IN A LINEAR FASHION. THE DIFFERENT MODES ARE EXECUTED IN ORDER
: FROM 1-7; HOWEVER, THE CODE IS ARRANGED SO THAT CONTROL LEAP
: FROGS THRU THE TEST CODE. THE ORDER OF APPEARANCE OF THE CODE
: IS:
:       JMP MODE 1
:       JMP MODE 3
:       JMP MODE 2
:       JMP MODE 4
:       JMP MODE 6
:       JMP MODE 5
:       JMP MODE 7
: AN INTERNAL SEQUENCE TEST (JMPSEQ) IS USED TO INSURE THAT THE
: JUMPS ARE OCCURRING IN THE PROGRAMMED SEQUENCE.
: THE TEST IS MADE UP OF SEVERAL BLOCKS OF CODE. EACH CODE
: BEGINS WITH A LABEL WHICH INDICATES THE MODE BEING EXECUTED IN
: THAT BLOCK. A SIMPLE PROCEDURE IS FOLLOWED IN EACH BLOCK. FOR
: EXAMPLE THE CODE BEGINNING AT JMP3 WILL FIRST COMPARE THE RESULTS
: OF THE PREVIOUS MODE 2 JUMP. (ANY REGISTER CHANGES ARE VERIFIED
: AND THE SEQUENCE CHECK IS MADE). THEN THE REGISTERS ARE SETUP
: FOR A MODE 3 JUMP TO THE NEXT TEST BLOCK (HERE, JMP4), THE SEQUENCE
: CHECKER IS UPDATED AND THE JUMP IS EXECUTED.
: IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
: DETERMINING JUST WHICH MODE FAILED. IF THE SEQUENCE IS CORRECT
: THEN THE ERROR DETECTED WAS A MODE FAILURE (E.G. FAILURE OF THE
: REGISTER TO BE INCREMENTED IN MODE 2 JUMP.)
.....
: TEST 201      TEST THE JMP INSTRUCTION IN ALL MODES
.....
S201:  INC      (R2)           ;UPDATE TEST NUMBER
      CMP      #201,(R2)     ;SEQUENCE ERROR?
      BNE     JMPCK+6        ;BR TO ERROR HALT ON SEQ ERROR
      CLR     JMPSEQ        ;ESTABLISH A SEQUENCE CHECKER
      MOV     #JMP2,R0      ;SET R0=JUMP TARGET
      JMP     (R0)          ;TRY JMP MODE 1
JMP3:  CMP      #.+2,R0      ;CHECK RESULT OF MODE 2 JUMP
      BEQ     JMP3A
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
      ;          CONDITIONAL BRANCH INST. AND
      ;          REPLACE THE MOVE INSTRUCTION
      ;          WHICH FOLLOWS W/ 767
      ;
      MOV     #407,-(R2)    ;MOVE TO MAILBOX # ***** 407 *****
      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      HALT
JMP3A: CMP     JMPSEQ,#1    ;REGISTER VALUE AFTER JMP MODE 2 INCORRECT
      BEQ     JMP3B        ;MAKE SURE JUMPS ARE IN SEQUENCE: JMPSEQ=1?
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
      ;          CONDITIONAL BRANCH INST. AND
      ;          REPLACE THE MOVE INSTRUCTION
      ;          WHICH FOLLOWS W/ 757

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016042	005212		
016044	022712	000201	
016050	001150		
016052	005067	000326	
016056	012700	016136	
016062	000110		
016064	022700	016066	
016070	001404		
016072	012742	000407	
016076	005242		
016100	000000		
016102	026727	000276	000001
016110	001404		

5597	016112	012742	000410		MOV	#410,-(R2)		:MOVE TO MAILBOX # ***** 410 *****
5598	016116	005242			INC	-(R2)		:SET MSGTYP TO FATAL ERROR
5599	016120	000000			HALT			:SHOULD BE HERE FROM JMP MODE 2 ONLY
5600	016122	012700	016134	JMP3B:	MOV	#I JMP4,R0		:POINT R0 TO INDIRECT JMP ADDR.
5601	016126	005267	000252		INC	JMPSEQ		:UPDATE SEQUENCE CHECKER
5602	016132	000130			JMP	@(R0)+		:TRY JMP MODE 3
5603	016134	016166		I JMP4:	JMP4			:ADDRESS INDIRECT JUMP
5604								
5605	016136	005767	000242	JMP2:	TST	JMPSEQ		:CHECK THAT JMPs ARE IN SEQUENCE: JMPSEQ=0?
5606	016142	001404			BEQ	JMP2A		
5607								: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
5608								: CONDITIONAL BRANCH INST. AND <====
5609								: REPLACE THE MOVE INSTRUCTION <====
5610								: WHICH FOLLOWS W/ 742 <====
5611	016144	012742	000411		MOV	#411,-(R2)		:MOVE TO MAILBOX # ***** 411 *****
5612	016150	005242			INC	-(R2)		:SET MSGTYP TO FATAL ERROR
5613	016152	000000			HALT			:SHOULD BE HERE FROM JMP MODE 1 ONLY
5614	016154	005267	000224	JMP2A:	INC	JMPSEQ		:UPDATE SEQUENCE CHECKER
5615	016160	012700	016064		MOV	#JMP3,R0		:SET R0=JUMP TARGET
5616	016164	000120			JMP	(R0)+		:TRY A JUMP MODE 2 TO "JMP3"
5617	016166	022700	016136	JMP4:	CMP	#I JMP4+2,R0		:CHECK RESULT OF REGISTER IN MODE 3 JUMP
5618	016172	001404			BEQ	JMP4A		
5619								: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
5620								: CONDITIONAL BRANCH INST. AND <===
5621								: REPLACE THE MOVE INSTRUCTION <===
5622								: WHICH FOLLOWS W/ 726 <===
5623	016174	012742	000412		MOV	#412,-(R2)		:MOVE TO MAILBOX # ***** 412 *****
5624	016200	005242			INC	-(R2)		:SET MSGTYP TO FATAL ERROR
5625	016202	000000			HALT			:REGISTER VALUE AFTER MODE 3 JUMP INCORRECT
5626	016204	022767	000002 000172	JMP4A:	CMP	#2,JMPSEQ		:CHECK JUMP SEQUENCE: JMPSEQ=2?
5627	016212	001404			BEQ	JMP4B		
5628								: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
5629								: CONDITIONAL BRANCH INST. AND <===
5630								: REPLACE THE MOVE INSTRUCTION <===
5631								: WHICH FOLLOWS W/ 716 <===
5632	016214	012742	000413		MOV	#413,-(R2)		:MOVE TO MAILBOX # ***** 413 *****
5633	016220	005242			INC	-(R2)		:SET MSGTYP TO FATAL ERROR
5634	016222	000000			HALT			:SHOULD BE ONLY FROM MODE 3 JUMP
5635	016224	012700	016274	JMP4B:	MOV	#JMP5+2,R0		:SET UP POINTER TO JUMP TARGET
5636	016230	005267	000150		INC	JMPSEQ		:UPDATE SEQUENCE CHECKER
5637	016234	000140			JMP	-(R0)		:TRY JUMP MODE 4 TO "JMP4"
5638								
5639	016236	022767	000004 000140	JMP6:	CMP	#4,JMPSEQ		:CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=4?
5640	016244	001404			BEQ	JMP6A		
5641								: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
5642								: CONDITIONAL BRANCH INST. AND <===
5643								: REPLACE THE MOVE INSTRUCTION <===
5644								: WHICH FOLLOWS W/ 701 <===
5645	016246	012742	000414		MOV	#414,-(R2)		:MOVE TO MAILBOX # ***** 414 *****
5646	016252	005242			INC	-(R2)		:SET MSGTYP TO FATAL ERROR
5647	016254	000000			HALT			:SHOULD BE HERE ONLY FROM MODE 5 JUMP
5648	016256	012700	016724	JMP6A:	MOV	#JMP7+376,R0		:SET UP OFFSET POINTER TO JUMP TARGET
5649	016262	005267	000116		INC	JMPSEQ		:UPDATE JUMP SEQUENCE
5650	016266	000160	177402		JMP	-376(R0)		:TRY MODE 6 JUMP
5651								
5652	016272	022767	000003 000104	JMP5:	CMP	#3,JMPSEQ		:CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=3?

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5653 016300 001404          BEQ      JMP5A          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5654                                     ;          CONDITIONAL BRANCH INST. AND <====
5655                                     ;          REPLACE THE MOVE INSTRUCTION <====
5656                                     ;          WHICH FOLLOWS W/ 663 <====
5657                                     ;
5658 016302 012742 000415    MOV      #415,-(R2)      ;MOVE TO MAILBOX # ***** 415 *****
5659 016306 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5660 016310 000000          HALT                    ;SHOULD ONLY BE HERE FROM MODE 4 JUMP
5661 016312 012700 016326    JMP5A:  MOV      #I JMP5+2,R0 ;SET UP POINTER TO INDIRECT JUMP ADDR.
5662 016316 005267 000062          INC      JMPSEQ        ;UPDATE JUMP SEQUENCE
5663 016322 000150          JMP      @-(R0)        ;TRY JUMP MODE 5 TO 'JMP6'
5664 016324 016236          IJMP5: JMP6           ;INDIRECT ADDRESS POINTER
5665
5666 016326 022767 000005 000050 JMP7:   CMP      #5,JMPSEQ ;CHECK JUMPS IN SEQUENCE: JMPSEQ=5?
5667 016334 001404          BEQ      JMP7A
5668                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5669                                     ;          CONDITIONAL BRANCH INST. AND <====
5670                                     ;          REPLACE THE MOVE INSTRUCTION <====
5671                                     ;          WHICH FOLLOWS W/ 645 <====
5672 016336 012742 000416    MOV      #416,-(R2)      ;MOVE TO MAILBOX # ***** 416 *****
5673 016342 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5674 016344 000000          HALT                    ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
5675 016346 012700 016372    JMP7A:  MOV      #I JMP+10,R0 ;SET UP OFFSET POINTER TO INDIRECT ADDR.
5676 016352 005267 000026          INC      JMPSEQ        ;UPDATE JUMP SEQUENCE
5677 016356 000170          JMP      @-10(R0)      ;TRY MODE 7 JUMP
5678 016362 016364          IJMP:   JMPCK         ;INDIRECT ADDRESS
5679
5680 016364 026727 000014 000006 JMPCK:  CMP      JMPSEQ,#6 ;CHECK JUMPS IN SEQUENCE: JMPSEQ
5681 016372 001405          BEQ      TS202
5682                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
5683                                     ;          CONDITIONAL BRANCH INST. AND <
5684                                     ;          REPLACE THE MOVE INSTRUCTION <--
5685                                     ;          WHICH FOLLOWS W/ 626 <-
5686 016374 012742 000417    MOV      #417,-(R2)      ;MOVE TO MAILBOX # ***** 417 *****
5687 016400 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5688 016402 000000          HALT                    ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
5689                                     ; OR SEQUENCE ERROR
5690 016404 000000          JMPSEQ: 0

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016406 005212
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016414 001001
016416 000402
016420 000137 017054
016424 012706 001000
016430 012700 016536
016434 005037 017034
016440 005001
016442 005101
016444 004110
016446
016446 012742 000420
016452 005242
016454 000000
016456 022737 000001 017034
016464 001014
016466 020127 016620
016472 001011
016474 022706 000776
016500 001006
016502 022716 125252
016506 001003
016510 022700 016460
016514 001404
016516
016516 012742 000421
016522 005242

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*****
: THIS TEST VERIFIES ALL LEGAL MODES OF THE JSR INSTRUCTION.
: THE CONCEPT OF LEAP FROGGING AND SEQUENCE CHECKING (JSRSEQ) IS
: IDENTICAL TO THAT USED IN JMP TEST (SEE PREVIOUS TEST). EACH
: BLOCK OF CODE VERIFIES THE PREVIOUS JSR BY CHECKING THE SEQUENCE,
: CHECKING THAT THE PC WAS SAVED IN THE SPECIFIED REGISTER, CHECKING
: THAT THE SP WAS DECREMENTED, CHECKING THAT THE REGISTER WAS
: SAVED ON THE STACK, AND FINALLY CHECKING THAT ANY MODE ADDRESS
: REGISTER ALTERATIONS (E.G. INCREMENT REGISTER IN MODE 2) WERE
: SUCCESSFUL. R1 IS USED AS THE REGISTER IN ALL JSR INSTRUCTIONS.
: IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
: DETERMINING JUST WHICH MODE FAILED. IF THE SEQUENCE IS CORRECT
: THEN THE ERROR DETECTED WAS A FUNCTIONAL FAILURE (E.G., INCORRECT
: REGISTER SAVED).
*****
: TEST 202 TEST JSR INSTRUCTION W/ ALL MODES
*****
TS202: INC (R2) ;UPDATE TEST NUMBER
CMP #202,(R2) ;SEQUENCE ERROR?
BNE JSR0 ;BR TO ERROR HALT ON SEQ ERROR
BR JSR1
JSR0: JMP @#JSRCK1

JSR1: MOV #STBOT,R6 ;SET STACK POINTER
MOV #JSR2,R0 ;SET TARGET ADDRESS
CLR @#JSRSEQ ;INITIALIZE SEQUENCE CHECKER
CLR R1 ;INITIALIZE R1
COM R1
JSR R1,(R0) ;TRY JSR MODE 1
; TO SCOPE: REPLACE THE MOVE INSTRUCTION <
; FOLLOWING W/ 774 <

JSR1A: MOV #420,-(R2) ;MOVE TO MAILBOX # ***** 420 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;JSR MODE 1 FAILED

JSR3: CMP #1,@# JSRSEQ ;CHECK SEQUENCE: JSRSEQ-1?
BNE JSR3A ;BRANCH IF OUT OF SEQUENCE
CMP R1,#JSR4 ;PROPER PC SAVED?
BNE JSR3A ;BRANCH IF PC WRONG
CMP #STBOT-2,R6 ;STACK POINTER DECREMENTED?
BNE JSR3A ;BRANCH IF SP WRONG
CMP #125252,(R6) ;REG SAVED ON STACK?
BNE JSR3A ;BRANCH IF REG. NOT SAVED
CMP #JSR3+2,R0 ;MODE 2 INCREMENT CORRECT?
BEQ JSR3B
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
; CONDITIONAL BRANCH INST. AND <==
; REPLACE THE MOVE INSTRUCTION <==
; WHICH FOLLOWS W/ 737 <==

JSR3A: MOV #421,-(R2) ;MOVE TO MAILBOX # ***** 421 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR

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5747	016524	000000			HALT				;JSR MODE 3 MALFUNCTIONED
5748	016526	005237	017034		JSR3B: INC	@#JSRSEQ			;UPDATE SEQUENCE CHECKER
5749	016532	004137	016620		JSR	R1,@#JSR4			;TRY JSR MODE 4
5750									
5751	016536	005737	017034		JSR2: TST	@#JSRSEQ			;CHECK SEQUENCE: JSRSEQ=0?
5752	016542	001011			BNE	JSR2A			;BRANCH IF OUT OF SEQUENCE
5753	016544	020127	016446		CMP	R1,#JSR1A			;PROPER PC SAVED?
5754	016550	001006			BNE	JSR2A			;BRANCH IF PC WRONG
5755	016552	022706	000776		CMP	#STBOT-2,R6			;R6 DECREMENT?
5756	016556	001003			BNE	JSR2A			;BRANCH IF R6 IS INCORRECT
5757	016560	021627	177777		CMP	(R6),#-1			;REGISTER SAVED?
5758	016564	001404			BEQ	JSR2B			
5759									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5760									; CONDITIONAL BRANCH INST. AND <====
5761									; REPLACE THE MOVE INSTRUCTION <====
5762									; WHICH FOLLOWS W/ 713 <====
5763	016566				JSR2A: MOV	#422,-(R2)			;MOVE TO MAILBOX # ***** 422 *****
5764	016566	012742	000422		INC	-(R2)			;SET MSGTYP TO FATAL ERROR
5765	016572	005242			HALT				;JSR MODE 1 MALFUNCTIONED
5766	016574	000000			JSR2B: MOV	#STBOT,R6			;INITIALIZE R6
5767	016576	012706	001000		MOV	#125252,R1			;INITIALIZE R1
5768	016602	012701	125252		INC	@#JSRSEQ			;UPDATE SEQUENCE CHECKER
5769	016606	005237	017034		MOV	#JSR3,R0			;SET TARGET ADDRESS
5770	016612	012700	016456		JSR	R1,(R0)+			;TRY JSR MODE 2
5771	016616	004120							
5772									
5773	016620	022737	000002	017034	JSR4: CMP	#2,@#JSRSEQ			;CHECK SEQUENCE: JSRSEQ=2?
5774	016626	001003			BNE	JSR4A			;BRANCH IF OUT OF SEQUENCE
5775	016630	022701	016536		CMP	#JSR2,R1			;PROPER PC SAVED?
5776	016634	001404			BEQ	JSR4B			
5777									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5778									; CONDITIONAL BRANCH INST. AND <====
5779									; REPLACE THE MOVE INSTRUCTION <====
5780									; WHICH FOLLOWS W/ 667 <====
5781	016636				JSR4A: MOV	#423,-(R2)			;MOVE TO MAILBOX # ***** 423 *****
5782	016636	012742	000423		INC	-(R2)			;SET MSGTYP TO FATAL ERROR
5783	016642	005242			HALT				;JSR MODE 3 MALFUNCTIONED
5784	016644	000000			JSR4B: INC	@#JSRSEQ			;UPDATE SEQUENCE CHECKER
5785	016646	005237	017034		MOV	#JSR5+2,R0			;SET TARGET ADDRESS
5786	016652	012700	016726		JSR	R1,-(R0)			;TRY JSR MODE 4
5787	016656	004140							
5788									
5789	016660	022767	000004	000146	JSR6: CMP	#4,JSRSEQ			;CHECK SEQUENCE: JSRSEQ=4?
5790	016666	001006			BNE	JSR6A			;BRANCH IF OUT OF SEQUENCE
5791	016670	022701	016772		CMP	#JSR7,R1			;PROPER PC SAVED?
5792	016674	001003			BNE	JSR6A			;BRANCH IF PC WRONG
5793	016676	022700	017030		CMP	#JSR6AD,R0			;MODE 5 REGISTER CORRECT?
5794	016702	001404			BEQ	JSR6B			
5795									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5796									; CONDITIONAL BRANCH INST. AND <====
5797									; REPLACE THE MOVE INSTRUCTION <====
5798									; WHICH FOLLOWS W/ 644 <====
5799	016704				JSR6A: MOV	#424,-(R2)			;MOVE TO MAILBOX # ***** 424 *****
5800	016704	012742	000424		INC	-(R2)			;SET MSGTYP TO FATAL ERROR
5801	016710	005242			HALT				;JSR MODE 5 FAILED
5802	016712	000000							

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5867 017064 005212
5868 017066 022712 000203
5869 017072 001016
5870 017074 012706 001000
5871 017100 012746 052525
5872 017104 012700 017122
5873 017110 000200
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5876 017112 012742 000430
5877 017116 005242
5878 017120 000000
5879 017122 022700 052525
5880 017126 001404
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5885 017130 012742 000431
5886 017134 005242
5887 017136 000000
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*****  
: THIS TEST VERIFIES THE RTS INSTRUCTION. THE STACK POINTER  
: IS INITIALIZED AND A TEST PATTERN STORED ON STACK. R0 IS LOADED  
: WITH RETURN ADDRESS. AN RTS IS EXECUTED, AND, AT THE TARGET  
: ADDRESS, A CHECK IS MADE THAT R0 WAS PROPERLY RESTORED FROM THE  
: STACK.  
:*****  
: TEST 203 TEST RTS INSTRUCTION  
:*****  
TS203: INC (R2) ;UPDATE TEST NUMBER  
CMP #203,(R2) ;SEQUENCE ERROR?  
BNE TS204-0 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #STBOT,R6 ;INITIALIZE STACK POINTER  
MOV #52525,-(R6) ;INITIALIZE TOP OF STACK  
MOV #RTS1,R0 ;INITIALIZE RETURN REGISTER  
RTS R0 ;TRY RTS THROUGH R0  
; TO SCOPE: REPLACE THE MOVE INSTRUCTION <===  
; FOLLOWING W/ 770 <===  
MOV #430,-(R2) ;MOVE TO MAILBOX # ***** 430 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RTS FAILED  
RTS1: CMP #52525,R0 ;CHECK THAT R0 RESTORED FROM STACK  
BEQ TS204  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
; CONDITIONAL BRANCH INST. AND <  
; REPLACE THE MOVE INSTRUCTION <=  
; WHICH FOLLOWS W/ 761 <  
MOV #431,-(R2) ;MOVE TO MAILBOX # ***** 431 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RTS MALFUNCTIONED  
; OR SEQUENCE ERROR
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5906 017140 005212
5907 017142 022712 000204
5908 017146 001022
5909 017150 000277
5910 017152 000251
5911 017154 012700 100000
5912 017160 101402
5913 017162 102401
5914 017164 100404
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5919 017166
5920 017166 012742 000432
5921 017172 005242
5922 017174 000000
5923
5924 017176 000277
5925 017200 000244
5926 017202 012700 000000
5927 017206 101002
5928 017210 102401
5929 017212 100004
5930
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5932
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5934 017214
5935 017214 012742 000433
5936 017220 005242
5937 017222 000000
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5942 017224 005212
5943 017226 022712 000205
5944 017232 001024

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.....  
: THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF A GROUP  
: OF FOUR INSTRUCTIONS. THE GROUP CONSISTS OF THE INSTRUCTIONS:  
: MOV, BIC, BIT, AND BIS. THESE INSTRUCTIONS ARE SIMILAR IN THE  
: WAY THEY EFFECT THE C AND V BITS. THEY ALL LEAVE THE V-BIT  
: CLEAR AND THE C-BIT UNAFFECTED.  
: THE TEST PROCEDURE IS AS FOLLOWS: THE N, Z, AND V BITS  
: ARE LOADED WITH THE COMPLEMENT OF THE EXPECTED RESULTS, THE C-BIT  
: IS LOADED WITH THE DESIRED RESULT. THE INSTRUCTION IS EXECUTED  
: WITH DIFFERENT DATA PATTERNS AND THE RESULTS ARE VERIFIED WITH  
: A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS. THE DATA IS CHOSEN  
: TO PRODUCT ALL POSSIBLE COMBINATIONS OF THE C AND V BITS.  
:.....  
: TEST 204 TEST MOV INSTRUCTION  
:.....  
TS204: INC (R2) ;UPDATE TEST NUMBER  
CMP #204,(R2) ;SEQUENCE ERROR?  
BNE TS205-10 ;BR TO ERROR HALT ON SEQ ERROR  
SCC ;CC=0110  
+CLM.CLC  
MOV #100000,R0 ;CC=1000  
BLOS MOV1  
BVS MOV1  
BMI MOV2  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
; CONDITIONAL BRANCH INST. AND <  
; REPLACE THE MOVE INSTRUCTION <  
; WHICH FOLLOWS W/ 770 <  
MOV1: MOV #432,-(R2) ;MOVE TO MAILBOX # ***** 432 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MOV DID NOT SET CC'S CORRECTLY  
MOV2: SCC ;CC=1011  
CLZ  
MOV #0,R0 ;CC=0101  
BHI MOV3 ;C OR Z = 0?  
BVS MOV3 ;V=1?  
BPL TS205  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <  
; CONDITIONAL BRANCH INST. AND <  
; REPLACE THE MOVE INSTRUCTION <-  
; WHICH FOLLOWS W/ 755 <-  
MOV3: MOV #433,-(R2) ;MOVE TO MAILBOX # ***** 433 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MOV DID NOT SET CC'S CORRECTLY  
; OR SEQUENCE ERROR  
:.....  
: TEST 205 TEST BIT INSTRUCTION  
:.....  
TS205: INC (R2) ;UPDATE TEST NUMBER  
CMP #205,(R2) ;SEQUENCE ERROR?  
BNE TS206-10 ;BR TO ERROR HALT ON SEQ ERROR
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5945 017234 012700 100001      MOV      #100001,R0
5946 017240 000277                SCC                      ;CC=0110
5947 017242 000251      +CLN!CLC
5948 017244 032700 100000      BIT      #100000,R0      ;CC=1000
5949 017250 101402      BLOS    BIT1
5950 017252 102401      BVS     BIT1
5951 017254 100404      BMI     BIT2
5952                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5953                                ; CONDITIONAL BRANCH INST. AND <====
5954                                ; REPLACE THE MOVE INSTRUCTION <====
5955                                ; WHICH FOLLOWS W/ 766 <====
5956 017256                BIT1:
5957 017256 012742 000434      MOV      #434,-(R2)      ;MOVE TO MAILBOX # ***** 434 *****
5958 017262 005242                INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5959 017264 000000                HALT                    ;BIT DID NOT SET CC'S CORRECTLY
5960
5961 017266 000277                BIT2:      SCC                      ;CC=1011
5962 017270 000244                CLZ
5963 017272 032700 077776      BIT      #77776,R0      ;CC=0101
5964 017276 101002      BHI     BIT3
5965 017300 102401      BVS     BIT3
5966 017302 100004      BPL     TS206
5967                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
5968                                ; CONDITIONAL BRANCH INST. AND <====
5969                                ; REPLACE THE MOVE INSTRUCTION <====
5970                                ; WHICH FOLLOWS W/ 753 <====
5971 017304                BIT3:
5972 017304 012742 000435      MOV      #435,-(R2)      ;MOVE TO MAILBOX # ***** 435 *****
5973 017310 005242                INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5974 017312 000000                HALT                    ;BIT DID NOT SET CC'S CORRECTLY
5975                                ; OR SEQUENCE ERROR
5976
5977 :*****
5978 :TEST 206      TEST BIC INSTRUCTION
5979 :*****
5979 017314 005212      TS206:  INC      (R2)          ;UPDATE TEST NUMBER
5980 017316 022712 000206      CMP      #206,(R2)      ;SEQUENCE ERROR?
5981 017322 001024                BNE     TS207-10        ;BR TO ERROR HALT ON SEQ ERROR
5982 017324 012700 177777      MOV      #177777,R0
5983 017330 000277                SCC                      ;CC=0110
5984 017332 000251      +CLN!CLC
5985 017334 042700 077777      BIC      #77777,R0      ;CC=1000
5986 017340 101402      BLOS    BIC1
5987 017342 102401      BVS     BIC1
5988 017344 100404      BMI     BIC2
5989                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
5990                                ; CONDITIONAL BRANCH INST. AND <
5991                                ; REPLACE THE MOVE INSTRUCTION <
5992                                ; WHICH FOLLOWS W/ 766 <
5993 017346                BIC1:
5994 017346 012742 000436      MOV      #436,-(R2)      ;MOVE TO MAILBOX # ***** 436 *****
5995 017352 005242                INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
5996 017354 000000                HALT                    ;BIC DID NOT SET CC'S CORRECTLY
5997 017356 000277                BIC2:      SCC                      ;CC=1011
5998 017360 000244                CLZ
5999 017362 042700 100000      BIC      #100000,R0      ;CC=0101
6000 017366 101002      BHI     BIC3

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6001 017370 102401
6002 017372 100004
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6007 017374
6008 017374 012742 000437
6009 017400 005242
6010 017402 000000
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6015 017404 005212
6016 017406 022712 000207
6017 017412 001025
6018 017414 005000
6019 017416 000277
6020 017420 000251
6021 017422 052700 000000
6022 017426 103403
6023 017430 102402
6024 017432 100401
6025 017434 001404
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6030 017436
6031 017436 012742 000440
6032 017442 005242
6033 017444 000000
6034 017446 000277
6035 017450 000250
6036 017452 052700 177777
6037 017456 103003
6038 017460 102402
6039 017462 001401
6040 017464 100404
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6042
6043
6044
6045 017466
6046 017466 012742 000441
6047 017472 005242
6048 017474 000000
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BVS BIC3
BPL TS207
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 753 <====
BIC3:
MOV #437,-(R2) ;MOVE TO MAILBOX # ***** 437 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;BIC DID NOT SET CC'S CORRECTLY
; OR SEQUENCE ERROR
:*****
;TEST 207 TEST BIS INSTRUCTION
:*****
TS207: INC (R2) ;UPDATE TEST NUMBER
CMP #207,(R2) ;SEQUENCE ERROR?
BNE TS210-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
SCC ;CC=1010
+CLN!CLC
BIS #0,R0 ;CC=0100 R0=0
BCS BIS1
BVS BIS1
BMI BIS1
BEQ BIS2
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 766 <
BIS1:
MOV #440,-(R2) ;MOVE TO MAILBOX # ***** 440 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;BIS DID NOT SET CC'S CORRECTLY
BIS2: SCC ;CC=0111
CLN
BIS #177777,R0 ;CC=1001
BCL BIS3
BVS BIS3
BEQ BIS3
BMI TS210
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 752 <
BIS3:
MOV #441,-(R2) ;MOVE TO MAILBOX # ***** 441 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;BIS DID NOT SET CC'S CORRECTLY
; OR SEQUENCE ERROR

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6065 017476 005212
6066 017500 022712 000210
6067 017504 001037
6068 017506 012700 077777
6069 017512 000257
6070 017514 000264
6071 017516 005200
6072 017520 101402
6073 017522 100001
6074 017524 102404
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6079 017526
6080 017526 012742 000442
6081 017532 005242
6082 017534 000000
6083 017536 052700 077777
6084 017542 000261
6085 017544 000244
6086 017546 005200
6087 017550 100403
6088 017552 102402
6089 017554 103001
6090 017556 001404
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6095 017560
6096 017560 012742 000443
6097 017564 005242
6098 017566 000000
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6100 017570 000277
6101 017572 000241
6102 017574 005200
6103 017576 101402
6104 017600 100401
6105 017602 100004

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:*****
:
: THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE INC AND
: DEC INSTRUCTIONS. THESE INSTRUCTIONS BOTH EFFECT THE C AND V
: BITS THE SAME; THE C-BIT IS LEFT UNCHANGED AND THE V-BIT IS DEPENDENT
: UPON THE DATA RESULTS. THE SAME PROCEDURE IS USED. THE CONDITION
: CODE BITS ARE INITIALIZED, THE INSTRUCTION IS EXECUTED AND THE
: RESULTS ARE VERIFIED WITH A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.
: THIS PROCEDURE IS REPEATED WITH SEVERAL DATA PATTERNS TO PRODUCE
: DIFFERENT COMBINATIONS OF THE C AND V BITS.
:*****
: TEST 210 TEST INC INSTRUCTION
:*****
TS210: INC (R2) ;UPDATE TEST NUMBER
CMP #210,(R2) ;SEQUENCE ERROR?
BNE TS211-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #077777,R0 ;R0=077777
CCC ;CC=0100
SEZ
INC R0 ;CC=1010 R0=10000
BLOS INC1
BPL INC1
BVS INC2
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 767 <
INC1: MOV #442,-(R2) ;MOVE TO MAILBOX # ***** 442 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INC DID NOT SET CC'S CORRECTLY
INC2: BIS #77777,R0 ;R0=177777
SEC ;CC=1011
CLZ
INL R0 ;CC=0101 R0=0
BMI INC3
BVS INC3
BCC INC3
BEQ INC4
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVF INSTRUCTION <--
; WHICH FOLLOWS W/ 752 <--
INC3: MOV #443,-(R2) ;MOVE TO MAILBOX # ***** 443 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INC DID NOT SET CC'S CORRECTLY
INC4: SCC ;CC=1110
CLC
INC R0 ;CC=0000 R0=1
BLOS INC5
BMI INC5
BPL TS211

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CRDB-D DEF11-AA CPU DIAG.
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1211 TEST DEC INSTRUCTION

H 10

6162 017714 012742 000447
6163 017720 005242
6164 017722 000000
6165 017724 042700 077777
6166 017730 000277
6167 017732 000252
6168 017734 005300
6169 017736 100403
6170 017740 001402
6171 017742 102001
6172 017744 103404
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6177 017746
6178 017746 012742 000450
6179 017752 005242
6180 017754 000000
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6182

DEC6: MOV #447,-(R2) ;MOVE TO MAILBOX # ***** 447 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEC DID NOT SET CC'S CORRECTLY
BIC #77777,R0 ;RO=100000
SCC ;CC=0101
*CLN:CLV
DEC R0 ;CC=1011 RO=77777
BMI DEC7 ;CC=0011
BEQ DEC7
BVC DEC7
BCS 15212

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 726 <====

DEC7: MOV #450,-(R2) ;MOVE TO MAILBOX # ***** 450 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DEC DID NOT SET CC'S CORRECTLY
; OR SEQUENCE ERROR

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6196 017756 005212
6197 017760 022712 000212
6198 017764 001007
6199 017766 000277
6200 017770 000244
6201 017772 005000
6202 017774 100403
6203 017776 102402
6204 020000 103401
6205 020002 001404
6206
6207
6208
6209
6210 020004
6211 020004 012742 000451
6212 020010 005242
6213 020012 000000
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6219 020014 005212
6220 020016 022712 000213
6221 020022 001022
6222 020024 000277
6223 020026 000244
6224 020030 005700
6225 020032 100403
6226 020034 102402
6227 020036 103401
6228 020040 001404
6229
6230
6231
6232
6233 020042
6234 020042 012742 000452
6235 020046 005242
6236 020050 000000
6237 020052 005300
6238 020054 000277

.....
: THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE CLR,
: TST, AND SWAB INSTRUCTIONS. THESE THREE INSTRUCTIONS ALL LEAVE
: THE C AND V BITS CLEARED. AGAIN, THE CONDITION CODES ARE PRESET,
: THE INSTRUCTION EXECUTED AND THE RESULTS CHECKED WITH CONDITIONAL
: BRANCH INSTRUCTIONS. THE PROCEDURE IS REPEATED TO PRODUCE OTHER
: COMBINATIONS OF CONDITION CODES.
:

: TEST 212 TEST CLR INSTRUCTION
:

TS212: INC (R2) ;UPDATE TEST NUMBER
CMP #212,(R2) ;SEQUENCE ERROR?
BNE TS213-10 ;BR TO ERROR HALT ON SEQ ERROR
SCC ;CC=1011
CLZ
CLR R0 ;CC=0100 R0=0
BMI CLR1
BVS CLR1
BCS CLR1
BEQ TS213
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
: CONDITIONAL BRANCH INST. AND <--
: REPLACE THE MOVE INSTRUCTION <--
: WHICH FOLLOWS W/ 770 <--
CLR1: MOV #451,-(R2) ;MOVE TO MAILBOX # ***** 451 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CLR DID NOT SET CC'S CORRECTLY
: OR SEQUENCE ERROR

: TEST 213 TEST TST INSTRUCTION
:

TS213: INC (R2) ;UPDATE TEST NUMBER
CMP #213,(R2) ;SEQUENCE ERROR?
BNE TS214-10 ;BR TO ERROR HALT ON SEQ ERROR
SCC ;CC=1011
CLZ
TST R0 ;CC=0100
BMI TEST1
BVS TEST1
BCS TEST1
BEQ TEST2
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
: CONDITIONAL BRANCH INST. AND <--
: REPLACE THE MOVE INSTRUCTION <--
: WHICH FOLLOWS W/ 770 <--
TEST1: MOV #452,-(R2) ;MOVE TO MAILBOX # ***** 452 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;TEST DID NOT SET CC'S CORRECTLY
TEST2: DEC R0 ;MAKE R0 NEGATIVE
SCC ;CC=0111

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6239 020056 000250          CLN
6240 020060 005700          TST      RO      ;CC=1000
6241 020062 101402          BLOS     TEST3
6242 020064 102401          BVS      TEST3
6243 020066 100404          BMI      TS214
6244
6245                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6246                      ; CONDITIONAL BRANCH INST. AND <====
6247                      ; REPLACE THE MOVE INSTRUCTION <====
6248                      ; WHICH FOLLOWS W/ 755 <====
6248 020070
6249 020070 012742 000453      TEST3:  MOV     #453,-(R2) ;MOVE TO MAILBOX # ***** 453 *****
6250 020074 005242          INC     -(R2) ;SET MSGTYP TO FATAL ERROR
6251 020076 000000          HALT    ;TEST DID NOT SET CC'S CORRECTLY
6252                      ; OR SEQUENCE ERROR
6253
6254                      :*****
6255                      :TEST 214      TEST SWAB INSTRUCTION
6256                      :*****
6256 020100 005212          TS214:  INC     (R2) ;UPDATE TEST NUMBER
6257 020102 022712 000214      CMP     #214,(R2) ;SEQUENCE ERROR?
6258 020106 001023          BNE     TS215-10 ;BR TO ERROR HALT ON SEQ ERROR
6259 020110 012700 170000      MOV     #170000,R0 ;R0=170000
6260 020114 000277          SCC     ;CC=0111
6261 020116 000250          CLN
6262 020120 000300          SWAB   RO      ;CC=1000 RO-360
6263 020122 101402          BLOS   SWB1
6264 020124 102401          BVS   SWB1
6265 020126 100404          BMI   SWB2
6266
6267                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6268                      ; CONDITIONAL BRANCH INST. AND <====
6269                      ; REPLACE THE MOVE INSTRUCTION <====
6270                      ; WHICH FOLLOWS W/ 767 <====
6270 020130
6271 020130 012742 000454      SWB1:  MOV     #454,-(R2) ;MOVE TO MAILBOX # ***** 454 *****
6272 020134 005242          INC     -(R2) ;SET MSGTYP TO FATAL ERROR
6273 020136 000000          HALT    ;SWAB DID NOT SET CC'S CORRECTLY
6274 020140 000277          SWB2:  SCC     ;CC=1011
6275 020142 000244          CLZ
6276 020144 000300          SWAB   RO      ;CC=0100 RO-170000
6277 020146 102403          BVS   SWB3
6278 020150 103402          BCS   SWB3
6279 020152 100401          BMI   SWB3
6280 020154 001404          BEQ   TS215
6281
6282                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6283                      ; CONDITIONAL BRANCH INST. AND <====
6284                      ; REPLACE THE MOVE INSTRUCTION <====
6285                      ; WHICH FOLLOWS W/ 754 <====
6285 020156
6286 020156 012742 000455      SWB3:  MOV     #455,-(R2) ;MOVE TO MAILBOX # ***** 455 *****
6287 020162 005242          INC     -(R2) ;SET MSGTYP TO FATAL ERROR
6288 020164 000000          HALT    ;
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6303 020166 005212
6304 020170 022712 000215
6305 020174 001062
6306 020176 012700 040000
6307 020202 000277
6308 020204 062700 030000
6309 020210 101402
6310 020212 102401
6311 020214 100004
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6316 020216
6317 020216 012742 000456
6318 020222 005242
6319 020224 000000
6320 020226 000264
6321
6322 020230 062700 010000
6323 020234 101402
6324 020236 102001
6325 020240 100404
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6330 020242
6331 020242 012742 000457
6332 020246 005242
6333 020250 000000
6334 020252 000257
6335 020254 000270
6336 020256 062700 100000
6337 020262 101002
6338 020264 102001
6339 020266 100004
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6344 020270

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.....
: THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE ADD AND
: ADC INSTRUCTIONS. BOTH OF THESE INSTRUCTIONS HANDLE THE C AND
: V BITS IDENTICALLY. THE PROCEDURE IS TO PRESET THE CONDITION
: CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
: THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
: BRANCHES. THIS PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
: DATA TO PRODUCE EVERY COMBINATION OF C AND V BITS.
.....
: TEST 215 TEST ADD INSTRUCTION
.....
TS215: INC (R2) ;UPDATE TEST NUMBER
CMP #215,(R2) ;SEQUENCE ERROR?
BNE TS216- ;BR TO ERROR HALT ON SEQ ERROR
MOV #40000, ;RO=40000
SCC ;CC=1111
ADD #30000,R0 ;CC=0000 R0=70000
BLOS ADD1
BVS ADD1
BPL ADD2
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 767 <====
ADD1: MOV #456,-(R2) ;MOVE TO MAILBOX # ***** 456 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ADD DID NOT SET CC'S CORRECTLY
ADD2: SEZ ;CC=0100
;CC=1010 40=100000
ADD #10000,R0
BLOS ADD3
BVC ADD3
BMI ADD4
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 755 <====
ADD3: MOV #457,-(R2) ;MOVE TO MAILBOX # ***** 457 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ADD DID NOT SET CC'S CORRECTLY
ADD4: CCC ;CC=1000
SEN
ADD #100000,R0 ;CC=0111 R0=0
BHI ADD5
BVC ADD5
BPL ADD6
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <====
: REPLACE THE MOVE INSTRUCTION <====
: WHICH FOLLOWS W/ 742 <====
ADD5:

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6345 020270 012742 000460      MOV      #460,-(R2)      ;MOVE TO MAILBOX # ***** 460 *****
6346 020274 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6347 020276 000000              HALT                    ;ADD DID NOT SET CC'S CORRECTLY
6348 020300 062700 177777      ADD6:   ADD      #177777,R0 ;CC=1000 R0=177777
6349 020304 101402              BLOS    ADD7
6350 020306 102401              BVS     ADD7
6351 020310 100404              BMI     ADD8
6352                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
6353                                     ; CONDITIONAL BRANCH INST. AND <----
6354                                     ; REPLACE THE MOVE INSTRUCTION <----
6355                                     ; WHICH FOLLOWS W/ 731 <----
6356 020312
6357 020312 012742 000461      ADD7:   MOV      #461,-(R2) ;MOVE TO MAILBOX # ***** 461 *****
6358 020316 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6359 020320 000000              HALT                    ;ADD DID NOT SET CC'S CORRECTLY
6360 020322 000277      ADD8:   SCC
6361 020324 000245              +CLC!CLZ              ;CC=1010 R=0
6362 020326 062700 000001      ADD     #1,R0
6363 020332 102403              BVS     ADD9
6364 020334 103002              BCC     ADD9
6365 020336 100401              BMI     ADD9
6366 020340 001404              BEQ     TS216
6367                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
6368                                     ; CONDITIONAL BRANCH INST. AND <----
6369                                     ; REPLACE THE MOVE INSTRUCTION <----
6370                                     ; WHICH FOLLOWS W/ 715 <----
6371 020342
6372 020342 012742 000462      ADD9:   MOV      #462,-(R2) ;MOVE TO MAILBOX # ***** 462 *****
6373 020346 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6374 020350 000000              HALT                    ;ADD DID NOT SET CC'S CORRECTLY
6375                                     ; OR SEQUENCE ERROR
6376
6377 :*****
6378 :TEST 216 TEST ADC INSTRUCTION
6379 :*****
6380 020352 005212      TS216:  INC      (R2)          ;UPDATE TEST NUMBER
6381 020354 022712 000216      CMP     #216,(R2)      ;SEQUENCE ERROR?
6382 020360 001037              BNE     TS217-10       ;BR TO ERROR HALT ON SEQ ERROR
6383 020362 012700 077777      MOV     #077777,R0
6384 020366 000277              SCC
6385 020370 000252              +CLN!CLV              ;CC=0101
6386 020372 005500              ADC     R0              ;CC=1010
6387 020374 101402              BLOS    ADC1
6388 020376 102001              BVC     ADC1
6389 020400 100404              BMI     ADC2
6390                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
6391                                     ; CONDITIONAL BRANCH INST. AND <----
6392                                     ; REPLACE THE MOVE INSTRUCTION <----
6393                                     ; WHICH FOLLOWS W/ 767 <----
6394 020402
6395 020402 012742 000463      ADC1:   MOV      #463,-(R2) ;MOVE TO MAILBOX # ***** 463 *****
6396 020406 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6397 020410 000000              HALT                    ;ADC DID NOT SET CC'S CORRECTLY
6398 020412 052700 077777      ADC2:   BIS     #77777,R0
6399 020416 000277              SCC
6400 020420 000244              CLZ
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6401	020422	005500		ADC	R0		:CC=0101	R0=0	
6402	020424	101002		BHI	ADC3				
6403	020426	102401		BVS	ADC3				
6404	020430	100004		BPL	ADC4				
6405							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS		<====
6406							: CONDITIONAL BRANCH INST. AND		<====
6407							: REPLACE THE MOVE INSTRUCTION		<====
6408							: WHICH FOLLOWS W/ 753		<====
6409	020432			ADC3:					
6410	020432	012742	000464	MOV	#464,-(R2)		:MOVE TO MAILBOX # ***** 464 *****		
6411	020436	005242		INC	-(R2)		:SET MSGTYP TO FATAL ERROR		
6412	020440	000000		HALT			:ADC DID NOT SET CC'S CORRECTLY		
6413	020442	000277		ADC4:	SCC				
6414	020444	000245			+CLZ!CLC		:CC=1010		
6415	020446	005500		ADC	R0		:CC=0100		
6416	020450	102403		BVS	ADC5				
6417	020452	103402		BCS	ADC5				
6418	020454	100401		BMI	ADC5				
6419	020456	001404		BEQ	TS217				
6420							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS		<====
6421							: CONDITIONAL BRANCH INST. AND		<====
6422							: REPLACE THE MOVE INSTRUCTION		<====
6423							: WHICH FOLLOWS W/ 740		<====
6424	020460			ADC5:					
6425	020460	012742	000465	MOV	#465,-(R2)		:MOVE TO MAILBOX # ***** 465 *****		
6426	020464	005242		INC	-(R2)		:SET MSGTYP TO FATAL ERROR		
6427	020466	000000		HALT			:ADC DID NOT SET CC'S CORRECTLY		
6428							: OR SEQUENCE ERROR		

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6443 020470 005212
6444 020472 022712 000217
6445 020476 001042
6446 020500 012700 000001
6447 020504 000277
6448 020506 000251
6449 020510 005400
6450 020512 103003
6451 020514 102402
6452 020516 001401
6453 020520 100404
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6458 020522
6459 020522 012742 000466
6460 020526 005242
6461 020530 000000
6462 020532 042700 077777
6463 020536 000257
6464 020540 000264
6465 020542 005400
6466 020544 102003
6467 020546 103002
6468 020550 001401
6469 020552 100404
6470
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6474 020554
6475 020554 012742 000467
6476 020560 005242
6477 020562 000000
6478 020564 005000
6479 020566 000277
6480 020570 000244
6481 020572 005400
6482 020574 102403
6483 020576 103402
6484 020600 001001

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.....  
: THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE NEG,  
: CMP, AND COM INSTRUCTIONS. EACH OF THESE INSTRUCTIONS GENERATE  
: THE C AND V BITS IDENTICALLY. THE CONDITION CODES ARE PRESET,  
: THE INSTRUCTIONS EXECUTED, AND THE RESULTS CHECKED WITH A SERIES  
: OF CONDITIONAL BRANCH INSTRUCTIONS. THIS PROCEDURE IS REPEATED  
: SEVERAL TIMES WITH DIFFERENT DATA IN ORDER TO GENERATE DIFFERENT  
: COMBINATIONS OF THE C AND V BITS.  
:.....  
: TEST 217 TEST NEG INSTRUCTION  
:.....  
TS217: INC (R2) ;UPDATE TEST NUMBER  
CMP #217,(R2) ;SEQUENCE ERROR?  
BNE TS220-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #1,R0  
SCC ;CC=0110  
+CLN!CLC  
NEG R0 ;CC=1001 R0=177777  
BCC NEG1  
BVS NEG1  
BEQ NEG1  
BMI NEG2  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=--  
: CONDITIONAL BRANCH INST. AND <--  
: REPLACE THE MOVE INSTRUCTION <--  
: WHICH FOLLOWS W/ 766 <- -  
NEG1: MOV #466,-(R2) ;MOVE TO MAILBOX # ***** 466 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;NEG DID NOT SET CC'S CORRECTLY  
NEG2: BIC #77777,R0  
CCC ;CC=0100  
SEZ  
NEG R0 ;CC=1011 R0=100000  
BVC NEG3  
BCC NEG3  
BEQ NEG3  
BMI NEG4  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=--  
: CONDITIONAL BRANCH INST. AND <= -  
: REPLACE THE MOVE INSTRUCTION <= -  
: WHICH FOLLOWS W/ 751 < =  
NEG3: MOV #467,-(R2) ;MOVE TO MAILBOX # ***** 467 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;NEG DID NOT SET CC'S CORRECTLY  
NEG4: CLR R0  
SCC ;CC=1011  
CLZ  
NEG R0 ;CC=0100 R0=0  
BVS NEG5  
BVS NEG5  
BNE NEG5
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6485 020602 100004          BPL      TS220
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6490 020604          NEG5:
6491 020604 012742 000470    MOV      #470,-(R2)
6492 020610 005242          INC      -(R2)
6493 020612 000000          HALT
6494
6495
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6498
6499 020614 005212          TS220:  INC      (R2)
6500 020616 022712 000220    CMP      #220,(R2)
6501 020622 001060          BNE     TS221-10
6502 020624 012700 000005    MOV      #5,R0
6503 020630 000257          CCC
6504 020632 000271          +SEN.SEC
6505 020634 022700 000005    CMP      #5,R0
6506 020640 101002          BHI     CMP1
6507 020642 002401          BVS     CMP1
6508 020644 100004          BPL     CMP2
6509
6510
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6513 020646          CMP1:
6514 020646 012742 000471    MOV      #471,-(R2)
6515 020652 005242          INC      -(R2)
6516 020654 000000          HALT
6517 020656 012700 100000    CMP2:  MOV      #100000,R0
6518 020662 000277          SCC
6519 020664 000242          CLV
6520 020666 020027 077777    CMP      R0,#77777
6521 020672 101402          BLOS   CMP3
6522 020674 102001          BVC    CMP3
6523 020676 100004          BPL     CMP4
6524
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6527
6528 020700          CMP3:
6529 020700 012742 000472    MOV      #472,-(R2)
6530 020704 005242          INC      -(R2)
6531 020706 000000          HALT
6532 020710 052700 040000    CMP4:  BIS      #40000,R0
6533 020714 000257          CCC
6534 020716 000264          SEZ
6535 020720 022700 040000    CMP      #40000,R0
6536 020724 102003          BVC    CMP5
6537 020726 103002          BCC    CMP5
6538 020730 001401          BEQ    CMP5
6539 020732 100404          BMI     CMP6
6540
```

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
CONDITIONAL BRANCH INST. AND
REPLACE THE MOVE INSTRUCTION
WHICH FOLLOWS W/ 735

: MOVE TO MAILBOX # ***** 470 *****
: SET MSGTYP TO FATAL ERROR
: NEG DID NOT SET CC'S CORRECTLY
: OR SEQUFNCE ERROR

: TEST 220 TEST CMP INSTRUCTION

: UPDATE TEST NUMBER
: SEQUENCE ERROR?
: BR TO ERROR HALT ON SEQ ERROR

: CC=1010
: CC=0101

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
CONDITIONAL BRANCH INST. AND
REPLACE THE MOVE INSTRUCTION
WHICH FOLLOWS W/ 766

: MOVE TO MAILBOX # ***** 471 *****
: SET MSGTYP TO FATAL ERROR
: CMP DID NOT SET CC'S CORRECTLY

: CC=1101
: CC=0010

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
CONDITIONAL BRANCH INST. AND
REPLACE THE MOVE INSTRUCTION
WHICH FOLLOWS W/ 751

: MOVE TO MAILBOX # ***** 472 *****
: SET MSGTYP TO FATAL ERROR
: CMP DID NOT SET CC'S CORRECTLY

: RO=140000
: CC=0100
: CC=1011

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS

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6541 :          (CONDITIONAL BRANCH INST. AND <---
6542 :          REPLACE THE MOVE INSTRUCTION <---
6543 :          WHICH FOLLOWS W/ 733 <---
6544 020734 CMP5:
6545 020734 012742 000473      MOV      #473,-(R2)      ;MOVE TO MAILBOX # ***** 473 *****
6546 020740 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6547 020742 000000          HALT                     ;CMP DID NOT SET CC'S CORRECTLY
6548 020744 042700 040000      CMP6:  BIC      #40000,R0
6549 020750 000277          SCC                     ;CC=1111
6550 020752 022700 177777      CMP      #-1,R0         ;CC=0000
6551 020756 101402          BLOS   CMP7
6552 020760 102401          BVS    CMP7
6553 020762 100004          BPL    TS221
6554 :          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
6555 :          ;          CONDITIONAL BRANCH INST. AND <---
6556 :          ;          REPLACE THE MOVE INSTRUCTION <---
6557 :          ;          WHICH FOLLOWS W/ 717 <---
6558 020764 CMP7:
6559 020764 012742 000474      MOV      #474,-(R2)      ;MOVE TO MAILBOX # ***** 474 *****
6560 020770 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6561 020772 000000          HALT                     ;CMP DID NOT SET CC'S CORRECTLY
6562 :          ; OR SEQUENCE ERROR
6563 :
6564 :*****
6565 :TEST 221      TEST COM INSTRUCTION
6566 :*****
6567 020774 005212 TS221:  INC      (R2)          ;UPDATE TEST NUMBER
6568 020776 022712 000221      CMP      #221,(R2)       ;SEQUENCE ERROR?
6569 021002 001010          BNE     TS222-10        ;BR TO ERROR HALT ON SEQ ERROR
6570 021004 012700 177777      MOV      #-1,R0
6571 021010 000257          LCC                     ;CC=1010
6572 021012 000265          +SEC!SEZ
6573 021014 005100          COM      R0             ;CC=0101
6574 021016 101002          BHI     COM1
6575 021020 102401          BVS    COM1
6576 021022 100004          BPL    TS222
6577 :          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
6578 :          ;          CONDITIONAL BRANCH INST. AND <---
6579 :          ;          REPLACE THE MOVE INSTRUCTION <---
6580 :          ;          WHICH FOLLOWS W/ 767 <---
6581 021024 COM1:
6582 021024 012742 000475      MOV      #475,-(R2)      ;MOVE TO MAILBOX # ***** 475 *****
6583 021030 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
6584 021032 000000          HALT                     ;COM DID NOT SET CC'S CORRECTLY
6585 :          ; OR SEQUENCE ERROR
6586 :

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6601 021034 005212
6602 021036 022712 000222
6603 021042 001055
6604 021044 012700 125252
6605 021050 000257
6606 021052 000271
6607 021054 162700 125252
6608 021060 101002
6609 021062 102401
6610 021064 100004
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6615 021066
6616 021066 012742 000476
6617 021072 005242
6618 021074 000000
6619 021076 052700 100000
6620 021102 000277
6621 021104 000242
6622 021106 162700 077777
6623 021112 101402
6624 021114 102001
6625 021116 100004
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6630 021120
6631 021120 012742 000477
6632 021124 005242
6633 021126 000000
6634 021130 005100
6635 021132 000277
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6637 021134 162700 100000
6638 021140 101402
6639 021142 102401
6640 021144 100004
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*****
:
: THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE SUB
: AND SBC INSTRUCTIONS. BOTH OF THESE INSTRUCTIONS HANDLE THE
: C AND V BITS IDENTICALLY. THE PROCEDURE IS TO PRESET THE CONDITION
: CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
: THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
: BRANCHES. THIS PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
: DATA PATTERNS TO PROVIDE EVERY COMBINATION OF THE C AND V BITS.
:
: *****
: TEST 222 TEST SUB INSTRUCTION
: *****
TS222: INC (R2) ;UPDATE TEST NUMBER
      CMP #222,(R2) ;SEQUENCE ERROR?
      BNE TS223-10 ;BR TO ERROR HALT ON SEQ ERROR
      MOV #125252,R0
      CCC ;CC=1010
      +SEN!SEC
      SUB #125252,R0 ;CC=0101 R0=0
      BHI SUB1
      BVS SUB1
      BPL SUB2
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
: CONDITIONAL BRANCH INST. AND <-
: REPLACE THE MOVE INSTRUCTION <-
: WHICH FOLLOWS W/ 766 <-
:
SUB1: MOV #476,-(R2) ;MOVE TO MAILBOX # ***** 476 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;SUB DID NOT SET CC'S CORRECTLY
SUB2: BIS #100000,R0
      SCC ;CC=1101
      CLV
      SUB #77777,R0 ;CC=0010 R0=1
      BLOS SUB3
      BVC SUB3
      BPL SUB4
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 751 <---
:
SUB3: MOV #477,-(R2) ;MOVE TO MAILBOX # ***** 477 *****
      INC -(R2) ;SFT MSGTYP TO FATAL ERROR
      HALT
SUB4: COM R0 ;R0=177777
      SCC ;CC=11111
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
:
SUB5: SUB #100000,R0 ;CC=0000 R0=77777
      BLOS SUB5
      BVS SUB5
      BPL SUB6
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
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6643 : REPLACE THE MOVE INSTRUCTION <====  
6644 : WHICH FOLLOWS W/ 736 <====  
6645 021146 SUB5: MOV #500,-(R2) ;MOVE TO MAILBOX # ***** 500 *****  
6646 021146 012742 000500 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
6647 021152 005242 HALT ;SUB DID NOT SET CC'S CORRECTLY  
6648 021154 000000 SUB6: CCC ;CC=0100  
6649 021156 000257 SEZ  
6650 021160 000264 SUB #140000,R0 ;CC=1011  
6651 021162 162700 140000 BVC SUB37  
6652 021166 102003 BCC SUB7  
6653 021170 103002 BEQ SUB7  
6654 021172 001401 BMI TS223  
6655 021174 100404  
6656 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
6657 : CONDITIONAL BRANCH INST. AND <====  
6658 : REPLACE THE MOVE INSTRUCTION <====  
6659 : WHICH FOLLOWS W/ 722 <====  
6660 021176 SUB7: MOV #501,-(R2) ;MOVE TO MAILBOX # ***** 501 *****  
6661 021176 012742 000501 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
6662 021202 005242 HALT ;  
6663 021204 000000  
6664 :*****  
6665 :TEST 223 TEST SBC INSTRUCTION  
6666 :*****  
6667 TS223: INC (R2) ;UPDATE TEST NUMBER  
6668 021206 005212 CMP #223,(R2) ;SEQUENCE ERROR?  
6669 021210 022712 000223 BNE TS224-10 ;BR TO ERROR HALT ON SEQ ERROR  
6670 021214 001053 MOV #1,R0  
6671 021216 012700 000001 SCC ;CC=1011  
6672 021222 000277 CLZ ;CC=0100 R=0  
6673 021224 000244 SBC R0  
6674 021226 005600 BCS SBC1  
6675 021230 103403 BVS SBC1  
6676 021232 102402 BMI SBC1  
6677 021234 100401 BEQ SBC2  
6678 021236 001404  
6679 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
6680 : CONDITIONAL BRANCH INST. AND <====  
6681 : REPLACE THE MOVE INSTRUCTION <====  
6682 : WHICH FOLLOWS W/ 766 <====  
6683 021240 SBC1: MOV #502,-(R2) ;MOVE TO MAILBOX # ***** 502 *****  
6684 021240 012742 000502 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
6685 021244 005242 HALT ;SBC DID NOT SET CC'S CORRECTLY  
6686 021246 000000 SBC2: SCC ;CC=1010  
6687 021250 000277 +CLZ!CLC ;CC=0100 R=C  
6688 021252 000245 SBC R0  
6689 021254 005600 BCS SBC3  
6690 021256 103403 BVS SBC3  
6691 021260 102402 BMI SBC3  
6692 021262 100401 BEQ SBC4  
6693 021264 001404  
6694 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
6695 : CONDITIONAL BRANCH INST. AND <====  
6696 : REPLACE THE MOVE INSTRUCTION <====  
6697 : WHICH FOLLOWS W/ 753 <====  
6698 021266 SBC3:
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021354 005212
021356 022712 000224
021362 001053
021364 012700 144000
021370 000257
021372 000266
021374 006100
021376 103003
021400 102402
021402 001401
021404 100404

021406
021406 012742 000506
021412 005242
021414 000000
021416 000277
021420 000243
021422 006100
021424 103003
021426 102002
021430 001401
021432 100004

021434
021434 012742 000507
021440 005242
021442 000000
021444 000277
021446 000250
021450 006100
021452 101402
021454 102401
021456 100004

.....
: THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF THE ROL,
: ROR, ASL AND ASR INSTRUCTIONS. SPECIAL DATA PATTERNS ARE LOADED
: AND ROTATED SEVERAL TIMES FOR EACH TEST. THE CONDITION CODES
: ARE PRESET BEFORE EACH ROTATION AND THE CONDITION CODES ARE
: CHECKED AFTER EACH ROTATION. THE FINAL CHECK IN EACH TEST IS
: TO VERIFY THE COMMULATIVE DATA RESULT. THE DATA PATTERNS HAVE
: BEEN SELECTED TO PRODUCE ALL COMBINATIONS OF THE C AND V BITS.
:

TEST 224 TEST ROL INSTRUCTION
.....

TS224: INC (R2) ;UPDATE TEST NUMBER
CMP #224,(R2) ;SEQUENCE ERROR?
BNE TS225-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #144000,R0 ;RO=144000
CCC ;CC=0110
+SEZ.SEV
ROL R0 ;CC=1001 RO=110000
BCC ROL1
BVS ROL1
BEQ ROL1
BMI ROL2

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 766 <---

ROL1: MOV #506,-(R2) ;MOVE TO MAILBOX # ***** 506 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT
:

ROL2: SCC ;CC=1100
+CLV!CLC
ROL R0 ;CC=0011 RO=020000
BCC ROL3
BVC ROL3
BEQ ROL3
BPL ROL4

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---
: WHICH FOLLOWS W/ 753 <---

ROL3: MOV #507,-(R2) ;MOVE TO MAILBOX # ***** 507 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ROL DID NOT SET CC'S CORRECTLY
:

ROL4: SCC ;CC=0111
CLN
ROL R0 ;CC=0000 RO=040001
BLOS ROL5
BVS ROL5
BPL ROL6

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
: CONDITIONAL BRANCH INST. AND <---
: REPLACE THE MOVE INSTRUCTION <---


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6790
6791 021460
6792 021460 012742 000510
6793 021464 005242
6794 021466 000000
6795 021470 000257
6796 021472 000265
6797 021474 006100
6798 021476 101405
6799 021500 102004
6800 021502 100003
6801 021504 022700 100003
6802 021510 001404
6803
6804
6805
6806
6807 021512
6808 021512 012742 000511
6809 021516 005242
6810 021520 000000
6811
6812
6813
6814
6815 021522 005212
6816 021524 022712 000225
6817 021530 001051
6818 021532 012700 000023
6819 021536 000277
6820 021540 000250
6821 021542 006000
6822 021544 102403
6823 021546 103002
6824 021550 001401
6825 021552 100404
6826
6827
6828
6829
6830 021554
6831 021554 012742 000512
6832 021560 005242
6833 021562 000000
6834 021564 000257
6835 021566 000274
6836 021570 006000
6837 021572 102003
6838 021574 103002
6839 021576 001401
6840 021600 100004
6841
6842
6843
6844
6845

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: WHICH FOLLOWS W/ 741
ROL5: MOV #510,-(R2) ;MOVE TO MAILBOX # ***** 510 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;ROL DID NOT SET CC'S CORRECTLY
ROL6: CCC ;CC=0101
      +SEZ,SEC
      ROL R0 ;CC=1010 R0=100003
      BLOS ROL7
      BVC ROL7
      BPL ROL7
      CMP #100003,R0
      BEQ TS225
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
      ; CONDITIONAL BRANCH INST. AND
      ; REPLACE THE MOVE INSTRUCTION
      ; WHICH FOLLOWS W/ 724
ROL7: MOV #511,-(R2) ;MOVE TO MAILBOX # ***** 511 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;ROL MALFUNCTIONED
      ; OR SEQUENCE ERROR
:*****
:TEST 225 TEST ROR INSTRUCTION
:*****
TS225: INC (R2) ;UPDATE TEST NUMBER
      CMP #225,(R2) ;SEQUENCE ERROR?
      BNE TS226-10 ;BR TO ERROR HALT ON SEQ ERROR
      MOV #23,R0 ;R0=23
      SCC ;CC=0111
      CLN
      ROR R0 ;CC=1001 R0=100011
      BVS ROR1
      BCC ROR1
      BEQ ROR1
      BMI ROR2
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
      ; CONDITIONAL BRANCH INST. AND
      ; REPLACE THE MOVE INSTRUCTION
      ; WHICH FOLLOWS W/ 766
ROR1: MOV #512,-(R2) ;MOVE TO MAILBOX # ***** 512 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;ROR DID NOT SET CC'S CORRECTLY
ROR2: CCC ;CC=1100
      +SEN:SEZ
      ROR R0 ;CC=0011 R0=0.0004
      BVC ROR3
      BCC ROR3
      BEQ ROR3
      BPL ROR4
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
      ; CONDITIONAL BRANCH INST. AND
      ; REPLACE THE MOVE INSTRUCTION
      ; WHICH FOLLOWS W/ 753
ROR3:

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```
6846 021602 012742 000513      MOV    #513,-(R2)      ;MOVE TO MAILBOX # ***** 513 *****
6847 021606 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
6848 021610 000000              HALT                    ;ROR DID NOT SET CC'S CORRECTLY
6849 021612 000277      ROR4:  SCC            ;CC=1110
6850 021614 000241              CLC
6851 021616 006000              ROR    R0              ;CC=0000  R0=020002
6852 021620 101403              BLOS   ROR5
6853 021622 102402              BVS   ROR5
6854 021624 001401              BEQ   ROR5
6855 021626 100004              BPL   ROR6
6856                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
6857                                ;          CONDITIONAL BRANCH INST. AND <-
6858                                ;          REPLACE THE MOVE INSTRUCTION <-
6859                                ;          WHICH FOLLOWS W/ 740 <-
6860 021630      ROR5:
6861 021630 012742 000514      MOV    #514,-(R2)      ;MOVE TO MAILBOX # ***** 514 *****
6862 021634 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
6863 021636 000000              HALT                    ;ROR DID NOT SET CC'S CORRECTLY
6864 021640 000257      ROR6:  CCC            ;CC=0101
6865 021642 000265              +SEC,SEZ
6866 021644 006000              ROR    R0              ;CC=1010  R0=110001
6867 021646 101402              BLOS   ROR7
6868 021650 102001              BVC   ROR7
6869 021652 100404              BMI   TS226
6870                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
6871                                ;          CONDITIONAL BRANCH INST. AND <-
6872                                ;          REPLACE THE MOVE INSTRUCTION <-
6873                                ;          WHICH FOLLOWS W/ 726 <-
6874 021654      ROR7:
6875 021654 012742 000515      MOV    #515,-(R2)      ;MOVE TO MAILBOX # ***** 515 *****
6876 021660 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
6877 021662 000000              HALT                    ;ROR DID NOT PRODUCE CORRECT RESULTS
6878                                ; OR SEQUENCE ERROR
6879      ;*****
6880      ;TEST 226      TEST ASL INSTRUCTION
6881      ;*****
6882 021664 005212      TS226: INC    (R2)          ;UPDATE TEST NUMBER
6883 021666 022712 000226      CMP    #226,(R2)      ;SEQUENCE ERROR?
6884 021672 001054              BNE   TS227-10        ;BR TO ERROR HALT ON SEQ ERROR
6885 021674 012700 144000      MOV    #144000,R0     ;R0=14000
6886 021700 000257              CCC            ;CC=0110
6887 021702 000271              +SEN!SEC
6888 021704 006300              ASL    R0              ;CC=1001  R0=110000
6889 021706 103003              BCC   ASL1
6890 021710 102402              BVS   ASL1
6891 021712 001401              BEQ   ASL1
6892 021714 100404              BMI   ASL2
6893                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
6894                                ;          CONDITIONAL BRANCH INST. AND <-
6895                                ;          REPLACE THE MOVE INSTRUCTION <-
6896                                ;          WHICH FOLLOWS W/ 766 <-
6897 021716      ASL1:
6898 021716 012742 000516      MOV    #516,-(R2)      ;MOVE TO MAILBOX # ***** 516 *****
6899 021722 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
6900 021724 000000              HALT                    ;
6901 021726 000277      ASL2:  SFC            ;CC 1100
```

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6902 021730 000243 +CLV.CLC
6903 021732 006300 ASL R0 ;CC=0011 R0=020000
6904 021734 103003 BCC ASL3
6905 021736 102002 BVC ASL3
6906 021740 001401 BEQ ASL3
6907 021742 100004 BPL ASL4
6908
6909 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6910 ; CONDITIONAL BRANCH INST. AND <====
6911 ; REPLACE THE MOVE INSTRUCTION <====
6912 ; WHICH FOLLOWS W/ 753 <====
6912 021744 ASL3:
6913 021744 012742 000517 MOV #517,-(R2) ;MOVE TO MAILBOX # ***** 517 *****
6914 021750 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
6915 021752 000000 HALT ;ASL DID NOT SET CC'S CORRECTLY
6916 021754 000277 ASL4: SLC ;CC=0111
6917 021756 000250 CLN
6918 021760 006300 ASL R0 ;CC=0000 R0=040000
6919 021762 101402 BLOS ASL5
6920 021764 102401 BVS ASL5
6921 021766 100004 BPL ASL6
6922
6923 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6924 ; CONDITIONAL BRANCH INST. AND <====
6925 ; REPLACE THE MOVE INSTRUCTION <====
6926 ; WHICH FOLLOWS W/ 741 <====
6926 021770 ASL5:
6927 021770 012742 000520 MOV #520,-(R2) ;MOVE TO MAILBOX # ***** 520 *****
6928 021774 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
6929 021776 000000 HALT ;ASL DID NOT SET CC'S CORRECTLY
6930 022000 000257 ASL6: CCC ;CC=0101
6931 022002 000265 +SEZ!SEC
6932 022004 006300 ASL R0 ;CC=1010 R0=100000
6933 022006 103406 BCS ASL7
6934 022010 001405 BEQ ASL7
6935 022012 102004 BVC ASL7
6936 022014 100003 BPL ASL7
6937 022016 022700 100000 CMP #100000,R0
6938 022022 001404 BEQ TS227
6939
6940 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
6941 ; CONDITIONAL BRANCH INST. AND <====
6942 ; REPLACE THE MOVE INSTRUCTION <====
6943 ; WHICH FOLLOWS W/ 723 <====
6943 022024 ASL7:
6944 022024 012742 000521 MOV #521,-(R2) ;MOVE TO MAILBOX # ***** 521 *****
6945 022030 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
6946 022032 000000 HALT ;ASL MALFUNCTIONED
6947 ; OR SEQUENCE ERROR
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6948
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6951 022034 005212
6952 022036 022712 000227
6953 022042 001060
6954 022044 012700 100023
6955 022050 000277
6956 022052 000250
6957 022054 006200
6958 022056 102403
6959 022060 103002
6960 022062 001401
6961 022064 100404
6962
6963
6964
6965
6966 022066
6967 022066 012742 0C0522
6968 022072 005242
6969 022074 000000
6970 022076 042700 100000
6971 022102 000277
6972 022104 000243
6973 022106 006200
6974 022110 102003
6975 022112 103002
6976 022114 001401
6977 022116 100004
6978
6979
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6981
6982 022120
6983 022120 012742 000523
6984 022124 005242
6985 022126 000000
6986 022130 000277
6987
6988 022132 006200
6989 022134 101403
6990 022136 102402
6991 022140 001401
6992 022142 100004
6993
6994
6995
6996
6997 022144
6998 022144 012742 000524
6999 022150 005242
7000 022152 000000
7001 022154 052700 100000
7002 022160 000257
7003 022162 000265

:*****
:TEST 227 TEST ASL INSTRUCTION
:*****
TS227: INC (R2) ;UPDATE TEST NUMBER
CMP #227,(R2) ;SEQUENCE ERROR?
BNE TS230-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #100023,R0 ;R0=100023
SCC ;CC=0110
CLN
ASR R0 ;CC=1001 RP-140011
BVS ASR1
BCC ASR1
BEQ ASR1
BMI ASR2

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 766 <====

ASR1: MOV #522,-(R2) ;MOVE TO MAILBOX # ***** 522 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ASR DID NOT SET CC'S CORRECTLY
ASR2: BIC #100000,R0 ;R0=40011
SCC ;CC=1100
+CLV:CLC
ASR R0 ;CC=0011 R0=020004
BVC ASR3
BCC ASR3
BEQ ASR3
BPL ASR4

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 751 <--

ASR3: MOV #523,-(R2) ;MOVE TO MAILBOX # ***** 523 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ASR DID NOT SET CC'S CORRECTLY
ASR4: SCC ;CC=1111

ASR: ASR R0 ;CC=0000 R0=010002
BLOS ASR5
BVS ASR5
BEQ ASR5
BPL ASR6

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 737 <

ASR5: MOV #524,-(R2) ;MOVE TO MAILBOX # ***** 524 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ASR DID NOT SET CC'S CORRECTLY
ASR6: BIS #100000,R0 ;R0=110002
CCC ;CC=0101
+SEZ.SEC
```

```
7004 022164 006200 ASR R0 ;C=1010 R0=144001
7005 022166 101406 BLOS ASR7
7006 022170 102005 BVC ASR7
7007 022172 100004 BPL ASR7
7008 022174 001403 BEQ ASR7
7009 022176 022700 144001 CMP #144001,R0 ;CHECK RESULT OF ASR'S
7010 022202 001404 BEQ TS230
7011 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7012 ; CONDITIONAL BRANCH INST. AND <====
7013 ; REPLACE THE MOVE INSTRUCTION <====
7014 ; WHICH FOLLOWS W/ 717 <====
7015 022204 ASR7:
7016 022204 012742 000525 MOV #525,-(R2) ;MOVE TO MAILBOX # ***** 525 *****
7017 022210 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7018 022212 000000 HALT ;ASR DID NOT FUNCTION CORRECTLY
7019 ; OR SEQUENCE ERROR
7020
7021
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7033
7034 022214 005212 TS230: INC (R2) ;UPDATE TEST NUMBER
7035 022216 022712 000230 CMP #230,(R2) ;SEQUENCE ERROR?
7036 022222 001033 BNE TS231-10 ;BR TO ERROR HALT ON SEQ ERROR
7037 022224 005000 CLR R0
7038 022226 000277 SCC ;SET CC=1011
7039 022230 000244 CLZ
7040 022232 006700 SXT R0 ;TRY SXT
7041 022234 100006 BPL SXT0 ;TEST CC=1001
7042 022236 001405 BEQ SXT0
7043 022240 102404 BVS SXT0
7044 022242 103003 BCC SXT0
7045 022244 022700 177777 CMP #-1,R0 ;CHECK DATA RESULT
7046 022250 001404 BEQ SXT1
7047 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
7048 ; CONDITIONAL BRANCH INST. AND <----
7049 ; REPLACE THE MOVE INSTRUCTION <----
7050 ; WHICH FOLLOWS W/ 764 <----
7051 022252 SXT0:
7052 022252 012742 000526 MOV #526,-(R2) ;MOVE TO MAILBOX # ***** 526 *****
7053 022256 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7054 022260 000000 HALT ;RESULTS OF SXT INCORRECT
7055 022262 005000 SXT1: CLR R0 ;R0=0
7056 022264 005010 CLR (R0) ;LOC. 0=0
7057 022266 005110 COM (R0) ;LOC. 0=177777
7058 022270 000257 CCC ;SET CC=0110
7059 022272 000266 +SEZ.SEV
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7087 022322 005212
7088 022324 022712 000231
7089 022330 001035
7090 022332 012700 007463
7091 022336 012701 031525
7092 022342 000277
7093 022344 000241
7094 022346 074100
7095 022350 101406
7096 022352 102405
7097 022354 001404
7098 022356 100403
7099 022360 022700 036146
7100 022364 001404
7101
7102
7103
7104
7105 022366
7106 022366 012742 000530
7107 022372 005242
7108 022374 000000
7109 022376 010104
7110 022400 000261
7111 022402 000241
7112 022404 074400
7113 022406 101406
7114 022410 102405
7115 022412 001404
7116 022414 100403
7117 022416 022700 007463
7118 022422 001404
7119
7120
7121
7122
7123 022424
7124 022424 012742 000531
7125 022430 005242
7126 022432 000000
7127

```
*****  
: THIS TEST VERIFIES THE XOR INSTRUCTION. UNIQUE PATTERNS  
: OF ONES AND ZEROES ARE MOVED TO DATA REGISTERS R0 AND R1.  
: AFTER THE FIRST XOR INSTRUCTION R0=36146. AN XOR IS THEN  
: EXECUTED WITH THIS NEW VALUE AND THE CONTENTS OF R1 TO  
: REPRODUCE THE ORIGINAL VALUE IF R0=31525.  
*****  
: TEST 231 TEST THE XOR INSTRUCTION  
*****  
TS231: INC (R2) ;UPDATE TEST NUMBER  
CMP #231,(R2) ;SEQUENCE ERROR?  
BNE TS232-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #7463,R0 ;SET UP R0  
MOV #31525,R1 ;SET UP R1  
SCC ;SET CC=1110  
CLC  
XOR R1,R0 ;TRY XOR  
BLOS XOR1 ;CC=0000?  
BVS XOR1  
BEQ XOR1  
BMI XOR1  
CMP #36146,R0 ;DATA RESULT CORRECT?  
BEQ XOR2  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---  
; CONDITIONAL BRANCH INST. AND <---  
; REPLACE THE MOVE INSTRUCTION <---  
; WHICH FOLLOWS W/ 761 <---  
XOR1: MOV #530,-(R2) ;MOVE TO MAILBOX # ***** 530 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
; :  
XOR2: MOV R1,R4 ;CC=1110  
SEC  
CLC  
XOR R4,R0 ;TRY XOR MGDE 0,0  
BLOS XOR3 ;CC=0000?  
BVS XOR3  
BEQ XOR3  
BMI XOR3  
CMP #7463,R0  
BEQ TS232  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---  
; CONDITIONAL BRANCH INST. AND <---  
; REPLACE THE MOVE INSTRUCTION <---  
; WHICH FOLLOWS W/ 742 <---  
XOR3: MOV #531,-(R2) ;MOVE TO MAILBOX # ***** 531 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;RESULT OF XOR INCORRECT  
; OR SEQUENCE ERROR
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7138 022434 005212
7139 022436 022712 000232
7140 022442 001023
7141 022444 012700 000525
7142 022450 010004
7143 022452 000277
7144 022454 101002
7145 022456 100001
7146 022460 102404
7147
7148
7149
7150
7151 022462
7152 022462 012742 000532
7153 022466 005242
7154 022470 000000
7155 022472 005304
7156 022474 000277
7157 022476 077012
7158 022500 101004
7159 022502 100003
7160 022504 102002
7161 022506 005704
7162 022510 001404
7163
7164
7165
7166
7167 022512
7168 022512 012742 000533
7169 022516 005242
7170 022520 000000
7171

```

```

:*****
: THIS TEST VERIFIES THE SOB INSTRUCTION. R4 IS USED AS A
: COUNTER WHILE R0 IS THE ADDRESS REGISTER. CONDITIONAL
: BRANCHES ARE USED TO VERIFY PROPER TRANSFER OF CONTROL
: WHILE R4 IS CHECKED TO INSURE PROPER DECREMENTING OF R0.
:*****
: TEST 232 TEST SOB INSTRUCTION
:*****
TS232: INC (R2) ;UPDATE TEST NUMBER
CMP #232,(R2) ;SEQUENCE ERROR?
BNE TS233-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #525,R0
MOV R0,R4
SOB1: SCC ;SET CC=1111
;CC=1111?
BHI SOB2
BPL SOB2
BVS SOB3
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 770 <--
SOB2: MOV #532,-(R2) ;MOVE TO MAILBOX # ***** 532 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT
SOB3: DEC R4 ;COUNT ITERATIONS
SCC ;CC=1111
SOB R0,SOB1 ;DO SOB W/ R0
BHI SOB4 ;CHECK CC=1111
BPL SOB4
BVC SOB4
TST R4 ;ITERATION COUNT OK?
BEQ TS233
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
; CONDITIONAL BRANCH INST. AND <==
; REPLACE THE MOVE INSTRUCTION <==
; WHICH FOLLOWS W/ 754 <==
SOB4: MOV #533,-(R2) ;MOVE TO MAILBOX # ***** 533 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT # OF BRANCHES OR CC'S CHANGED
; OR SEQUENCE ERROR

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7182 022522 005212
7183 022524 022712 000233
7184 022530 001061
7185 022532 012706 001000
7186 022536 012746 125252
7187 022542 162706 000074
7188 022546 012705 022572
7189 022552 012746 006436
7190 022556 000277
7191 022560 000116
7192 022562 012742 000534
7193 022566 005242
7194 022570 000000
7195 022572 101010
7196 022574 100007
7197 022576 102006
7198 022600 020527 125252
7199 022604 001003
7200 022606 022706 001000
7201 022612 001404
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7206 022614
7207 022614 012742 000535
7208 022620 005242
7209 022622 000000
7210 022624 012746 052525
7211 022630 012746 006400
7212 022634 010605
7213 022636 004737 022646
7214 022642 000137 022660
7215 022646 000205
7216 022650 012742 000536
7217 022654 005242
7218 022656 000000
7219 022660 022706 001000
7220 022664 001003
7221 022666 022705 052525
7222 022672 001404
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7227 022674

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:*****
:
:   THIS TEST VERIFIES THE MARK INSTRUCTION. THE EFFECTS
: OF THE MARK INSTRUCTION ARE SIMULATED BY THE PROGRAM INSTRUCTIONS.
: THE CONTENTS OF R5 AND THE STACK POINTER ARE CHECKED AFTER EACH
: OF THE TWO ROUTINES IN THE TEST.
:
:*****
:TEST 233      TEST MARK INSTRUCTION
:*****
TS233:  INC      (R2)      ;UPDATE TEST NUMBER
        CMP      #233,(R2) ;SEQUENCE ERROR?
        BNE     TS234-10 ;BR TO ERROR HALT ON SEQ ERROR
        MOV     #STBOT,SP
        MOV     #125252,-(SP) ;PUT R5 VALUE ON STACK
        SUB     #74,SP ;EFFECTIVELY PUT 36 ARGUMENTS ON STACK
        MOV     #MRK1,R5 ;SET NEW PC IN R5
        MOV     #6436,-(SP) ;PUT MARK 36 INST. ON STACK
        SCC     ;SET CC=1111
        JMP     (SP) ;XFER CONTL TO MARK 36 INST. ON STACK
        MOV     #534,-(R2) ;MOVE TO MAILBOX # ***** 534 *****
        INC     -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT    ;MARK INST. SHOULD HAVE JUMPED TO MRK1
MRK1:   BHI     MRK2 ;TEST CC UNAFFECTED
        BPL     MRK2 ;IE. CC=1111
        BVC     MRK2
        CMP     R5,#125252 ;CHECK R5 RESTORED FROM STACK
        BNE     MRK2
        CMP     #STBOT,R6 ;CHECK STACK POINTER READJUSTED CORRECTLY.
        BEQ     MRK3
        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
        ; CONDITIONAL BRANCH INST. AND <-
        ; REPLACE THE MOVE INSTRUCTION <-
        ; WHICH FOLLOWS W/ 746 <-
MRK2:   MOV     #535,-(R2) ;MOVE TO MAILBOX # ***** 535 *****
        INC     -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT    ;RESULTS OF MARK INCORRECT
MRK3:   MOV     #52525,-(SP) ;PUT MARK 0 INST. ON STACK
        MOV     #6400,-(SP) ;SET ADDR. OF MARK INST. IN R5
        MOV     SP,R5
        JSR     PC,@MRK4 ;DO JSR
        JMP     @MRK5
MRK4:   RTS     R5 ;DO RTS WITH R5 TO MARK INST ON STACK
        MOV     #536,-(R2) ;MOVE TO MAILBOX # ***** 536 *****
        INC     -(R2) ;SET MSGTYP TO FATAL ERROR
        HALT    ;RTS,MARK SEQUENCE FAILED
MRK5:   CMP     #STBOT,R6 ;STACK ADJUSTED CORRECTLY
        BNE     MRK6 ;IF NOT: BR
        CMP     #52525,R5 ;CHECK IF R5 RESTORED FROM STACK
        BEQ     TS234
        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
        ; CONDITIONAL BRANCH INST. AND <-
        ; REPLACE THE MOVE INSTRUCTION <-
        ; WHICH FOLLOWS W/ 716 <-
MRK6:

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MACY11 30A(1052) 14-JAN-81 11:46 D 12 PAGE 146
T233 TEST MARK INSTRUCTION

SEQ 0146

7228 022674 012742 000537
7229 022700 005242
7230 022702 000000
7231

MOV #537, -(R2)
INC -(R2)
HALT

:MOVE TO MAILBOX # 537
:SET MSGTYP TO FATAL ERROR
:RESULTS OF MARK INCORRECT
: OR SEQUENCE ERROR

7232 177776

PS=177776

```

*****
THESE NEXT SEVEN TESTS VERIFY THE MTPS INSTRUCTION IN ALL
MODES. THE PSW IS DEFINED BY AN EQUATE STATEMENT BEFORE THE
FIRST MTPS TEST. IN EACH TEST A PATTERN OF ONES AND
ZEROS IS SET IN A DATA REGISTER AND MOVED TO THE PSW.
THE DATA IN THE PSW, AND THE DATA REGISTER ADDRESS,
ARE CHECKED TO VERIFY PROPER EXECUTION OF THE INSTRUCTION.
*****

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022704 005212
022706 022712 000234
022712 001024
022714 012700 000377
022720 000257
022722 106400
022724 022767 000357 155044
022732 001404

022734 012742 000540
022740 005242
022742 000000
022744 005000
022746 005010
022750 000277
022752 106410
022754 100403
022756 102402
022760 103401
022762 001004

022764 012742 000541
022770 005242
022772 000000

022774 005212
022776 022712 000235
023002 001021
023004 005000
023006 012710 177777
023012 005037 177776
023016 106420

```

*****
TEST 234 TEST MTPS INSTRUCTION
*****
TS234: INC (R2) ;UPDATE TEST NUMBER
CMP #234,(R2) ;SEQUENCE ERROR?
BNE TS235-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #377,R0
CCC
MTPS R0
CMP #357,PS
BEQ MTPS1
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 767 <---
MOV #540,-(R2) ;MOVE TO MAILBOX # ***** 540 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MTPS FAILED
MTPS1: CLR R0
CLR (R0)
SCC ;CC=1111
MTPS (R0) ;TRY MTPS MODE 1
BMI MTPS1A ;CHECK PS
BVS MTPS1A
BCS MTPS1A
BNE TS235
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 753 <---
MTPS1A: MOV #541,-(R2) ;MOVE TO MAILBOX # ***** 541 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;MTPS FAILED
; OR SEQUENCE ERROR

```

```

*****
TEST 235 TEST MTPS MODE 2
*****
TS235: INC (R2) ;UPDATE TEST NUMBER
CMP #235,(R2) ;SEQUENCE ERROR?
BNE TS236-10 ;BR TO ERROR HALT ON SEQ ERROR
CLR R0 ;R0=0
MOV #-1,(R0) ;LOC. 0=-1
CLR @#PS ;PS=0
MTPS (R0)+ ;TRY MTPS W/MODE 2

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7288 023020 022737 000357 177776      CMP      #357,@#PS      ;CHECK DATA
7289 023026 001404                      BEQ      MTPS2
7290                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7291                      ; CONDITIONAL BRANCH INST. AND
7292                      ; REPLACE THE MOVE INSTRUCTION
7293                      ; WHICH FOLLOWS W/ 765
7294 023030 012742 000542      MOV      #542,-(R2)    ;MOVE TO MAILBOX # ***** 542 *****
7295 023034 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
7296 023036 000000      HALT
7297 023040 022700 000001      MTPS2:  CMP      #1,R0  ;DEST. DATA INCORRECT
7298 023044 001404      BEQ      TS236        ;CHECK DEST. REGISTER.
7299                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7300                      ; CONDITIONAL BRANCH INST. AND
7301                      ; REPLACE THE MOVE INSTRUCTION
7302                      ; WHICH FOLLOWS W/ 756
7303 023046 012742 000543      MOV      #543,-(R2)    ;MOVE TO MAILBOX # ***** 543 *****
7304 023052 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
7305 023054 000000      HALT
7306                      ;DEST REGISTER NOT INCREMENTED BY 1
7307                      ; OR SEQUENCE ERROR
7308
7309 :*****
7310 :TEST 236      TEST MTPS MODE 3
7311 :*****
7311 023056 005212      TS236:  INC      (R2)        ;UPDATE TEST NUMBER
7312 023060 022712 000236      CMP      #236,(R2)    ;SEQUENCE ERROR?
7313 023064 001024      BNE      TS237-10     ;BR TO ERROR HALT ON SEQ ERROR
7314 023066 012700 000402      MOV      #402,R0      ;R0=402
7315 023072 005010      CLR      (R0)        ;LOC. 402=0
7316 023074 012737 052652 000000      MOV      #52652,@#0   ;LOC. 0=52652
7317 023102 005037 177776      CLR      @#PS        ;PS=0
7318 023106 106430      MTPS   @(R0)+        ;TRY MTPS W/MODE 3
7319 023110 022737 000252 177776      CMP      #252,@#PS    ;CHECK DEST. DATA
7320 023116 001404      BEQ      MTPS3
7321                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7322                      ; CONDITIONAL BRANCH INST. AND
7323                      ; REPLACE THE MOVE INSTRUCTION
7324                      ; WHICH FOLLOWS W/ 762
7325 023120 012742 000544      MOV      #544,-(R2)    ;MOVE TO MAILBOX # ***** 544 *****
7326 023124 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
7327 023126 000000      HALT
7328 023130 022700 000404      MTPS3:  CMP      #404,R0  ;CHECK MODE 3 REGISTER.
7329 023134 001404      BEQ      TS237
7330                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7331                      ; CONDITIONAL BRANCH INST. AND
7332                      ; REPLACE THE MOVE INSTRUCTION
7333                      ; WHICH FOLLOWS W/ 753
7334 023136 012742 000545      MOV      #545,-(R2)    ;MOVE TO MAILBOX # ***** 545 *****
7335 023142 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
7336 023144 000000      HALT
7337                      ;MODE 3 REGISTER INCORRECT
7338                      ; OR SEQUENCE ERROR
7339
7340 :*****
7341 :TEST 237      TEST MTPS MODE 4
7342 :*****
7342 023146 005212      TS237:  INC      (R2)        ;UPDATE TEST NUMBER
7343 023150 022712 000237      CMP      #237,(R2)    ;SEQUENCE ERROR?
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7344 023154 001022      BNE      TS240-10      ;BR TO ERROR HALT ON SEQ ERROR
7345 023156 012700 000001  MOV      #1,R0        ;R0=1
7346 023162 012737 125125 000000  MOV      #125125,@#0   ;LOC. 0 = 125125
7347 023170 005037 177776      CLR      @#PS         ;PS=0
7348 023174 106440      MTPS    -(R0)        ;TRY MTPS W/MODE 4
7349 023176 022737 000105 177776  CMP      #105,@#PS    ;CHECK DEST. DATA
7350 023204 001404      BEQ     MTPS4
7351      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7352      ;         CONDITIONAL BRANCH INST. AND
7353      ;         REPLACE THE MOVE INSTRUCTION
7354      ;         WHICH FOLLOWS W/ 763
7355      ;=====
7355 023206 012742 000546      MOV      #546,-(R2)   ;MOVE TO MAILBOX # ***** 546 *****
7356 023212 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
7357 023214 000000      HALT
7358 023216 005700      MTPS4: TST     R0     ;DEST. DATA INCORRECT
7359 023220 001404      BEQ     TS240        ;CHECK MODE 4 REGISTER
7360      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7361      ;         CONDITIONAL BRANCH INST. AND
7362      ;         REPLACE THE MOVE INSTRUCTION
7363      ;         WHICH FOLLOWS W/ 755
7364      ;=====
7364 023222 012742 000547      MOV      #547,-(R2)   ;MOVE TO MAILBOX # ***** 547 *****
7365 023226 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
7366 023230 000000      HALT
7367      ;MODE 4 REGISTER NOT DECREMENTED BY 1
7368      ; OR SEQUENCE ERROR
7369      ;
7370      ;*****
7371      ;TEST 240      TEST MTPS MODE 5
7372      ;*****
7372 023232 005212      TS240: INC     (R2)    ;UPDATE TEST NUMBER
7373 023234 022712 000240      CMP     #240,(R2)    ;SEQUENCE ERROR?
7374 023240 001021      BNE     TS241-10    ;BR TO ERROR HALT ON SEQ ERROR
7375 023242 012700 000404      MOV     #404,R0     ;R0=404
7376 023246 012737 177400 000000  MOV     #177400,@#0  ;LOC. 0=177400
7377 023254 000277      SCC
7378 023256 106450      MTPS    @-(R0)     ;SET ALL COND. CODES
7379 023260 005737 177776      TST     @#PS        ;TRY MTPS W/MODE 5
7380 023264 001404      BEQ     MTPS5      ;CHECK DEST. DATA.
7381      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7382      ;         CONDITIONAL BRANCH INST. AND
7383      ;         REPLACE THE MOVE INSTRUCTION
7384      ;         WHICH FOLLOWS W/ 765
7385      ;=====
7385 023266 012742 000550      MOV     #550,-(R2)   ;MOVE TO MAILBOX # ***** 550 *****
7386 023272 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
7387 023274 000000      HALT
7388 023276 022700 000402      MTPS5: CMP     #402,R0 ;DESTINATION DATA INCORRECT
7389 023302 001404      BEQ     TS241      ;CHECK MODE 5 REGISTER
7390      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
7391      ;         CONDITIONAL BRANCH INST. AND
7392      ;         REPLACE THE MOVE INSTRUCTION
7393      ;         WHICH FOLLOWS W/ 756
7394      ;=====
7394 023304 012742 000551      MOV     #551,-(R2)   ;MOVE TO MAILBOX # ***** 551 *****
7395 023310 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
7396 023312 000000      HALT
7397      ;MODE 5 REGISTER NOT DECREMENTED BY 2
7398      ; OR SEQUENCE ERROR
7399      ;

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7400 : TEST 241 TEST MTPS MODE 6
7401 :-----
7402 023314 005212 TS241: INC (R2) ;UPDATE TEST NUMBER
7403 023316 022712 000241 CMP #241,(R2) ;SEQUENCE ERROR?
7404 023322 001024 BNE TS242-10 ;BR TO ERROR HALT ON SEQ ERROR
7405 023324 012737 052652 000000 MOV #52652,@#0 ;LOC. 0=52652
7406 023332 012700 000406 MOV #406,R0 ;R0=406
7407 023336 005037 177776 CLR @#PS ;PS=0
7408 023342 106460 177372 MTPS @-2(R0) ;TRY MTPS W/MODE 6
7409 023346 022737 000252 177776 CMP #252,@#PS ;CHECK DEST. DATA
7410 023354 001404 BEQ MTPS6
7411 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7412 : CONDITIONAL BRANCH INST. AND <====
7413 : REPLACE THE MOVE INSTRUCTION <====
7414 : WHICH FOLLOWS W/ 762 <====
7415 023356 012742 000552 MOV #552,-(R2) ;MOVE TO MAILBOX # ***** 552 *****
7416 023362 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7417 023364 000000 HALT ;DEST. DATA INCORRECT
7418 023366 022700 000406 MTPS6: CMP #406,R0 ;CHECK MODE 6 REGISTER
7419 023372 001404 BEQ TS242
7420 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7421 : CONDITIONAL BRANCH INST. AND <====
7422 : REPLACE THE MOVE INSTRUCTION <====
7423 : WHICH FOLLOWS W/ 753 <====
7424 023374 012742 000553 MOV #553,-(R2) ;MOVE TO MAILBOX # ***** 553 *****
7425 023400 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7426 023402 000000 HALT ;MODE 6 REGISTER MODIFIED
7427 : OR SEQUENCE ERROR
7428
7429 :-----
7430 : TEST 242 TEST MTPS MODE 7
7431 :-----
7432 023404 005212 TS242: INC (R2) ;UPDATE TEST NUMBER
7433 023406 022712 000242 CMP #242,(R2) ;SEQUENCE ERROR?
7434 023412 001024 BNE TS243-10 ;BR TO ERROR HALT ON SEQ ERROR
7435 023414 012737 052652 000000 MOV #52652,@#0 ;LOC. 0=52652
7436 023422 012700 000410 MOV #410,R0 ;R0=410
7437 023426 005037 177776 CLR @#PS ;PS=0
7438 023432 106470 177776 MTPS @-2(R0) ;TRY MTPS W/MODE 7
7439 023436 022737 000105 177776 CMP #105,@#PS ;CHECK DEST. DATA
7440 023444 001404 BEQ MTPS7
7441 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7442 : CONDITIONAL BRANCH INST. AND <====
7443 : REPLACE THE MOVE INSTRUCTION <====
7444 : WHICH FOLLOWS W/ 762 <====
7445 023446 012742 000554 MOV #554,-(R2) ;MOVE TO MAILBOX # ***** 554 *****
7446 023452 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7447 023454 000000 HALT ;DESTINATION DATA INCORRECT
7448 023456 022700 000410 MTPS7: CMP #410,R0 ;CHECK MODE 7 REGISTER
7449 023462 001404 BEQ TS243
7450 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7451 : CONDITIONAL BRANCH INST. AND <====
7452 : REPLACE THE MOVE INSTRUCTION <====
7453 : WHICH FOLLOWS W/ 753 <====
7454 023464 012742 000555 MOV #555,-(R2) ;MOVE TO MAILBOX # ***** 555 *****
7455 023470 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
```

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T242 TEST MTF5 MODE 7 PAGE 151

SEQ 0151

7456 023472 000000
7457
7458

HALT

:MODE 7 REGISTER MODIFIED
: OR SEQUENCE ERROR

7459
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7470 023474 005212
7471 023476 022712 000243
7472 023502 001025
7473 023504 012737 000377 177776
7474 023512 106700
7475 023514 022700 177757
7476 023520 001404
7477
7478
7479
7480
7481 023522 012742 000556
7482 023526 005242
7483 023530 000000
7484
7485 023532 005000
7486 023534 012737 177777 000000
7487 023542 005037 177776
7488 023546 106710
7489 023550 105737 000000
7490 023554 001404
7491
7492
7493
7494
7495 023556 012742 000557
7496 023562 005242
7497 023564 000000
7498
7499
7500
7501
7502
7503 023566 005212
7504 023570 022712 000244
7505 023574 001031
7506 023576 005000
7507 023600 005010
7508 023602 012737 000377 177776
7509 023610 106720
7510 023612 103003
7511 023614 102402
7512 023616 001401
7513 023620 100404
7514

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.....  
: THESE NEXT SEVEN TESTS VERIFY THE MFPS INSTRUCTION IN ALL  
: MODES. IN EACH TEST, A PATTERN OF ONES AND ZEROES IS MOVED TO THE  
: PSW, AND AN MFPS INSTRUCTION MOVES THE DATA TO A LOCATION SETUP  
: BY R0, EITHER DIRECTLY OR INDIRECTLY. CONDITIONAL BRANCHES ARE  
: USED TO CHECK PROPER ADDRESSING AND DATA.  
:.....  
: TEST 243 TEST MFPS INSTRUCTION  
:.....  
TS243: INC (R2) ;UPDATE TEST NUMBER  
CMP #243,(R2) ;SEQUENCE ERROR?  
BNE TS244-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #377,@#PS  
MFPS R0  
CMP #177757,R0  
BEQ MFPS1  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 770 <====  
MOV #556,-(R2) ;MOVE TO MAILBOX # ***** 556 *****  
INL -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MFPS FAILED  
MFPS1: CLR R0  
MOV #-1,@#0  
CLR @#PS  
MFPS (R0)  
TSTB @#0  
BEQ TS244  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 752 <====  
MOV #557,-(R2) ;MOVE TO MAILBOX # ***** 557 *****  
INL -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;MFPS FAILED  
: OR SEQUENCE ERROR  
:.....  
: TEST 244 TEST MFPS MODE 2  
:.....  
S244: INC (R2) ;UPDATE TEST NUMBER  
CMP #244,(R2) ;SEQUENCE ERROR?  
BNE TS245-10 ;BR TO ERROR HALT ON SEQ ERROR  
CLR R0 ;R0=0  
CLR (R0) ;LOC. 0=0  
MOV #377,@#PS ;SET PS=357  
MFPS (R0)+ ;TRY MFPS W/MODE 2  
BCC MFPS2A ;BR TO ERROR IF C BIT CLEAR  
BVS MFPS2A ;BR TO ERROR IF V BIT SET  
BEQ MFPS2A ;BR TO ERROR IF Z BIT SET  
BMI MFPS2B  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
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7515 : (CONDITIONAL BRANCH INST. AND <====
7516 : REPLACE THE MOVE INSTRUCTION <====
7517 : WHICH FOLLOWS W/ 765 <====
7518 MFPS2A:
7519 023622 012742 000560 MOV #560,-(R2) ;MOVE TO MAILBOX # ***** 560 *****
7520 023626 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7521 023630 000000 HALT ;COND. CODES INCORRECT
7522 023632 022737 000357 000000 MFPS2B: CMP #357,@#0 ;CHECK DEST. DATA
7523 023640 001404 BEQ MFPS2C
7524 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7525 : (CONDITIONAL BRANCH INST. AND <====
7526 : REPLACE THE MOVE INSTRUCTION <====
7527 : WHICH FOLLOWS W/ 755 <====
7528 023642 012742 000561 MOV #561,-(R2) ;MOVE TO MAILBOX # ***** 561 *****
7529 023646 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7530 023650 000000 HALT ;DEST. DATA INCORRECT
7531 023652 022700 000001 MFPS2C: CMP #1,R0 ;CHECK MODE 2 REGISTER
7532 023656 001404 BEQ TS245
7533 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7534 : (CONDITIONAL BRANCH INST. AND <====
7535 : REPLACE THE MOVE INSTRUCTION <====
7536 : WHICH FOLLOWS W/ 746 <====
7537 023660 012742 000562 MOV #562,-(R2) ;MOVE TO MAILBOX # ***** 562 *****
7538 023664 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7539 023666 000000 HALT ;MODE 2 REGISTER NOT INCREMENTED 1
7540 : OR SEQUENCE ERROR
7541
7542 :*****
7543 :TEST 245 TEST MFPS MODE 3
7544 :*****
7545 TS245: INC (R2) ;UPDATE TEST NUMBER
7546 023672 022712 000245 CMP #245,(R2) ;SEQUENCE ERROR?
7547 023676 001033 BNE TS246-10 ;BR TO ERROR HALT ON SEQ ERROR
7548 023700 012700 000406 MOV #406,R0 ;R0=406
7549 023704 005037 000000 CLR @#0 ;LOC. 0=0
7550 023710 012737 000252 177776 MOV #252,@#PS ;PS=252
7551 023716 106730 MFPS @ (R0)+ ;TRY MFPS WITH MODE 3
7552 023720 103403 BCS MFPS3A ;BR TO ERROR IF C-BIT SET
7553 023722 102402 BVS MFPS3A ;BR TO ERROR IF V-BIT SET
7554 023724 001401 BEQ MFPS3A ;BR TO ERROR IF Z-BIT SET
7555 023726 100404 BMI MFPS3B
7556 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7557 : (CONDITIONAL BRANCH INST. AND <====
7558 : REPLACE THE MOVE INSTRUCTION <====
7559 : WHICH FOLLOWS W/ 763 <====
7560 MFPS3A:
7561 023730 012742 000563 MOV #563,-(R2) ;MOVE TO MAILBOX # ***** 563 *****
7562 023734 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
7563 023736 000000 HALT ;CONDITION CODES INCORRECT
7564 023740 022737 125000 000000 MFPS3B: CMP #125000,@#0 ;CHECK DEST. DATA
7565 023746 001404 BEQ MFPS3C
7566 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7567 : (CONDITIONAL BRANCH INST. AND <====
7568 : REPLACE THE MOVE INSTRUCTION <====
7569 : WHICH FOLLOWS W/ 753 <====
7570 023750 012742 000564 MOV #564,-(R2) ;MOVE TO MAILBOX # ***** 564 *****

```

```

7571 023754 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7572 023756 000000          HALT                    ;DEST DATA INCORRECT
7573 023760 020027 000410 MFPS3C: CMP      R0,#410  ;CHECK MODE 3 REGISTER.
7574 023764 001404          BEQ      TS246
7575                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
7576                          ;          CONDITIONAL BRANCH INST. AND <====
7577                          ;          REPLACE THE MOVE INSTRUCTION <====
7578                          ;          WHICH FOLLOWS W/ 744 <====
7579 023766 012742 000565          MOV      #565,-(R2)    ;MOVE TO MAILBOX # ***** 565 *****
7580 023772 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7581 023774 000000          HALT                    ;MODE 3 REGISTER NOT INCREMENTED BY 2
7582                          ; OR SEQUENCE ERROR

```

```

*****
:TEST 246          TEST MFPS MODE 4
*****

```

```

7583
7584
7585
7586
7587 023776 005212          TS246: INC      (R2)          ;UPDATE TEST NUMBER
7588 024000 022712 000246          CMP      #246,(R2)    ;SEQUENCE ERROR?
7589 024004 001033          BNE     TS247-10      ;BR TO ERROR HALT ON SEQ ERROR
7590 024006 012700 000002          MOV      #2,R0        ;R0=2
7591 024012 005037 000000          CLR     @#0          ;LOC. 0=0
7592 024016 012737 000125 177776          MOV      #125,@#PS   ;PS=125
7593 024024 106740          MFPS    -(R0)        ;TRY MFPS W/MODE 4
7594 024026 103003          BCC     MFPS4A        ;BR TO ERROR IF C-BIT CLEAR
7595 024030 102402          BVS     MFPS4A        ;BR TO ERROR IF V-BIT SET
7596 024032 001401          BEQ     MFPS4A        ;BR TO ERROR IF Z-BIT SET
7597 024034 100004          BPL     MFPS4B

```

```

7598                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
7599                          ;          CONDITIONAL BRANCH INST. AND <
7600                          ;          REPLACE THE MOVE INSTRUCTION <---
7601                          ;          WHICH FOLLOWS W/ 763 <---

```

```

7602 024036          MFPS4A:
7603 024036 012742 000566          MOV      #566,-(R2)    ;MOVE TO MAILBOX # ***** 566 *****
7604 024042 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7605 024044 000000          HALT                    ;COND. CODES INCORRECT
7606 024046 022737 042400 000000 MFPS4B: CMP      #42400,@#0  ;CHECK DEST. DATA
7607 024054 001404          BEQ     MFPS4C

```

```

7608                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
7609                          ;          CONDITIONAL BRANCH INST. AND <===
7610                          ;          REPLACE THE MOVE INSTRUCTION <---
7611                          ;          WHICH FOLLOWS W/ 753 <=

```

```

7612 024056 012742 000567          MOV      #567,-(R2)    ;MOVE TO MAILBOX # ***** 567 *****
7613 024062 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7614 024064 000000          HALT                    ;DEST. DATA INCORRECT
7615 024066 020027 000001 MFPS4C: CMP      R0,#1    ;CHECK MODE 4 REGISTER
7616 024072 001404          BEQ     TS247

```

```

7617                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
7618                          ;          CONDITIONAL BRANCH INST. AND <====
7619                          ;          REPLACE THE MOVE INSTRUCTION <---
7620                          ;          WHICH FOLLOWS W/ 744 <=

```

```

7621 024074 012742 000570          MOV      #570,-(R2)    ;MOVE TO MAILBOX # ***** 570 *****
7622 024100 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7623 024102 000000          HALT                    ;MODE 4 REGISTER NOT DECREMENTED BY 1
7624                          ; OR SEQUENCE ERROR

```

```

*****

```

```

7625
7626

```

```

7627      ;TEST 247      TEST MFPS MODE 5
7628      :*****
7629 024104 005212      TS247: INC      (R2)      ;UPDATE TEST NUMBER
7630 024106 022112 000247  CMP      #247,(R2)    ;SEQUENCE ERROR?
7631 024112 001033      BNE      TS250-10    ;BR TO ERROR HALT ON SEQ ERROR
7632 024114 012700 000410  MOV      #410,R0    ;RO=410
7633 024120 012737 177777 000000  MOV      #-1,@#0    ;LOC. 0=-1
7634 024126 005037 177776  CLR      @#PS       ;PS=0
7635 024132 106750      MFPS     @-(R0)     ;TRY MFPS W/MODE 5
7636 024134 103403      BCS     MFPS5A     ;BR TO ERROR IF C-BIT SET
7637 024136 102402      BVS     MFPS5A     ;BR TO ERROR IF V-BIT SET
7638 024140 100401      BMI     MFPS5A     ;BR TO ERROR IF N-BIT SET
7639 024142 001404      BEQ     MFPS5B
7640      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7641      ;          CONDITIONAL BRANCH INST. AND <====
7642      ;          REPLACE THE MOVE INSTRUCTION <====
7643      ;          WHICH FOLLOWS W/ 763 <====
7644      MFPS5A:
7645 024144 012742 000571  MOV      #571,-(R2) ;MOVE TO MAILBOX # ***** 571 *****
7646 024150 005242      INC      -(R2)     ;SET MSGTYP TO FATAL ERROR
7647 024152 000000      HALT
7648 024154 022737 000377 000000  MFPS5B: CMP      #377,@#0 ;COND. CODES INCORRECT
7649 024162 001404      BEQ     MFPS5C     ;CHECK DEST. DATA
7650      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7651      ;          CONDITIONAL BRANCH INST. AND <====
7652      ;          REPLACE THE MOVE INSTRUCTION <====
7653      ;          WHICH FOLLOWS W/ 753 <====
7654 024164 012742 000572      MOV      #572,-(R2) ;MOVE TO MAILBOX # ***** 572 *****
7655 024170 005242      INC      -(R2)     ;SET MSGTYP TO FATAL ERROR
7656 024172 000000      HALT
7657 024174 020027 000406  MFPS5C: CMP      R0,#406 ;DEST DATA INCORRECT
7658 024200 001404      BEQ     TS250     ;CHECK MODE 5 REGISTER
7659      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7660      ;          CONDITIONAL BRANCH INST. AND <====
7661      ;          REPLACE THE MOVE INSTRUCTION <====
7662      ;          WHICH FOLLOWS W/ 744 <====
7663 024202 012742 000573      MOV      #573,-(R2) ;MOVE TO MAILBOX # ***** 573 *****
7664 024206 005242      INC      -(R2)     ;SET MSGTYP TO FATAL ERROR
7665 024210 000000      HALT
7666      ; MODE 5 REGISTER NOT DECREMENTED BY 2
7667      ; OR SEQUENCE ERROR
7668      :*****
7669      :TEST 250      TEST MFPS MODE 6
7670      :*****
7671 024212 005212      TS250: INC      (R2)      ;UPDATE TEST NUMBER
7672 024214 022712 000250  CMP      #250,(R2)  ;SEQUENCE ERROR?
7673 024220 001034      BNE      TS251-10  ;BR TO ERROR HALT ON SEQ ERROR
7674 024222 012700 000401  MOV      #401,R0    ;RO=410
7675 024226 005037 000000  CLR      @#0       ;LOC. 0=0
7676 024232 012737 000252 177776  MOV      #252,@#PS ;PS=252
7677 024240 106760 177377  MFPS     -401(R0)   ;TRY MFPS W/MODE 6
7678 024244 102403      BVS     MFPS6A     ;BR TO ERROR IF V-BIT SET
7679 024246 103402      BCS     MFPS6A     ;BR TO ERROR IF C-BIT SET
7680 024250 001401      BEQ     MFPS6A     ;BR TO ERROR IF Z-BIT SET
7681 024252 100404      BMI     MFPS6B
7682      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====

```

```

7683          :          CONDITIONAL BRANCH INST. AND <====
7684          :          REPLACE THE MOVE INSTRUCTION <====
7685          :          WHICH FOLLOWS W/ 762 <====
7686 024254          MFPS6A:
7687 024254 012742 000574      MOV    #574,-(R2)      ;MOVE TO MAILBOX # ***** 574 *****
7688 024260 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
7689 024262 000000          HALT                   ;COND. CODES INCORRECT
7690 024264 022737 000252 000000 MFPS6B: CMP    #252,a#0      ;CHECK DEST. DATA
7691 024272 001404          BEQ    MFPS6C
7692          :          TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7693          :          CONDITIONAL BRANCH INST. AND <====
7694          :          REPLACE THE MOVE INSTRUCTION <====
7695          :          WHICH FOLLOWS W/ 752 <====
7696 024274 012742 000575      MOV    #575,-(R2)      ;MOVE TO MAILBOX # ***** 575 *****
7697 024300 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
7698 024302 000000          HALT                   ;DEST. DATA INCORRECT
7699 024304 022700 000401      MFPS6C: CMP    #401,R0      ;CHECK DEST. REGISTER
7700 024310 001404          BEQ    TS251
7701          :          TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7702          :          CONDITIONAL BRANCH INST. AND <====
7703          :          REPLACE THE MOVE INSTRUCTION <====
7704          :          WHICH FOLLOWS W/ 743 <====
7705 024312 012742 000576      MOV    #576,-(R2)      ;MOVE TO MAILBOX # ***** 576 *****
7706 024316 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
7707 024320 000000          HALT                   ;DEST. DATA INCORRECT
7708          :          OR SEQUENCE ERROR
7709
7710
7711          :*****
7712          :TEST 251      TEST MFPS MODE 7
7713          :*****
7713 024322 005212          TS251: INC    (R2)          ;UPDATE TEST NUMBER
7714 024324 022712 000251      CMP    #251,(R2)      ;SEQUENCE ERROR?
7715 024330 001034          BNE    TS252-10       ;BR TO ERROR HALT ON SEQ ERROR
7716 024332 012700 000777      MOV    #777,R0        ;R0=777
7717 024336 005037 000000      CLR    a#0            ;LOC. 0=0
7718 024342 012737 000125 177776 MFPS  #125,a#PS        ;PS=125
7719 024350 106770 177407      MFPS  a-371(R0)      ;TRY MFPS W/MODE 7
7720 024354 102403          BVS    MFPS7A         ;BR TO ERROR IF V-BIT SET
7721 024356 103002          BCC    MFPS7A         ;BR TO ERROR IF C-BIT SET
7722 024360 001401          BEQ    MFPS7A         ;BR TO ERROR IF Z-BIT SET
7723 024362 100004          BPL    MFPS7B
7724          :          TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7725          :          CONDITIONAL BRANCH INST. AND <====
7726          :          REPLACE THE MOVE INSTRUCTION <====
7727          :          WHICH FOLLOWS W/ 762 <====
7728          MFPS7A:
7729 024364 012742 000577      MOV    #577,-(R2)      ;MOVE TO MAILBOX # ***** 577 *****
7730 024370 005242          INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
7731 024372 000000          HALT                   ;CONDITION CODE INCORRECT
7732 024374 022737 042400 000000 MFPS7B: CMP    #42400,a#0     ;CHECK DESTINATION DATA
7733 024402 001404          BEQ    MFPS7C
7734          :          TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
7735          :          CONDITIONAL BRANCH INST. AND <====
7736          :          REPLACE THE MOVE INSTRUCTION <====
7737          :          WHICH FOLLOWS W/ 752 <====
7738 024404 012742 000600      MOV    #600,-(R2)      ;MOVE TO MAILBOX # ***** 600 *****

```

```

7739 024410 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7740 024412 000000          HALT           ;DEST. DATA INCORRECT
7741 024414 022700 000777  MFPS7C: CMP      #777,R0    ;CHECK MODE 7 REGISTER
7742 024420 001404          BEQ      TS252
7743                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
7744                                     ;          CONDITIONAL BRANCH INST. AND <---
7745                                     ;          REPLACE THE MOVE INSTRUCTION <---
7746                                     ;          WHICH FOLLOWS W/ 743 <---
7747 024422 012742 000601          MOV      #601,-(R2)    ;MOVE TO MAILBOX # ***** 601 *****
7748 024426 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7749 024430 000000          HALT           ;MODE 7 REGISTER MODIFIED
7750                                     ; OR SEQUENCE ERROR
7751
7752
7753
7754
7755
7756
7757
7758
7759
7760
7761
7762
7763 024432 005212          TS252: INC      (R2)          ;UPDATE TEST NUMBER
7764 024434 022712 000252          CMP      #252,(R2)    ;SEQUENCE ERROR?
7765 024440 001010          BNE     TS253-10      ;BR TO ERROR HALT ON SEQ ERROR
7766 024442 012737 000357 177776  MOV      #357,@#PS    ;MOV ONES TO PSW
7767 024450 000005          RESET
7768 024452 022737 000357 177776  CMP      #357,@#PS    ;PSW CORRECT?
7769 024460 001404          BEQ     TS253
7770                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
7771                                     ;          CONDITIONAL BRANCH INST. AND <=
7772                                     ;          REPLACE THE MOVE INSTRUCTION <=
7773                                     ;          WHICH FOLLOWS W/ 767 <=
7774 024462 012742 000602          MOV      #602,-(R2)    ;MOVE TO MAILBOX # ***** 602 *****
7775 024466 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
7776 024470 000000          HALT           ;RESET ALTERED PSW
7777                                     ; OR SEQUENCE ERROR
7778 024472          REST:
7779
7780
7781
7782
7783
7784
7785
7786
7787
7788 024472 005212          TS253: INC      (R2)          ;UPDATE TEST NUMBER
7789 024474 022712 000253          CMP      #253,(R2)    ;SEQUENCE ERROR?
7790 024500 001022          BNE     TS254-10      ;BR TO ERROR HALT ON SEQ ERROR
7791 024502 012767 000340 153266  MOV      #340,PS      ;LOCK OUT INTERRUPTS WHILE PLAYING WITH R6
7792 024510 052767 140000 153260  BIS      #USRM,PS     ;SET USER MODE
7793 024516 012706 000001          MOV      #1,R6        ;SET BIT0
7794 024522 000241          CLC           ;CLEAR C-BIT

```

```

:*****
: THIS TEST VERIFIES THAT RESET DOES NOT CLEAR THE PSW.
: THE PSW IS LOADED WITH ONES, A RESET IS ISSUED, AND THE
: CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT THEY HAVE NOT
: CHANGED. THIS TEST IS EXECUTED ONLY ONCE EVERY 240 (DECIMAL)
: ITERATIONS OF PROGRAM.
:*****

```

```

:*****
: TEST 252 TEST THAT RESET DOES NOT CLEAR PSW
:*****

```

```

TS252: INC      (R2)          ;UPDATE TEST NUMBER
      CMP      #252,(R2)    ;SEQUENCE ERROR?
      BNE     TS253-10      ;BR TO ERROR HALT ON SEQ ERROR
      MOV      #357,@#PS    ;MOV ONES TO PSW
      RESET
      CMP      #357,@#PS    ;PSW CORRECT?
      BEQ     TS253
      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
      ;          CONDITIONAL BRANCH INST. AND <=
      ;          REPLACE THE MOVE INSTRUCTION <=
      ;          WHICH FOLLOWS W/ 767 <=
      MOV      #602,-(R2)    ;MOVE TO MAILBOX # ***** 602 *****
      INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
      HALT           ;RESET ALTERED PSW
      ; OR SEQUENCE ERROR

```

```

REST:
:*****
: THE FOLLOWING TEST CHECKS THE INDEPENDENT FUNCTIONING OF BASIC
: DATA PATH COMPONENTS WITH USER MODE SET.
:*****

```

```

:*****
: TEST 253 TEST USER MODE R6 CAN HOLD A ONE IN EVERY POSITION
:*****

```

```

TS253: INC      (R2)          ;UPDATE TEST NUMBER
      CMP      #253,(R2)    ;SEQUENCE ERROR?
      BNE     TS254-10      ;BR TO ERROR HALT ON SEQ ERROR
      MOV      #340,PS      ;LOCK OUT INTERRUPTS WHILE PLAYING WITH R6
      BIS      #USRM,PS     ;SET USER MODE
      MOV      #1,R6        ;SET BIT0
      CLC           ;CLEAR C-BIT

```

TEST USER MODE R6 CAN HOLD A ONE IN EVERY POSITION

```

7795 024524 006106      USP1:  ROL      R6          ;ROTATE 1 POSITION
7796 024526 103376      BCC     USP1      ;BR IF NOT ALL DONE
7797 024530 001407      BEQ     USP1A     ;BR IF NO BITS PICKED
7798 024532 042767 140C00 153236  BIC     #USRM,PS   ;CLEAR USER MODE
7799 024540 012742 000603      MOV     #603,-(R2) ;MOVE TO MAILBOX # ***** 603 *****
7800 024544 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
7801 024546 000000      HALT                    ;USER MODE R6 PICKED A BIT
7802 024550 042767 140000 153220  USP1A: BIC     #USRM,PS   ;CLEAR USER MODE

```

```

:*****
:
:      THIS TEST CHECKS THE INDEPENDENT FUNCTIONING OF THE USER
:AND KERNEL MODE R6'S. R6 IS SETUP AND ADDRESSED IN EACH
:OF THE TWO MODES TO VERIFY THAT THE TWO R6'S ARE INDEPENDENT
:OF EACH OTHER.

```

```

:*****
:TEST 254      TEST INDEPENDENCE OF USER AND KERNEL MODE R6'S
:*****

```

```

7815 024556 005212      TS254: INC     (R2)          ;UPDATE TEST NUMBER
7816 024560 022712 000254      CMP     #254,(R2)   ;SEQUENCE ERROR?
7817 024564 001046      BNE     USP4-10    ;BR TO ERROR HALT ON SEQ ERROR
7818 024566 012767 000340 153202  MOV     #340,PS     ;LOCK OUT INTERRUPTS WHILE PLAYING WITH R6
7819 024574 052767 140000 153174  BIS     #USRM,PS    ;SET USER MODE
7820 024602 012706 177777      MOV     #-1,R6     ;SET USER R6 TO ALL ONES
7821 024606 022706 177777      CMP     #-1,R6     ;READ AND CHECK USER R6
7822 024612 001407      BEQ     USP2      ;BR IF NO ERROR
7823 024614 042767 140000 153154  BIC     #USRM,PS    ;CLEAR USER MODE
7824 024622 012742 000604      MOV     #604,-(R2) ;MOVE TO MAILBOX # ***** 604 *****
7825 024626 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
7826 024630 000000      HALT                    ;USER R6 WILL NOT HOLD ALL ONES
7827 024632 042767 140000 153136  USP2:  BIC     #USRM,PS   ;SET KERNEL MODE
7828 024640 022706 177777      CMP     #-1,R6     ;KERNEL MODE R6 ADDR. FROM USER MODE?>>
7829 024644 001004      BNE     USP3

```

```

7830      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
7831      ;          CONDITIONAL BRANCH INST. AND <
7832      ;          REPLACE THE MOVE INSTRUCTION <
7833      ;          WHICH FOLLOWS W/ 747 <

```

```

7834 024646 012742 000605      MOV     #605,-(R2) ;MOVE TO MAILBOX # ***** 605 *****
7835 024652 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
7836 024654 000000      HALT                    ;DUAL ADDRESSING ERROR USER/KERNEL R6
7837 024656 005006      USP3:  CLR     R6          ;CLEAR KERNEL MODE SP
7838 024660 052767 140000 153110  BIS     #USRM,PS    ;SET USER MODE
7839 024666 022706 177777      CMP     #-1,R6     ;CHECK USER R6 NOT ADDR. FROM KERNEL MODE
7840 024672 042767 140000 153076  BIC     #USRM,PS    ;CLEAR USER MODE
7841 024700 001404      BEQ     USP4      ;BR IF NO ERROR
7842 024702 012742 000606      MOV     #606,-(R2) ;MOVE TO MAILBOX # ***** 606 *****
7843 024706 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
7844 024710 000000      HALT                    ;DUAL ADDRESSING ERROR OR SEQUENCE ERROR
7845 024712 012706 001000 153052  USP4:  MOV     #STBOT,R6 ;RESTORE SP USER
7846 024716 042767 140000      BIC     #USRM,PS    ;SET KERNEL MODE
7847 024724 012706 001000      MOV     #STBOT,R6   ;RESTORE SP KERNEL

```

```

7848      :*****
7849      :
7850      :

```

THESE NEXT TWO TESTS VERIFY MFPI AND MTPI INSTRUCTIONS
WITH R6 IN MODE 0.

```

7851 :
7852 :
7853 :
7854 :
7855 :TEST 255      TEST MFPI WITH R6 IN MODE 0
7856 :*****
7857 TS255:  INC      (R2)          ;UPDATE TEST NUMBER
7858      CMP      #255,(R2)      ;SEQUENCE ERROR?
7859      BNE      TS256-10      ;BR TO ERROR HALT ON SFQ ERROR
7860      MOV      #STBOT,R6      ;INITIALIZE KERNEL STACK POINTER
7861      MOV      #USRM,PS       ;SET USER MODE.PREVIOUS KERNEL
7862      MOV      #USTBOT,R6     ;INITIALIZE USER STACK POINTER
7863      MFPI    R6             ;TRY MFPI WITH MODE 0
7864      CMP      #140000,PS     ;CHECK PSW
7865      BEQ     MFPI0         ;BR IF NO ERROR
7866      BIC     #USRM,PS       ;CLEAR USER MODE
7867      MOV     #607,-(R2)     ;MOVE TO MAILBOX # ***** 607 *****
7868      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
7869      HALT                    ;INCORRECT PSW FROM MFPI
7870 MFPI0:  BIC     #USRM,PS     ;CLEAR USER MODE
7871      CMP     #STBOT,USTBOT-2 ;CHECK DATA ON STACK
7872      BEQ     MFPI0A        ;BR IF NO ERROR
7873      MOV     #610,-(R2)     ;MOVE TO MAILBOX # ***** 610 *****
7874      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
7875      HALT                    ;INCORRECT DATA FROM MFPI
7876 MFPI0A:
7877 :
7878 :*****
7879 :TEST 256      TEST MTPI WITH R6 IN MODE 0
7880 :*****
7881 TS256:  INC      (R2)          ;UPDATE TEST NUMBER
7882      CMP      #256,(R2)      ;SEQUENCE ERROR?
7883      BNE      TS257-10      ;BR TO ERROR HALT ON SEQ ERROR
7884      MOV      #340,PS       ;SET KERNEL MODE AND LOCK OUT INTERRUPTS
7885      CLR     R6             ;INITIALIZE KERNEL R6
7886      BIS     #USRM,PS       ;SET USER MODE/PREVIOUS KERNEL
7887      MOV      #USTBOT,R6     ;INITIALIZE USER STACK POINTER
7888      MOV      #STBOT,-(R6)   ;SET UP TARGET DATA
7889      MTPI   R6             ;TRY MODE 0 MTPI
7890      CMP      #140340,PS     ;CHECK PSW
7891      BEQ     MTPI0         ;BR IF NO ERROR
7892      BIC     #USRM,PS       ;CLEAR USER MODE
7893      MOV     #611,-(R2)     ;MOVE TO MAILBOX # ***** 611 *****
7894      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
7895      HALT                    ;PS INCORRECT FOLLOWING MTPI
7896 MTPI0:  BIC     #USRM,PS     ;SET KERNEL MODE
7897      CMP     R6,#STBOT      ;CHECK TARGET DATA
7898      BEQ     TS257
7899 :
7900 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
7901 :          CONDITIONAL BRANCH INST. AND <---
7902 :          REPLACE THE MOVE INSTRUCTION <---
7903 :          WHICH FOLLOWS W/ 742 <---
7904 :
7905      MOV     #612,-(R2)     ;MOVE TO MAILBOX # ***** 612 *****
7906      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
7907      HALT                    ;DATA INCORRECT FOLLOWING MTPJ
7908 :          OR SEQUENCE ERROR

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T256 TEST MPI WITH R6 IN MODE 0

E 13

SEQ 0160

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025146 005212
025150 022712 000257
025154 001062
025156 012700 027214
025162 012704 027252
025166 012767 000017 000142
025174 012067 000110
025200 012401
025202 012767 177777 000074
025210 012703 000020
025214 005267 000064
025220 032701 100000
025224 013705 177776
025230 042705 177773
025234 000165 025240
025240 000167 000020
025244 012767 025340 000042
025252 012767 025322 000040
025260 000167 000014
025264 012767 025322 000022
025272 012767 025340 000020
025300 006101
025302 012737
025304 000000
025306 177776
025310 000000
025312 000137
025314 000000
025316 000137

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.....
:
: THIS TEST EXECUTES EVERY POSSIBLE BRANCH WITH EVERY POSSIBLE
: CONDITION CODE COMBINATION.
: THE ROUTINE USES TWO TABLES. THE BRANCH TABLE HOLDS ALL THE
: POSSIBLE BRANCH INSTRUCTIONS, THE OTHER TABLE (YNTAB) HOLDS BIT MAPS FOR
: EACH BRANCH. A ONE IN THE BIT MAP INDICATES THAT THE CORRESPONDING
: BRANCH INSTRUCTION SHOULD BRANCH FOR THE CONDITION CODE SETTING WHICH
: CORRESPONDS TO THE BIT POSITION WITHIN THE MAP. FOR EXAMPLE IF THE LEFT
: MOST BIT IS A ONE THEN THE CORRESPONDING BRANCH INSTRUCTION SHOULD BRANCH
: WHEN THE CONDITION CODES ARE 0.
: THE ROUTINE CONSISTS OF NESTED LOOPS; THE OUTER LOOP SETS UP
: ALL THE POSSIBLE BRANCH INSTRUCTIONS. THE INNER LOOP SETS UP EVERY POSSIBLE
: CONDITION CODE FOR EACH BRANCH.
: THE BIT MAP IS USED TO SET THE ADDRESS LOCATION IN TWO
: JUMP MODE 3 INSTRUCTIONS. THE ADDRESSES ARE CHANGED TO ALLOW THE
: PROGRAM TO CONTINUE OR JUMP TO AN ERROR ROUTINE DEPENDING UPON
: WHETHER IT HANDLED THE BRANCH INSTRUCTION CORRECTLY.
: AT ANY ERROR HALT, LOCATION, BRH, HOLDS THE BRANCH INSTRUCTION
: UNDER TEST AND LOCATION, CC, HOLDS THE VALUE OF THE CONDITION CODES
: AT THE TIME THE BRANCH WAS EXECUTED.
:
: *****
: TEST 257 TEST THE BRANCH ROM
: *****
TS257: INC (R2) ;UPDATE TEST NUMBER
CMP #257,(R2) ;SEQUENCE ERROR?
BNE ER ;BR TO ERROR HALT ON SEQ ERROR
SETUP: MOV #BRTAB,R0 ;INITIALIZE BRANCH TABLE POINTER
MOV #YNTAB,R4 ;INITIALIZE YES/NO BRANCH MAP POINTER
MOV #15, BRCT ;INITIALIZE BRANCH TABLE COUNT
SETBR: MOV (R0)+,BRH ;GET NEXT BRANCH INST.
MOV (R4)+,R1 ;GET NEXT BRANCH MAP
MOV #-1,CC1 ;INITIALIZE CONDITION CODE VALUE
MOV #16, R3 ;INITIALIZE CONDITION CODE COUNT
SETCC: INC CC1 ;SET FOR NEXT CC VALUE
BIT #100000,R1 ;SEE IF SHOULD BR W/ THESE CC'S
MOV @#177776,R5 ;SIMULATE A JNE
BIC #177773,R5 ; (JUMP NOT EQUAL)
JMP .+4(R5) ; TO SET2BR
JMP SET2BR
MOV #CONT,NBR ;SET TO CONTINUE IF NO BRANCH
MOV #ER,YBR ;SET TO REPORT ERROR IF BRANCH
JMP AROUND ;GO AROUND OPPOSITE CONDITION
SET2BR: MOV #ER,NBR ;SET TO REPORT ERROR IF NO BRANCH
MOV #CONT,YBR ;SET TO CONTINUE IF BRANCH
AROUN: ROL R1 ;UPDATE BIT MAP
MOV (PC)+,@(PC)+ ;SET CONDITION CODE
CC1: 0 ;NEW CC VALUE GOES HERE
177776
BRH: 0 ;BRANCH INST. GOES HERE
JMP @ (PC)+ ;THIS JUMP IF NO BRANCH
NBR: 0 ;WHERE TO GO IF NO BRANCH OCCURS
JMP @ (PC)+ ;THIS JUMP IF BRANCH OCCURS
:
: *****
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7964 025320 000000
7965 025322 012702 000304
7966 025326 012742 000613
7967 025332 005242
7968 025334 000000
7969 025336 000000
7970 025340 005303
7971 025342 013705 177776
7972 025346 042705 177773
7973 025352 000165 025356
7974 025356 000167 177632
7975 025362 005367 177750
7976 025366 013705 177776
7977 025372 042705 177773
7978 025376 000165 025402
7979 025402 000167 177566

YBR: 0 ;WHERE TO GO IF BRANCH OCCURS
ER: MOV #STESTN,R2 ;RESTORE POINTER
MOV #613,-(R2) ;MOVE TO MAILBOX # 613
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;
BRCT: 0 ;
CONT: DEC R3 ;CC'S DONE?
MOV @#177776,R5 ;SIMULATE A JNE
BIC #177773,R5 ; (JUMP NOT EQUAL)
JMP .+4(R5) ; TO SETCC
SETCC
DEC BRCT ;BR'S DONE?
MOV @#177776,R5 ;SIMULATE A JNE
BIC #177773,R5 ; (JUMP NOT EQUAL)
JMP .+4(R5) ; TO SETBR
SETBR

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7991 025406 005212
7992 025410 022712 000260
7993 025414 001051
7994 025416 005000
7995 025420 005001
7996 025422 005002
7997 025424 005003
7998 025426 005004
7999 025430 005005
8000 025432 052700 000001
8001 025436 052701 000002
8002 025442 052702 000004
8003 025446 052703 000010
8004 025452 052704 000020
8005 025456 052705 000040
8006 025462 052706 001000
8007 025466 022706 001000
8008 025472 001022
8009 025474 022705 000040
8010 025500 001017
8011 025502 022704 000020
8012 025506 001014
8013 025510 022703 000010
8014 025514 001011
8015 025516 022702 000004
8016 025522 001006
8017 025524 022701 000002
8018 025530 001003
8019 025532 022700 000001
8020 025536 001404
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8025 025540
8026 025540 012742 000614
8027 025544 005242
8028 025546 000000
8029 025550 012702 000304
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: THE FOLLOWING TEST VERIFIES THAT NO DUAL ADDRESSING OF THE GENERAL
: REGISTERS OCCURS. ALL REGISTERS ARE CLEARED, AND A UNIQUE BIT IS SET
: IN EACH. CMP INSTRUCTIONS CHECK THAT ONLY ONE BIT IS SET IN EACH
: REGISTER.
.....
: TEST 260 DUAL REGISTER ADDRESSING TEST
.....
TS260: INC (R2) ;UPDATE TEST NUMBER
CMP #260,(R2) ;SEQUENCE ERROR?
BNE DAERR ;BR TO ERROR HALT ON SEQ ERROR
BITCLR: CLR R0 ;INITIALIZE ALL REGISTERS
CLR R1
CLR R2
CLR R3
CLR R4
CLR R5
BITSET: BIS #1,R0 ;SET R0 1
BIS #2,R1 ;R1=2
BIS #4,R2 ;R2=4
BIS #10,R3 ;R3=10
BIS #20,R4 ;R4=20
BIS #40,R5 ;R5=40
BITCHK: CMP #1000,R6 ;R6=1000
BNE DAERR ;TEST THAT NO DUAL ADDRESSING OCCURRED
CMP #40,R5 ;BR TO ERROR HALT IF ANY OTHER BITS ARE SET
BNE DAERR
CMP #20,R4
BNE DAERR
CMP #10,R3
BNE DAERR
CMP #4,R2
BNE DAERR
CMP #2,R1
BNE DAERR
CMP #1,R0
BEQ BITCON
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
; CONDITIONAL BRANCH INST. AND
; REPLACE THE MOVE INSTRUCTION
; WHICH FOLLOWS W/ 726
DAERR: MOV #614,-(R2) ;MOVE TO MAILBOX # ..... 614 .....
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DUAL ADDRESSING ERROR
BITCON: MOV #TESTN,R2 ;RESTORE POINTER

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8040 025554 005212
8041 025556 022712 000261
8042 025562 001012
8043 025564 052737 170357 177776
8044 025572 105037 177776
8045 025576 013700 177776
8046 025602 022700 170004
8047 025606 001006
8048 025610 005037 177776
8049 025614 012742 000615
8050 025620 005242
8051 025622 000000
8052 025624 005037 177776
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8063 025630 005212
8064 025632 022712 000262
8065 025636 001010
8066 025640 000277
8067 025642 000252
8068 025644 000167 000000
8069 025650 100403
8070 025652 001002
8071 025654 102401
8072 025656 03404
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8077 025660
8078 025660 012742 000616
8079 025664 005242
8080 025666 000000
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:*****
: THIS TEST VERIFIES THAT THE UPPER BYTE OF THE PSW IS NOT AFFECTED
: WHEN THE PRIORITY LEVEL OR CC'S ARE CHANGED. ALL BITS ARE
: INITIALLY SET IN THE PSW, AND THE LOW BYTE IS CLEARED. A BIT
: INSTRUCTION VERIFIES THE DATA.
:*****

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:*****
: TEST 261 TEST BYTE INSTRUCTION ON PSW
:*****
TS261: INC (R2) ;UPDATE TEST NUMBER
CMP #261,(R2) ;SEQUENCE ERROR?
BNE BTERR ;BR TO ERROR HALT ON SEQ ERROR
BIS #170357,@#PS ;SET ALL POSSIBLE BITS IN PSW
CLRB @#PS ;CLR PR LEVEL AND CC'S
MOV @#PS,R0 ;COPY CONTENTS OF PSW
CMP #170004,R0 ;TEST THAT CLRB AFFECTED ONLY LOW BYTE
BNE BTCON ;CONTINUE IF OK
BTERR: CLR @#PS ;RETURN TO KERNEL MODE
MOV #615,-(R2) ;MOVE TO MAILBOX # ***** 615 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;BYTE INSTRUCTION ALTERED PSW
BTCON: CLR @#PS ;RETURN TO KERNEL MODE

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:*****
: THIS TEST VERIFIES THAT A JMP INSTRUCTION DOES NOT ALTER THE
: CONDITION CODES IN THE PSW. THE CC'S ARE PRESET, THE JMP IS
: EXECUTED, AND CONDITIONAL BRANCHES VERIFY THE STATE OF THE CC'S.
:*****

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:*****
: TEST 262 TEST THAT JMP INSTRUCTION DOES NOT AFFECT CONDITION CODES
:*****
TS262: INC (R2) ;UPDATE TEST NUMBER
CMP #262,(R2) ;SEQUENCE ERROR?
BNE TS263-10 ;BR TO ERROR HALT ON SEQ ERROR
SCC ;CC-0101
+CLN.CLV ;JUMP TO TEST PSW
JMPT: BMI JMPERR ;BR TO ERROR HALT IF N-BIT IS SET
BNE JMPERR ;BR TO ERROR HALT IF Z-BIT IS CLEAR
BVS JMPERR ;BR TO ERROR HALT IF V-BIT IS SET
BCS TS263
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <---
; REPLACE THE MOVE INSTRUCTION <---
; WHICH FOLLOWS W/ 767 <---
JMPPERR: MOV #616,-(R2) ;MOVE TO MAILBOX # ***** 616 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;JMP INSTRUCTION AFFECTED CC'S
; OR SEQUENCE ERROR

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025670 005212
025672 022712 000263
025676 001062
025700 012767 000240 000024
025706 012767 000017 000032
025714 012767 000261 000102
025722 012767 000001 000110
025730 000277
025732 000000
025734 013704 177776
025740 042704 177760
025744 022704
025746 000000
025750 001404

012742 000617
005242
000000
005367 177760
005267 177740
026727 177734 000257
026000 003753
026002 026727 177724 000260
026010 001004
026012 012767 000017 177726
026020 000743
026022 000257
026024 000000
026026 013704 177776
026032 042704 177760
026036 022704
026040 000000
026042 001404

.....
: THIS TEST VERIFIES THE SET AND CLEAR CONDITION CODE INSTRUCTIONS.
: THE TEST CONSISTS OF TWO ROUTINES, ONE TO TEST ALL CLEAR CC
: INSTRUCTIONS, AND THE SECOND TO TEST ALL SET CC INSTRUCTIONS. ALL
: POSSIBLE COMBINATIONS OF CONDITION CODES ARE TESTED, INCLUDING NOP'S.
: TO TEST THE CLEAR CC INSTRUCTIONS, ALL CONDITION CODES ARE
: INITIALLY SET. THE INSTRUCTION IS EXECUTED, AND THE PSW IS CHECKED
: TO VERIFY THE PROPER COMBINATION OF CONDITION CODES.
: TO TEST THE SET CC INSTRUCTIONS, THE CONDITION CODES ARE
: INITIALLY CLEARED, AND ONLY THE REQUIRED BITS ARE SET BY THE SET CC
: INSTRUCTION. THE CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT
: ONLY THE REQUIRED BITS WERE SET.
:

: TEST 263 TEST SET CC AND CLEAR CC INSTRUCTIONS
:

TS263: INC (R2) ;UPDATE TEST NUMBER
CMP #263,(R2) ;SEQUENCE ERROR?
BNE CCERR ;BR TO ERROR HALT ON SEQ ERROR
MOV #240,CC3 ;INITIALIZE CLR CC INSTRUCTION CODES
MOV #17,CC2 ;INITIALIZE OCTAL MAP
MOV #261,SC3 ;INITIALIZE SET CC INSTRUCTION CODES
MOV #1,SC4 ;INITIALIZE OCTAL MAP
CLRCD: SCC ;SET ALL CONDITION CODES
CC3: 0 ;CONDITION CODE INSTRUCTION
MOV @#PS,R4 ;COPY THE PSW
BIC #177760,R4 ;ISOLATE CONDITION CODES
CMP (PC)+,R4 ;CHECK THAT PROPER CC'S WERE CLEARED
CC2: 0 ;OCTAL REPRESENTATION OF CC'S
BEQ CON1

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
: CONDITIONAL BRANCH INST. AND <== -
: REPLACE THE MOVE INSTRUCTION < - -
: WHICH FOLLOWS W/ 752 < - -
:

MOV #617,-(R2) ;MOVE TO MAILBOX # ***** 617 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;CLEAR CC INSTRUCTION FAILED
CON1: DEC CC2 ;SET NEXT OCTAL MAP OF CC'S
INC CC3 ;GET NEXT CLEAR CC INSTRUCTION
CMP CC3,#257 ;TEST FOR CCC INSTRUCTION
BLE CLRCD ;GO TEST NEXT INSTRUCTION IF NOT FOUND
CMP CC3,#260 ;CHECK FOR NOP=260
BNE SETCD ;GO TEST SET CC INSTRUCTIONS
MOV #17,CC2 ;SET OCTAL MAP TO TEST NOP
BR CLRCD ;GO TEST NOP
SETCD: CCC ;CLEAR ALL CONDITION CODES
SC3: 0 ;CONDITION CODE INSTRUCTION
MOV @#FS,R4 ;COY PSW
BIC #177760,R4 ;CLEAR AWAY UNWANTED BITS
CMP (PC)+,R4 ;CHECK THAT PROPER CC'S WERE SET
SC4: 0 ;OCTAL REPRESENTATION OF CC'S
BEQ CON2

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
: CONDITIONAL BRANCH INST. AND <== -
: REPLACE THE MOVE INSTRUCTION < - -
:

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1263 TEST SET CC AND CLEAR CC INSTRUCTIONS

SEQ 0164

8138	026044		
8140	026044	012742	000620
8141	026050	005242	
8142	026052	000000	
8143	026054	005267	177760
8144	026060	005267	177740
8145	026064	026727	177734
8146	026072	003753	
8147	026074	000167	000006

000277

CCERR:

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MOV #620,-(R2)
INC -(R2)
HALT
CON2: INC SC4
      INC SC3
      CMP SC3,#277
      BLE SETCD
      JMP MO:0

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; WHICH FOLLOWS W/ 715
; MOVE TO MAILBOX # ***** 620 *****
; SET MSGTYP TO FATAL ERROR
; SET CC FAILED OR SEQUENCE ERROR
; SET NEXT OCTAL MAP
; PREPARE NEXT SET CC INSTRUCTION
; FINISHED?
; BR IF NO
; JUMP TO NEXT TESTS

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8148 :*****
8149 :SBITL TEST INSTRUCTIONS USING SAME REGISTER FOR SOURCE & DESTINATION
8150 :
8151 :IN AUTO INCREMENT (DECREMENT) MODES AND
8152 :AUTO INCREMENT (DECREMENT) DEFERRED MODES,
8153 :CONTENTS OF THE REGISTER IN USED ARE
8154 :INCREMENTED (DECREMENTED) BY 2
8155 :BEFORE USED AS THE SOURCE OPERAND.
8156 :
8157 026100 000000 000000 000000 A: .WORD 0,0,0
8158 026106 MORO:
8159 :*****
8160 :TEST 264 TEST AUTO-INCREMENT MODE, USING R0
8161 :*****
8162 026106 005212 TS264: INC (R2) ;UPDATE TEST NUMBER
8163 026110 022712 000264 CMP #264,(R2) ;SEQUENCE ERROR?
8164 026114 001020 BNE TS265-10 ;BR TO ERROR HALT ON SEQ ERROR
8165 026116 005037 026100 CLR @#A ;CLEAR LOC A
8166 026122 012700 026100 MOV #A,R0 ;R0 STORES ADDR OF A
8167 026126 060020 ADD R0,(R0)+ ;CHECK THAT R0 IS INCR BY 2 BEFORE
8168 : ;BEING USED AS THE SOURCE OPERAND
8169 026130 022700 026102 CMP #A+2,R0 ;R0 INCR BY 2?
8170 026134 001404 BEQ MOR1
8171 : ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
8172 : ; CONDITIONAL BRANCH INST. AND <---
8173 : ; REPLACE THE MOVE INSTRUCTION <---
8174 : ; WHICH FOLLOWS W/ 767 <---
8175 026136 012742 000621 MOV #621,-(R2) ;MOVE TO MAILBOX # ***** 621 *****
8176 026142 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8177 026144 000000 HALT ;R0 WAS NOT INCREMENTED BY 2
8178 :
8179 026146 022737 026102 026100 MOR1: CMP #A+2,@#A ;CHECK CONTENT OF R0 WAS INCR BY 2 BEFORE
8180 : ;BEING USED IN THE "ADD" INSTR
8181 : ;LOC A CONTAINS (A+2)?
8182 026154 001404 BEQ TS265
8183 : ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8184 : ; CONDITIONAL BRANCH INST. AND <====
8185 : ; REPLACE THE MOVE INSTRUCTION <====
8186 : ; WHICH FOLLOWS W/ 757 <====
8187 026156 012742 000622 MOV #622,-(R2) ;MOVE TO MAILBOX # ***** 622 *****
8188 026162 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8189 026164 000000 HALT ;WRONG SUM IN LOC A
8190 : ; OR SEQUENCE ERROR
8191 :
8192 :*****
8193 :TEST 265 AUTO-DECREMENT MODE, USING R0
8194 :*****
8195 026166 005212 TS265: INC (R2) ;UPDATE TEST NUMBER
8196 026170 022712 000265 CMP #265,(R2) ;SEQUENCE ERROR?
8197 026174 001020 BNE TS266-10 ;BR TO ERROR HALT ON SEQ ERROR
8198 026176 005037 026100 CLR @#A ;CLEAR LOC A
8199 026202 012700 026102 MOV #A+2,R0 ;R0 STORES ADDR OF A+2
8200 026206 060040 ADD R0,-(R0) ;CHECK THAT R0 IS DECR BY 2 BEFORE
8201 : ;BEING USED AS THE SOURCE OPERAND
8202 026210 022700 026100 CMP #A,R0 ;R0 DECR BY 2?
8203 026214 001404 BEQ MOR2
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8204 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8205 ; CONDITIONAL BRANCH INST. AND <====
8206 ; REPLACE THE MOVE INSTRUCTION <====
8207 ; WHICH FOLLOWS W/ 767 <====
8208 026216 012742 000623 MOV #623,-(R2) ; MOVE TO MAILBOX # ***** 623 *****
8209 026222 005242 INC -(R2) ; SET MSGTYP TO FATAL ERROR
8210 026224 000000 HALT ; RO WAS NOT DECREMENTED BY 2
8211
8212 026226 022737 026100 026100 MOR2: CMP #A,@#A ; CONTENT OF RO WAS DECR BY 2 BEFORE
8213 ; BEING USED IN THE 'ADD' INSTR
8214 ; LOC A CONTAINS (RO)
8215 026234 001404 BEQ TS266
8216 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8217 ; CONDITIONAL BRANCH INST. AND <====
8218 ; REPLACE THE MOVE INSTRUCTION <====
8219 ; WHICH FOLLOWS W/ 757 <====
8220 026236 012742 000624 MOV #624,-(R2) ; MOVE TO MAILBOX # ***** 624 *****
8221 026242 005242 INC -(R2) ; SET MSGTYP TO FATAL ERROR
8222 026244 000000 HALT ; WRONG SUM IN LOC A
8223 ; OR SEQUENCE ERROR
8224
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8226 ;*****
8227 ;TEST 266 TEST AUTO-INCREMENT DEFERRED MODE, USING RO
8228 ;*****
8228 026246 005212 TS266: INC (R2) ; UPDATE TEST NUMBER
8229 026250 022712 000266 CMP #266,(R2) ; SEQUENCE ERROR?
8230 026254 001044 BNE TS267-10 ; BR TO ERROR HALT ON SEQ ERROR
8231 026256 005037 026100 CLR @#A ; CLEAR LOC A
8232 026262 005037 026104 CLR @#A+4 ; CLEAR LOC A+4
8233 026266 012737 026100 026102 MOV #A,@#A+2 ; STORE ADDR A IN LOC A+2
8234 026274 012700 026102 MOV #A+2,RO ; RO STORES ADDR A+2
8235 026300 060030 ADD RO,@(RO)+ ; CHECK THAT RO IS INCR BY 2 BEFORE
8236 ; BEING USED AS THE SOURCE OPERAND
8237 026302 022700 026104 CMP #A+4,RO ; RO INCR BY 2?
8238 026306 001404 BEQ MOR3
8239 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
8240 ; CONDITIONAL BRANCH INST. AND <--
8241 ; REPLACE THE MOVE INSTRUCTION <=
8242 ; WHICH FOLLOWS W/ 762 <-
8243 026310 012742 000625 MOV #625,-(R2) ; MOVE TO MAILBOX # ***** 625 *****
8244 026314 005242 INC -(R2) ; SET MSGTYP TO FATAL ERROR
8245 026316 000000 HALT ; RO WAS NOT INCREMENTED BY 2
8246
8247 026320 022737 026100 026102 MOR3: CMP #A,@#A+2 ; LOC A+2 STILL STORES ADDR A?
8248 026326 001404 BEQ MOR4
8249 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
8250 ; CONDITIONAL BRANCH INST. AND <--
8251 ; REPLACE THE MOVE INSTRUCTION <==
8252 ; WHICH FOLLOWS W/ 752 <--
8253 026330 012742 000626 MOV #626,-(R2) ; MOVE TO MAILBOX # ***** 626 *****
8254 026334 005242 INC -(R2) ; SET MSGTYP TO FATAL ERROR
8255 026336 000000 HALT ; LOC A+2 STORES WRONG DATA
8256
8257 026340 022737 026104 026100 MOR4: CMP #A+4,@#A ; CHECK CONTENT OF RO WAS INCR BY 2 BEFORE
8258 ; BEING USED IN THE 'ADD' INSTR
8259 026346 001404 BEQ MOR5
```



```
8260 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8261 ; CONDITIONAL BRANCH INST. AND <====
8262 ; REPLACE THE MOVE INSTRUCTION <====
8263 ; WHICH FOLLOWS W/ 742 <====
8264 026350 012742 000627 MOV #627,-(R2) ;MOVE TO MAILBOX # ***** 627 *****
8265 026354 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8266 026356 000000 HALT ;LOC A STORES WRONG DATA
8267 ;
8268 026360 005737 026104 MOR5: TST @#A+4 ;LOC A+4 STILL STORES 0?
8269 026364 001404 BEQ TS267
8270 ;
8271 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8272 ; CONDITIONAL BRANCH INST. AND <====
8273 ; REPLACE THE MOVE INSTRUCTION <====
8274 ; WHICH FOLLOWS W/ 733 <====
8274 026366 012742 000630 MOV #630,-(R2) ;MOVE TO MAILBOX # ***** 630 *****
8275 026372 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8276 026374 000000 HALT ;LOC A+4 DID NOT STAY CLEAR
8277 ; OR SEQUENCE ERROR
8278 ;
8279 ;*****
8280 ;TEST 267 TEST AUTO-DECREMENT DEFERRED, USING R0
8281 ;*****
8282 026376 005212 TS267: INC (R2) ;UPDATE TEST NUMBER
8283 026400 022712 000267 CMP #267,(R2) ;SEQUENCE ERROR?
8284 026404 001044 BNE TS270-10 ;BR TO ERROR HALT ON SEQ ERROR
8285 026406 005037 026100 CLR @#A ;CLEAR LOC A
8286 026412 005037 026104 CLR @#A+4 ;CLEAR LOC A+4
8287 026416 012700 026104 MOV #A+4,R0 ;R0 STORES ADDR A+4
8288 026422 012737 026100 026102 MOV #A,@#A+2 ;STORE ADDR A IN LOC A+2
8289 026430 060050 ADD R0,@-(R0) ;CHECK THAT R0 IS DECR BY 2 BEFORE
8290 ; BEING USED AS THE SOURCE OPERAND
8291 026432 022700 026102 CMP #A+2,R0 ;R0 DECREMENTED BY 2?
8292 026436 001404 BEQ MOR6
8293 ;
8294 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8295 ; CONDITIONAL BRANCH INST. AND <====
8296 ; REPLACE THE MOVE INSTRUCTION <====
8297 ; WHICH FOLLOWS W/ 762 <====
8297 026440 012742 000631 MOV #631,-(R2) ;MOVE TO MAILBOX # ***** 631 *****
8298 026444 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8299 026446 000000 HALT ;R0 WAS NOT DECREMENTED BY 2
8300 ;
8301 026450 022737 026102 026100 MOR6: CMP #A+2,@#A ;CHECK CONTENT OF R0 WAS DECR BY 2 BEFORE
8302 ; BEING USED IN THE 'ADD' INSTR
8303 026456 001404 BEQ MOR7
8304 ;
8305 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8306 ; CONDITIONAL BRANCH INST. AND <====
8307 ; REPLACE THE MOVE INSTRUCTION <====
8308 ; WHICH FOLLOWS W/ 752 <====
8308 026460 012742 000632 MOV #632,-(R2) ;MOVE TO MAILBOX # ***** 632 *****
8309 026464 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8310 026466 000000 HALT ;LOC A STORES WRONG DATA
8311 ;
8312 ;
8313 026470 022737 026100 026102 MOR7: CMP #A,@#A+2 ;LOC A+2 STILL STORES A?
8314 026476 001404 BEQ MOR8
8315 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
```



```

8334 :*****
8335 :SBTTL INSTRUCTION USING PC AS SOURCE REGISTER
8336 :
8337 :IN INDEX, INDEX DEFERRED, RELATIVE, AND
8338 :RELATIVE DEFERRED MODES, DESTINATION WILL CONTAIN
8339 :THE PC COUNT OF THE CURRENT INSTRUCTION +4.
8340 :
8341 :*****
8342 :TEST 270 TEST PC AS SOURCE IN MODE 0, USING R0
8343 :*****
8344 026526 005212 TS270: INC (R2) ;UPDATE TEST NUMBER
8345 026530 022712 000270 CMP #270,(R2) ;SEQUENCE ERROR?
8346 026534 001006 BNE TS271-10 ;BR TO ERROR HALT ON SEQ ERROR
8347 026536 012700 177777 MOV #-1,R0 ;SET ALL 1 IN R0
8348 026542 010700 PCN01: MOV PC,R0 ;STORES PC IN R0
8349 026544 022700 026544 CMP #PCN01+2,R0 ;R0 STORES PC+2?
8350 026550 001404 BEQ TS271
8351 :
8352 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--- -
8353 : CONDITIONAL BRANCH INST. AND <---=-
8354 : REPLACE THE MOVE INSTRUCTION <====
8355 : WHICH FOLLOWS W/ 771 <=-=-
8355 026552 012742 000635 MOV #635,-(R2) ;MOVE TO MAILBOX # ***** 635 *****
8356 026556 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8357 026560 000000 HALT ;R0 STORED WRONG VALUE
8358 : OR SEQUENCE ERROR
8359 :
8360 :*****
8361 :TEST 271 TEST PC AS SOURCE IN MODE 6, USING R0
8362 :*****
8363 026562 005212 TS271: INC (R2) ;UPDATE TEST NUMBER
8364 026564 022712 000271 CMP #271,(R2) ;SEQUENCE ERROR?
8365 026570 001010 BNE TS272-10 ;BR TO ERROR HALT ON SEQ ERROR
8366 026572 012700 026100 MOV #A,R0 ;R0 STORES ADDR A
8367 026576 010760 000004 PCN2: MOV PC,4(R0) ;EFFECTIVE ADDR IS A+4
8368 026602 022737 026602 026104 CMP #PCN2+4,@#A+4 ;LOC A+4 STORES PC+4?
8369 026610 001404 BEQ TS272
8370 :
8371 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8372 : CONDITIONAL BRANCH INST. AND <=====-
8373 : REPLACE THE MOVE INSTRUCTION <=====-
8374 : WHICH FOLLOWS W/ 767 <=-=-
8374 026612 012742 000636 MOV #636,-(R2) ;MOVE TO MAILBOX # ***** 636 *****
8375 026616 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8376 026620 000000 HALT ;LOC A+4 STORED WRONG VALUE
8377 : OR SEQUENCE ERROR
8378 :
8379 :*****
8380 :TEST 272 TEST PC AS SOURCE IN MODE 7, USING R0
8381 :*****
8382 026622 005212 TS272: INC (R2) ;UPDATE TEST NUMBER
8383 026624 022712 000272 CMP #272,(R2) ;SEQUENCE ERROR?
8384 026630 001013 BNE TS273-10 ;BR TO ERROR HALT ON SEQ ERROR
8385 026632 012737 026100 026104 MOV #A,@#A+4 ;LOC A+4 STORES ADDR A
8386 026640 012700 026100 MOV #A,R0 ;R0 STORES ADDR A
8387 026644 010770 000004 PCN3: MOV PC,@4(R0) ;EFFECTIVE ADDR IS A
8388 026650 022737 026650 026100 CMP #PCN3+4,@#A ;LOC A STORES PC+4?
8389 026656 001404 BEQ TS273

```

```

8390 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8391 ; CONDITIONAL BRANCH INST. AND <====
8392 ; REPLACE THE MOVE INSTRUCTION <====
8393 ; WHICH FOLLOWS W/ 764 <====
8394 026660 012742 000637 MOV #637,-(R2) ;MOVE TO MAILBOX # *** 637 *****
8395 026664 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8396 026666 000000 HALT ;LOC A STORED WRONG VALUE
8397 ; OR SEQUENCE ERROR
8398
8399

```

```

8400 :*****
8400 :TEST 273 TEST PC AS SOURCE IN RELATIVE DEFERRED MODE ,USING R0
8401 :*****

```

```

8402 026670 005212 TS273: INC (R2) ;UPDATE TEST NUMBER
8403 026672 022712 000273 CMP #273,(R2) ;SEQUENCE ERROR?
8404 026676 001011 BNE TS274-10 ;BR TO ERROR HALT ON SEQ ERROR
8405 026700 012737 026102 026100 MOV #A+2,@#A ;LOC A STORES ADDR A+2
8406 026706 010777 177166 PCN4: MOV PC,@A ;EFFECTIVE ADDR IS A+2
8407 026712 022737 026712 026102 CMP #PCN4+4,@#A+2 ;LOC A+2 STORES PC+4?
8408 026720 001404 BEQ TS274

```

```

8409 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8410 ; CONDITIONAL BRANCH INST. AND <====
8411 ; REPLACE THE MOVE INSTRUCTION <====
8412 ; WHICH FOLLOWS W/ 766 <====
8413 026722 012742 000640 MOV #640,-(R2) ;MOVE TO MAILBOX # ***** 640 *****
8414 026726 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8415 026730 000000 HALT ;LOC A+2 STORED WRONG VALUE
8416 ; OR SEQUENCE ERROR
8417
8418

```

```

8419 :*****
8419 :TEST 274 TEST PC AS SOURCE IN RELATIVE MODE ,USING R0
8420 :*****

```

```

8421 026732 005212 TS274: INC (R2) ;UPDATE TEST NUMBER
8422 026734 022712 000274 CMP #274,(R2) ;SEQUENCE ERROR?
8423 026740 001010 BNE TS275-10 ;BR TO ERROR HALT ON SEQ ERROR
8424 026742 005037 026100 CLR @#A ;CLEAR A
8425 026746 010767 177126 PCN5: MOV PC,A ;EFFECTIVE ADDR IS A
8426 026752 022737 026752 026100 CMP #PCN5+4,@#A ;LOC A STORES PC+4?
8427 026760 001404 BEQ TS275

```

```

8428 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8429 ; CONDITIONAL BRANCH INST. AND <====
8430 ; REPLACE THE MOVE INSTRUCTION <====
8431 ; WHICH FOLLOWS W/ 767 <====
8432 026762 012742 000641 MOV #641,-(R2) ;MOVE TO MAILBOX # ***** 641 *****
8433 026766 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8434 026770 000000 HALT ;LOCATION A STORED WRONG VALUE
8435 ; OR SEQUENCE ERROR
8436
8437

```

```

8438 :*****
8438 :SBTTL THE NEXT THREE TESTS EXERCISE MASKING ACTION OF MICROCODES.
8439 :*****

```

```

8440 :TEST 275 TEST SUB INSTRUCTION, SM=0, DM=2
8441 :*****

```

```

8442 026772 005212 TS275: INC (R2) ;UPDATE TEST NUMBER
8443 026774 022712 000275 CMP #275,(R2) ;SEQUENCE ERROR?
8444 027000 001013 BNE TS276-10 ;BR TO ERROR HALT ON SEQ ERROR
8445 027002 012737 052525 000000 MOV #052525,@#0 ;SET UP LOC 0

```

```

8446 027010 012701 050505      MOV      #050505,R1      ;SET UP R1
8447 027014 005000      CLR      R0              ;CLEAR R0
8448 027016 160120      SUB      R1,(R0)+        ;SUBTRACTION, SM=0,DM=2
8449 027020 022737 002020 000000  CMP      #2020,@#0      ;CHECK DIFFERENCE AT LOC 0
8450 027026 001404      BEQ      TS276           ;
8451                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
8452                                     ; CONDITIONAL BRANCH INST. AND
8453                                     ; REPLACE THE MOVE INSTRUCTION
8454                                     ; WHICH FOLLOWS W/ 764
8455 027030 012742 000642      MOV      #6+2,-(R2)     ;MOVE TO MAILBOX # ***** 642 *****
8456 027034 005242      INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
8457 027036 000000      HALT                    ;WRONG RESULT FROM SUBTRACTION
8458                                     ; OR SEQUENCE ERROR
8459

```

```

8460 :*****
8461 :TEST 276      TEST MFPD WITH R0, IN MODE 2
8462 :*****
8463 TS276:  INC      (R2)          ;UPDATE TEST NUMBER
8464      CMP      #276,(R2)    ;SEQUENCE ERROR?
8465      BNE     TS277-10    ;BR TO ERROR HALT ON SEQ ERROR
8466      MOV      #052525,@#0 ;SET UP LOC 0
8467      CLR      R0          ;CLEAR R0
8468      MOV      #170000,PS  ;SET USER MODE ON, CURRENT & PREVIOUS
8469      MOV      #USTBOT,R6  ;SET USER STACK POINTER
8470      MFPD    (R0)+        ;MODE 2, MFPD
8471      CLR      PS          ;SET KERNEL MODE
8472      CMP      #052525,USTBOT-2 ;CHECK DATA ON STACK
8473      BEQ     BRMFPD      ;BR IF NO ERROR
8474      MOV      #643,-(R2)  ;MOVE TO MAILBOX # ***** 643 *****
8475      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8476      HALT                    ;INCORRECT DATA FROM MFPD
8477 BRMFPD:
8478

```

```

8479 :*****
8480 :TEST 277      TEST MTPD WITH R0, IN MODE 2
8481 :*****
8482 TS277:  INC      (R2)          ;UPDATE TEST NUMBER
8483      CMP      #277,(R2)    ;SEQUENCE ERROR?
8484      BNE     END1         ;BR TO ERROR HALT ON SEQ ERROR
8485      MOV      #170000,PS  ;SET USER MODE ON, CURRENT & PREVIOUS
8486      MOV      #USTBOT,R6  ;SET USER STACK POINTER
8487      MOV      #125252,-(R6) ;PUSH DATA IN USER STACK
8488      MOV      #0,@#0      ;CLEAR LOC 0
8489      CLR      R0          ;CLEAR R0
8490      MTPD    (R0)+        ;MODE 2, MTPD
8491      CLR      PS          ;SET KERNEL MODE
8492      CMP      #125252,@#0 ;CHECK DATA ON LOC 0
8493      BEQ     SECPRT      ;BR TO TRAP TEST IF NO ERROR
8494      MOV      #644,-(R2)  ;MOVE TO MAILBOX # ***** 644 *****
8495      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8496      HALT                    ;INCORRECT DATA FROM MTPD
8497 END1:
8498

```

```

8498      MOV      #645,-(R2)  ;MOVE TO MAILBOX # ***** 645 *****
8499      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8500      HALT                    ;SEQUENCE ERROR
8501

```

8502					
8503	027214	000402	BRTAB:	BR	+.6
8504	027216	001002		BNE	+.6
8505	027220	001402		BEQ	+.6
8506	027222	002002		BGE	+.6
8507	027224	002402		BLT	+.6
8508	027226	003002		BGT	+.6
8509	027230	003402		BLE	+.6
8510	027232	100002		BPL	+.6
8511	027234	100402		BMI	+.6
8512	027236	101002		BHI	+.6
8513	027240	101402		BLOS	+.6
8514	027242	102002		BVC	+.6
8515	027244	102402		BVS	+.6
8516	027246	103002		BCC	+.6
8517	027250	103402		BCS	+.6
8518					
8519		000002	.RADIX	2	
8520	027252	177777	YNTAB:	1111111111111111	:BR
8521	027254	170360		1111000011110000	:BNE: Z=0
8522	027256	007417		0000111100001111	:BEQ: Z=1
8523	027260	146063		1100110000110011	:BGE: N XOR V -0
8524	027262	031714		0011001111001100	:BLT: N XOR V -1
8525	027264	140060		1100000000110000	:BGT: Z+(N XOR V) =0
8526	027266	037717		0011111111001111	:BLE: Z+(N XOR V) -1
8527					
8528	027270	177400		1111111100000000	:BPL: N=0
8529	027272	000377		0000000011111111	:BMI: N=1
8530	027274	120240		1010000010100000	:BHI: C+Z=0
8531	027276	057537		0101111101011111	:BLOS: C+Z=1
8532	027300	146314		1100110011001100	:BVC: V=0
8533	027302	031463		0011001100110011	:BVS: V=1
8534	027304	125252		1010101010101010	:BCC: C=0
8535	027306	052525		0101010101010101	:BCS: C=1
8536		000010	.RADIX	8	
8537					
8538			.EVEN		
8539	027310	000006	.BLKW	6	
8540	027324		USTBOT:		
8541					.....
8542					: THE FOLLOWING ARE SPECIAL CPU TRAP
8543					: HANDLERS TO TRAP AND REPORT SPECIAL TRAPS.
8544					.....
8545					.....
8546					
8547	027324		T04:		
8548	027324	012742 000646		MOV #646, -(R2)	: MOVE TO MAILBOX # ***** 64 *****
8549	027330	005242		INC -(R2)	: SET MSGTYP TO FATAL ERROR
8550	027332	000000		HALT	: TRAPPED THRU LOC. 4
8551	027334		T010:		
8552	027334	012742 000647		MOV #647, -(R2)	: MOVE TO MAILBOX # ***** 647 *****
8553	027340	005242		INC -(R2)	: SET MSGTYP TO FATAL ERROR
8554	027342	000000		HALT	: TRAPPED THRU LOC. 10
8555	027344		T014:		
8556	027344	012742 000650		MOV #650, -(R2)	: MOVE TO MAILBOX # ***** 650 *****
8557	027350	005242		INC -(R2)	: SET MSGTYP TO FATAL ERROR

8558	027352	000000									
8559	027354										
8560	027354	012742	000651	T030:	HALT						
8561	027360	005242			MOV #651,-(R2)						
8562	027362	000000			INC -(R2)						
8563	027364				HALT						
8564	027364	012742	000652	T034:	MOV #652,-(R2)						
8565	027370	005242			INC -(R2)						
8566	027372	000000			HALT						
8567	027374										
8568	027374	012742	000653	T0114:	MOV #653,-(R2)						
8569	027400	005242			INC -(R2)						
8570	027402	000000			HALT						
8571	027404										
8572	027404	012742	000654	T0244:	MOV #654,-(R2)						
8573	027410	005242			INC -(R2)						
8574	027412	000000			HALT						
8575	027414										
8576	027414	012742	000655	T0250:	MOV #655,-(R2)						
8577	027420	005242			INC -(R2)						
8578	027422	000000			HALT						
8579											
8580	027424										

.SBTTL ** STARTING OF TRAP TEST **
SECPRT:

8581
8582 JG0000
8583
8584
8585
8586
8587
8588
8589
8590
8591
8592
8593
8594
8595
8596
8597
8598
8599
8600 000006
8601 000006
8602 000003
8603 000001
8604 000005
8605 000002
8606 000000
8607 000003
8608 000004
8609 000004
8610 000014
8611 000030
8612 000020
8613 000034
8614 177564
8615 177560
8616 177564
8617 177566
8618 000240
8619 000240
8620 177776
8621 000077
8622 000010
8623 004700
8624 000100
8625 177776
8626 001000
8627
8628
8629

.REPT 0

PART TWO:

F11 TRAP TEST, THIS IS THE SECOND
PART OF THE MAIN PROGRAM.

ABSTRACT

THIS IS A TEST OF ALL OPERATIONS AND INSTRUCTIONS THAT CAUSE
TRAPS. ALSO TESTED ARE TRAP OVERFLOW CONDITIONS,
ODDITIES OF REGISTER 6, INTERRUPTS, THE RESET AND WAIT INSTRUCTIONS.

.ENDR

.LIST ME

.NLIST MC,MD,CND

.ABS

SP=%6

R6=%6

TAB=%3

LAST=%1

FIRST=%5

R2=%2

HLT-HALT

TRT-3

ITRAP5=4

RTRAP5=4

RTRAP4=14

RTRAP3=30

RTRAP2=20

RTRAP1=34

ITCSR=177564

TRCSR=177560

TPS=177564

TPB=177566

BELL=240

NOP=240

STATUS=177776

TRAPA=77

RTRAP=10

ILLA=004700

ILLB=100

CC=177776

BUFF=STBOT

:RESERVED INST AND ILLEGAL ADDRESSES
:FOR TRACE TRAP
:FOR EMULATOR TRAP
:FOR IOT TRAP
:FOR TRAP INST


```

8630
8631 ;SPECIAL CASE OF ODD;.EVEN .BYTE AND REGISTER 6
8632 000000 HERE=0
8633
8634 027424 000167 000026 JMP TESTN1
8635 027430 000000 K1: 0
8636 027432 000000 K2: 0
8637 027434 000000 K3: 0
8638 027436 000000 K4: 0
8639 027440 000000 K5: 0
8640 027442 000000 K6: 0
8641 027444 052525 K7: 052525
8642 027446 052400 K10: 052400
8643 027450 000000 K11: 0
8644 027452 000000 K12: 0
8645 027454 000176 SWR: 176
8646
8647 027456 012767 000176 177770 TESTN1: MOV #176,SWR ;POINT TO LOC 176 AS SOFTWARE SWITCH REGISTER
8648 027464 032737 000001 000320 BIT #1,@$ENV ;ARE WE RUNNING IN APT MODE
8649 027472 001403 BEQ 1$ ;IF NO USE SOFTWARE SWITCH REGISTER
8650 027474 012767 000322 177752 MOV #$$SWREG,SWR ;IF YES USE APT SWITCH REGISTER
8651 027502 032777 000001 177744 1$: BIT #1,@SWR ;IF BIT IS NON-ZERO SHIP ALL TRAPS TESTS
8652 027510 001402 BEQ 2$
8653 027512 000167 013006 JMP THRPRT
8654 027516 2$:
8655 ;*****
8656 ;TEST 300 TEST AUTO INCREMENT AND DECREMENT OF R6 FOR WORD AND BYTES
8657 ;*****
8658 027516 005212 TS300: INC (R2) ;UPDATE TEST NUMBER
8659 027520 022712 000300 CMP #300,(R2) ;SEQUENCE ERROR?
8660 027524 001127 BNE TS301-10 ;BR TO ERROR HALT ON SEQ ERROR
8661 027526 005006 CLR %6
8662 027530 112667 150244 MOV#B (6)+,HERE ;SIX SHOULD INCREMENT BY TWO
8663 027534 020627 000002 CMP %6,#2
8664 027540 001404 BEQ BR1
8665 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8666 ; CONDITIONAL BRANCH INST. AND <---
8667 ; REPLACE THE MOVE INSTRUCTION <---
8668 ; WHICH FOLLOWS W/ 771 <---
8669 027542 012742 000656 MOV #656,-(R2) ;MOVE TO MAILBOX # ***** 656 *****
8670 027546 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8671 027550 000000 HALT ;R6 DID NOT AUTO INCREMENT BY TWO
8672
8673 027552 012706 001000 BR1: MOV #1000,%6
8674 027556 114627 000000 MOV#B -(6),#HERE ;SHOULD DECREMENT BY TWO
8675 027562 020627 000776 CMP %6,#776
8676 027566 001404 BEQ BR2
8677 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8678 ; CONDITIONAL BRANCH INST. AND <---
8679 ; REPLACE THE MOVE INSTRUCTION <---
8680 ; WHICH FOLLOWS W/ 756 <---
8681 027570 012742 000657 MOV #657,-(R2) ;MOVE TO MAILBOX # ***** 657 *****
8682 027574 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
8683 027576 000000 HALT ;R6 DID NOT AUTO DECREMENT BY 2
8684
8685 027600 005006 BR2: CLR %6

```

```

8686 027602 112626      MOVB  (6)+,(6)+      ;DOUBLES AUTO INCREMENT OF R6
8687 027604 020627 000004  CMP   %6,#4
8688 027610 001404      BEQ   BR3
8689                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8690                                     ;         CONDITIONAL BRANCH INST. AND <---
8691                                     ;         REPLACE THE MOVE INSTRUCTION <---
8692                                     ;         WHICH FOLLOWS W/ 745 <---
8693 027612 012742 000660  MOV   #660,-(R2)    ;MOVE TO MAILBOX # ***** 660 *****
8694 027616 005242      INC   -(R2)         ;SET MSGTYP TO FATAL ERROR
8695 027620 000000      HALT                ;WRONG AUTO INCREMENT OF R6
8696
8697 027622 005006      BR3:  CLR   %6
8698 027624 005004      CLR   %4
8699 027626 122624      CMPB  (6)+,(4)+    ;TEST INCREMENT OF R6
8700 027630 020627 000002  CMP   %6,#2
8701 027634 001404      BEQ   BR4
8702                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8703                                     ;         CONDITIONAL BRANCH INST. AND <---
8704                                     ;         REPLACE THE MOVE INSTRUCTION <---
8705                                     ;         WHICH FOLLOWS W/ 733 <---
8706 027636 012742 000661  MOV   #661,-(R2)    ;MOVE TO MAILBOX # ***** 661 *****
8707 027642 005242      INC   -(R2)         ;SET MSGTYP TO FATAL ERROR
8708 027644 000000      HALT                ;WRONG INCREMENT OF R6
8709
8710 027646 005006      BR4:  CLR   %6
8711 027650 005004      CLR   %4
8712 027652 122426      CMPB  (4)+,(6)+    ;TEST INCREMENT OF R6
8713 027654 020627 000002  CMP   %6,#2
8714 027660 001404      BEQ   BR5
8715                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8716                                     ;         CONDITIONAL BRANCH INST. AND <---
8717                                     ;         REPLACE THE MOVE INSTRUCTION <---
8718                                     ;         WHICH FOLLOWS W/ 721 <---
8719 027662 012742 000662  MOV   #662,-(R2)    ;MOVE TO MAILBOX # ***** 662 *****
8720 027666 005242      INC   -(R2)         ;SET MSGTYP TO FATAL ERROR
8721 027670 000000      HALT                ;WRONG INCREMENT OF R6
8722
8723 027672 005006      BR5:  CLR   %6
8724 027674 005004      CLR   %4
8725 027676 122624      CMPB  (6)+,(4)+    ;TEST INCREMENT OF R4
8726 027700 020427 000001  CMP   %4,#1
8727 027704 001404      BEQ   BR6
8728                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8729                                     ;         CONDITIONAL BRANCH INST. AND <---
8730                                     ;         REPLACE THE MOVE INSTRUCTION <---
8731                                     ;         WHICH FOLLOWS W/ 707 <---
8732 027706 012742 000663  MOV   #663,-(R2)    ;MOVE TO MAILBOX # ***** 663 *****
8733 027712 005242      INC   -(R2)         ;SET MSGTYP TO FATAL ERROR
8734 027714 000000      HALT                ;WRONG INCREMENT OF R4
8735 027716 005006      BR6:  CLR   %6
8736 027720 005004      CLR   %4
8737 027722 122426      CMPB  (4)+,(6)+    ;TEST INCREMENT OF R6
8738 027724 020627 000002  CMP   %6,#2
8739 027730 001404      BEQ   BR7
8740                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
8741                                     ;         CONDITIONAL BRANCH INST. AND <---

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```
8742                                     :           REPLACE THE MOVE INSTRUCTION <====
8743                                     :           WHICH FOLLOWS W/ 675          <====
8744 027732 012742 000664                MOV    #664,-(R2)                       :MOVE TO MAILBOX # ***** 664 *****
8745 027736 005242                        INC    -(R2)                            :SET MSGTYP TO FATAL ERROR
8746 027740 000000                        HALT                                     :WRONG INCREMENT OF R6
8747
8748 027742 005006                BR7:   CLR    %6
8749 027744 005004                CLR    %4
8750 027746 122426                CMPB   (4)+,(6)+                       :TEST INCREMENT OF R4
8751 027750 020427 000001                CMP    %4,#1
8752 027754 001404                BEQ    BR10
8753                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8754                                     :           CONDITIONAL BRANCH INST. AND <====
8755                                     :           REPLACE THE MOVE INSTRUCTION <====
8756                                     :           WHICH FOLLOWS W/ 663          <====
8757 027756 012742 000665                MOV    #665,-(R2)                       :MOVE TO MAILBOX # ***** 665 *****
8758 027762 005242                        INC    -(R2)                            :SET MSGTYP TO FATAL ERROR
8759 027764 000000                        HALT                                     :WRONG INCREMENT OF R4
8760
8761 027766 012706 001000                BR10: MOV    #1000,%6
8762 027772 124627 000000                CMPB   -(6),#HERE                       :TEST DECREMENT OF R6
8763 027776 022706 000776                CMP    #776,%6
8764 030002 001404                BEQ    TS301
8765                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8766                                     :           CONDITIONAL BRANCH INST. AND <====
8767                                     :           REPLACE THE MOVE INSTRUCTION <====
8768                                     :           WHICH FOLLOWS W/ 650          <====
8769 030004 012742 000666                MOV    #666,-(R2)                       :MOVE TO MAILBOX # ***** 666 *****
8770 030010 005242                        INC    -(R2)                            :SET MSGTYP TO FATAL ERROR
8771 030012 000000                        HALT                                     :WRONG DECREMENT OF R6,OR WRONG $TSTNM
8772                                     : OR SEQUENCE ERROR
8773
8774 :*****
8775 :TEST 301 TEST TRANSFER OF .BYTE USING R6
8776 030014 005212                TS301: INC    (R2)                       :UPDATE TEST NUMBER
8777 030016 022712 000301                CMP    #301,(R2)                       :SEQUENCE ERROR?
8778 030022 001133                BNE    TS302-10                         :BR TO ERROR HALT ON SEQ ERROR
8779 030024 012767 123456 177406                MOV    #123456,K5
8780 030032 012767 050505 177370                MOV    #050505,K1
8781 030040 012705 027430                MOV    #K1,%5                           :%5=(050505)K1
8782 030044 012706 027440                MOV    #K5,%6                           :%6=(123456)K5
8783 030050 112625                MOVB   (6)+,(5)+                       :LOW .BYTE OF R6 TO R5
8784 030052 022767 050456 177350                CMP    #050456,K1
8785 030060 001404                BEQ    BR11
8786                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
8787                                     :           CONDITIONAL BRANCH INST. AND <--
8788                                     :           REPLACE THE MOVE INSTRUCTION <--
8789                                     :           WHICH FOLLOWS W/ 760          <--
8790 030062 012742 000667                MOV    #667,-(R2)                       :MOVE TO MAILBOX # ***** 667 *****
8791 030066 005242                        INC    -(R2)                            :SET MSGTYP TO FATAL ERROR
8792 030070 000000                        HALT                                     :FALSE TRANSFER OF .BYTE
8793
8794 030072 012767 123456 177340                BR11: MOV    #123456,K5
8795 030100 012767 050505 177322                MOV    #050505,K1
8796 030106 012705 027430                MOV    #K1,%5                           :%5(050505)K1
8797 030112 012706 027442                MOV    #K6,%6                           :%6(123456)K5
```



```
*****  
:TEST 302 TEST BYTE OPERATION WITH SEQUENTIAL ODD-EVEN ADDRESS  
*****  
8854  
8855  
8856  
8857 030322 005212  
8858 030324 022712 000302  
8859 030330 001074  
8860 030332 126767 177106 177105  
8861 030340 001404  
8862  
8863  
8864  
8865  
8866 030342 012742 000674  
8867 030346 005242  
8868 030350 000000  
8869  
8870 030352 126767 177067 177064 BR15:  
8871 030360 001404  
8872  
8873  
8874  
8875  
8876 030362 012742 000675  
8877 030366 005242  
8878 030370 000000  
8879  
8880 030372 126767 177051 177044 BR16:  
8881 030400 001404  
8882  
8883  
8884  
8885  
8886 030402 012742 000676  
8887 030406 005242  
8888 030410 000000  
8889  
8890 030412 126767 177030 177022 BR17:  
8891 030420 001404  
8892  
8893  
8894  
8895  
8896 030422 012742 000677  
8897 030426 005242  
8898 030430 000000  
8899 030432 126767 177007 177007 BR20:  
8900 030440 001404  
8901  
8902  
8903  
8904  
8905 030442 012742 000700  
8906 030446 005242  
8907 030450 000000  
8908  
8909 030452 126767 176770 176767 BR21:  
*****  
T302: INC (R2) ;UPDATE TEST NUMBER  
CMP #302,(R2) ;SEQUENCE ERROR?  
BNE TS303-10 ;BR TO ERROR HALT ON SEQ ERROR  
CMPB K7,K7+1 ;SAME .WORD LOW TO HIGH  
BEQ BR15  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVF INSTRUCTION <====  
: WHICH FOLLOWS W/ 773 <====  
: MOVE TO MAILBOX # ***** 674 *****  
: SET MSGTYP TO FATAL ERROR  
: SHOULD COMPARE LOW TO HIGH  
: COMPARE ODD TO .EVEN SAME .WORD  
CMPB K7+1,K7  
BEQ BR16  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 763 <====  
: MOVE TO MAILBOX # ***** 675 *****  
: SET MSGTYP TO FATAL ERROR  
: ODD TO .EVEN .BYTE FAILURE  
: SEQUENTIAL .BYTES  
CMPB K10+1,K7  
BEQ BR17  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 753 <====  
: MOVE TO MAILBOX # ***** 676 *****  
: SET MSGTYP TO FATAL ERROR  
: ODD TO .EVEN FAILED  
: SEQUENTIAL .BYTES  
CMPB K10,K6  
BEQ BR20  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 743 <====  
: MOVE TO MAILBOX # ***** 677 *****  
: SET MSGTYP TO FATAL ERROR  
: .EVEN TO EVEN FAILED  
: SEQUENTIAL .BYTES  
CMPB K7+1,K10+1  
BEQ BR21  
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
: CONDITIONAL BRANCH INST. AND <====  
: REPLACE THE MOVE INSTRUCTION <====  
: WHICH FOLLOWS W/ 733 <====  
: MOVE TO MAILBOX # ***** 700 *****  
: SET MSGTYP TO FATAL ERROR  
: ODD TO ODD FAILED  
: SEQUENTIAL .BYTES  
CMPB K10,K10+1
```

```
8910 030460 001004      BNE      BR22
8911                      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8912                      :          CONDITIONAL BRANCH INST. AND <====
8913                      :          REPLACE THE MOVE INSTRUCTION <====
8914                      :          WHICH FOLLOWS W/ 723 <====
8915 030462 012742 000701  MOV      #701,-(R2)  ;MOVE TO MAILBOX # ***** 701 *****
8916 030466 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8917 030470 000000      HALT                    ;LOW TO HIGH IN SAME .WORD FAILED
8918
8919 030472 126767 176751 176747 BR22:  CMPB    K10+1,K10+1
8920 030500 001404      BEQ      BR23
8921                      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8922                      :          CONDITIONAL BRANCH INST. AND <====
8923                      :          REPLACE THE MOVE INSTRUCTION <====
8924                      :          WHICH FOLLOWS W/ 713 <====
8925 030502 012742 000702  MOV      #702,-(R2)  ;MOVE TO MAILBOX # ***** 702 *****
8926 030506 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8927 030510 000000      HALT                    ;HIGH TO LOW IN SAME .WORD FAILED
8928
8929 030512 126767 176730 176725 BR23:  CMPB    K10,K7+1
8930 030520 001004      BNE      TS303
8931                      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8932                      :          CONDITIONAL BRANCH INST. AND <====
8933                      :          REPLACE THE MOVE INSTRUCTION <====
8934                      :          WHICH FOLLOWS W/ 703 <====
8935 030522 012742 000703  MOV      #703,-(R2)  ;MOVE TO MAILBOX # ***** 703 *****
8936 030526 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8937 030530 000000      HALT                    ;EVEN TO ODD FAILED,OR WRONG $STNM
8938                      ; OR SEQUENCE ERROR
8939
8940
8941
8942
8943
8944 030532 005212      TS303:  INC      (R2)      ;UPDATE TEST NUMBER
8945 030534 022712 000303  CMP      #303,(R2)  ;SEQUENCE ERROR?
8946 030540 001053      BNE      TS304-10   ;BR TO ERROR HALT ON SEQ ERROR
8947 030542 000277      SCC                    ;SET STATUS
8948 030544 005067 147226  CLR      STATUS     ;CLEAR STATUS
8949 030550 103004      BCC      BR33
8950                      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8951                      :          CONDITIONAL BRANCH INST. AND <====
8952                      :          REPLACE THE MOVE INSTRUCTION <====
8953                      :          WHICH FOLLOWS W/ 773 <====
8954 030552 012742 000704  MOV      #704,-(R2)  ;MOVE TO MAILBOX # ***** 704 *****
8955 030556 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8956 030560 000000      HALT                    ;C NOT CLEAR
8957 030562
8958 030562 102004      BR33:  BVC      BR34
8959                      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
8960                      :          CONDITIONAL BRANCH INST. AND <====
8961                      :          REPLACE THE MOVE INSTRUCTION <====
8962                      :          WHICH FOLLOWS W/ 766 <====
8963 030564 012742 000705  MOV      #705,-(R2)  ;MOVE TO MAILBOX # ***** 705 *****
8964 030570 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
8965 030572 000000      HALT                    ;V NOT CLEAR
```

Address	OpCode	Operand 1	Operand 2	Operand 3	Operand 4	Instruction	Comments
8966	030574					BR34:	
8967	030574	001004				BNE BR35	
8968							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
8969							: CONDITIONAL BRANCH INST. AND
8970							: REPLACE THE MOVE INSTRUCTION
8971							: WHICH FOLLOWS W/ 761
8972	030576	012742	000706			MOV #706,-(R2)	: MOVE TO MAILBOX # ***** 706 *****
8973	030602	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
8974	030604	000000				HALT	: Z NOT CLEAR
8975	030606					BR35:	
8976	030606	100004				BPL BR36	
8977							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
8978							: CONDITIONAL BRANCH INST. AND
8979							: REPLACE THE MOVE INSTRUCTION
8980							: WHICH FOLLOWS W/ 754
8981	030610	012742	000707			MOV #707,-(R2)	: MOVE TO MAILBOX # ***** 707 *****
8982	030614	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
8983	030616	000000				HALT	: N NOT CLEAR
8984	030620	000257				BR36:	: CLEAR CONDITION CODES
8985	030622	052767	0C0017	147146		CCC	: SET STATUS TO ONES
8986						BIS #17,STATUS	
8987	030630	103404				BCS BR37	
8988							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
8989							: CONDITIONAL BRANCH INST. AND
8990							: REPLACE THE MOVE INSTRUCTION
8991							: WHICH FOLLOWS W/ 743
8992	030632	012742	000710			MOV #710,-(R2)	: MOVE TO MAILBOX # ***** 710 *****
8993	030636	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
8994	030640	000000				HALT	: C NOT SET
8995	030642					BR37:	
8996	030642	102404				BVS BR40	
8997							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
8998							: CONDITIONAL BRANCH INST. AND
8999							: REPLACE THE MOVE INSTRUCTION
9000							: WHICH FOLLOWS W/ 736
9001	030644	012742	000711			MOV #711,-(R2)	: MOVE TO MAILBOX # ***** 711 *****
9002	030650	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
9003	030652	000000				HALT	: V NOT SET
9004	030654					BR40:	
9005	030654	001404				BEQ BR41	
9006							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
9007							: CONDITIONAL BRANCH INST. AND
9008							: REPLACE THE MOVE INSTRUCTION
9009							: WHICH FOLLOWS W/ 731
9010	030656	012742	000712			MOV #712,-(R2)	: MOVE TO MAILBOX # ***** 712 *****
9011	030662	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
9012	030664	000000				HALT	: Z NOT SET
9013	030666					BR41:	
9014	030666	100404				BMI TS304	
9015							: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
9016							: CONDITIONAL BRANCH INST. AND
9017							: REPLACE THE MOVE INSTRUCTION
9018							: WHICH FOLLOWS W/ 724
9019	030670	012742	000713			MOV #713,-(R2)	: MOVE TO MAILBOX # ***** 713 *****
9020	030674	005242				INC -(R2)	: SET MSGTYP TO FATAL ERROR
9021	030676	000000				HALT	: N NOT SET,OR WRONG \$STNM

: OP SEQUENCE ERROR

9022
9023
9024
9025
9026 030700 005212
9027 030702 022712 000304
9028 030706 001006
9029 030710 012706 001000
9030 030714 012767 030734 147066
9031 030722 000077
9032 030724
9033 030724 012742 000714
9034 030730 005242
9035 030732 000000
9036 030734
9037
9038
9039
9040 030734 005212
9041 030736 022712 000305
9042 030742 001011
9043 030744 012706 001000
9044 030750 012767 030760 147032
9045 030756 000077
9046 030760 020627 000774
9047 030764 001404
9048
9049
9050
9051
9052 030766 012742 000715
9053 030772 005242
9054 030774 000000
9055
9056
9057
9058
9059 030776 005212
9060 031000 022712 000306
9061 031004 001012
9062 031006 012706 001000
9063 031012 012767 031022 146770
9064 031020 000077
9065 031022 022767 031022 147744
9066 031030 001404
9067
9068
9069
9070
9071 031032 012742 000716
9072 031036 005242
9073 031040 000000
9074
9075
9076
9077

:*****
:TEST 304 TEST THAT A TRAP OCCURS ON A RESERVED INSTRUCTION
:*****
TS304: INC (R2) ;UPDATE TEST NUMBER
CMP #304,(R2) ;SEQUENCE ERROR?
BNE RETA ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETAH,RTRAP ;RETURN LOCATION
TRAPA ;RESERVED INSTRUCTION, SHOULD TRAP
RETA: MOV #714,-(R2) ;MOVE TO MAILBOX # ***** 714 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;RESERVE INSTRUCTION DIDN'T TRAP,OR WRONG \$STNM
RETAH: :*****
:TEST 305 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
:*****
TS305: INC (R2) ;UPDATE TEST NUMBER
CMP #305,(R2) ;SEQUENCE ERROR?
BNE TS306-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETB,RTRAP ;RETURN POINTER
TRAPA ;RESERVED INSTRUCTION
RETB: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
BEQ TS306 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: ; CONDITIONAL BRANCH INST. AND <- -
: ; REPLACE THE MOVE INSTRUCTION <- -
: ; WHICH FOLLOWS W/ 766 <- -
MOV #715,-(R2) ;MOVE TO MAILBOX # ***** 715 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;NOT DECREMENTED TWO WORDS,OR WRONG \$STNM
; OR SEQUENCE ERROR
:*****
:TEST 306 TEST THAT PROPER P.C. IS SAVED
:*****
TS306: INC (R2) ;UPDATE TEST NUMBER
CMP #306,(R2) ;SEQUENCE ERROR?
BNE TS307-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETC,RTRAP ;RETURN FROM TRAP POINTER
INSTC: TRAPA ;TRAP ON THIS INSTRUCTION
RETC: CMP #,BUFF-4 ;CHECK FOR INCREMENTED P.C.
BEQ TS307 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <- -
: ; CONDITIONAL BRANCH INST. AND <- -
: ; REPLACE THE MOVE INSTRUCTION <-
: ; WHICH FOLLOWS W/ 765 <-
MOV #716,-(R2) ;MOVE TO MAILBOX # ***** 716 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT P.C.,OR WRONG \$STNM
; OR SEQUENCE ERROR
:*****
:TEST 307 TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
:*****


```
9078 031042 005212      TS307: INC      (R2)          ;UPDATE TEST NUMBER
9079 031044 022712 000307  CMP      #307,(R2)       ;SEQUENCE ERROR?
9080 031050 001037      BNE      TS310-10       ;BR TO ERROR HALT ON SEQ ERROR
9081 031052 012706 001000  MOV      #BUFF,SP      ;SET UP
9082 031056 012767 031074 146724  MOV      #RETD,RTRAP   ;SET UP
9083 031064 005067 146706  CLR      CC            ;CLEAR CC AND PRIORITY
9084 031070 000257      CCC
9085 031072 000077      TRAPA
9086 031074 026727 147676 000000 RETD:  CMP      BUFF-2,#0   ;TRAP
9087 031102 001404      BEQ      1$           ;TEST THAT OLD STATUS WENT TO STACK
9088
9089
9090
9091
9092 031104 012742 000717  MOV      #717,-(R2)    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
9093 031110 005242      INC      -(R2)        ; CONDITIONAL BRANCH INST. AND <=
9094 031112 000000      HALT
9095 031114 012706 001000 1$:  MOV      #BUFF,SP      ; REPLACE THE MOVE INSTRUCTION <
9096 031120 012767 031140 146662  MOV      #RETE,RTRAP  ; WHICH FOLLOWS W/ 762 <
9097 031126 012767 000357 146642  MOV      #357,CC      ; MOVE TO MAILBOX # ***** 717 *****
9098 031134 000277      SCC
9099 031136 000077      TRAPA
9100 031140 026727 147632 000357 RETE:  CMP      BUFF-2,#357  ; SET MSGTYP TO FATAL ERROR
9101 031146 001404      BEQ      TS310        ; INCORRECT STATUS
9102
9103
9104
9105
9106 031150 012742 000720  MOV      #720,-(R2)    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9107 031154 005242      INC      -(R2)        ; CONDITIONAL BRANCH INST. AND <
9108 031156 000000      HALT
9109
9110
9111
9112
9113 031160 005212      TS310: INC      (R2)          ;UPDATE TEST NUMBER
9114 031162 022712 000310  CMP      #310,(R2)       ;SEQUENCE ERROR?
9115 031166 001110      BNE      STPP
9116 031170 012706 001000  MOV      #BUFF,SP      ;BR TO ERROR HALT ON SEQ ERROR
9117 031174 012767 031210 146606  MOV      #RETF,RTRAP   ;SET UP
9118 031202 005067 146604  CLR      RTRAP+2      ;CLEAR FUTURE PRIORITY AND CC
9119 031206 000077      TRAPA
9120 031210      RETF:
9121 031210 100004      BPL      1$           ;TEST FOR 'C' CLEARED
9122
9123
9124
9125
9126 031212 012742 000721  MOV      #721,-(R2)    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9127 031216 005242      INC      -(R2)        ; CONDITIONAL BRANCH INST. AND <==
9128 031220 000000      HALT
9129 031222      1$:
9130 031222 001004      BNE      2$
9131
9132
9133
```

```
9134                                     : WHICH FOLLOWS W/ 761 <
9135 031224 012742 000722 MOV #722,-(R2) :MOVE TO MAILBOX # ***** 722 ***** <
9136 031230 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9137 031232 000000 HALT :Z NOT CLEARED <
9138 031234                                     2$: <
9139 031234 102004 BVC 3$ <
9140                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9141                                     : CONDITIONAL BRANCH INST. AND <
9142                                     : REPLACE THE MOVE INSTRUCTION <
9143                                     : WHICH FOLLOWS W/ 754 <
9144 031236 012742 000723 MOV #723,-(R2) :MOVE TO MAILBOX # ***** 723 ***** <
9145 031242 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9146 031244 000000 HALT :V NOT CLEARED <
9147 031246                                     3$: <
9148 031246 103004 BCC 4$ <
9149                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9150                                     : CONDITIONAL BRANCH INST. AND <
9151                                     : REPLACE THE MOVE INSTRUCTION <
9152                                     : WHICH FOLLOWS W/ 747 <
9153 031250 012742 000724 MOV #724,-(R2) :MOVE TO MAILBOX # ***** 724 ***** <
9154 031254 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9155 031256 000000 HALT :C NOT CLEARED <
9156 031260 032767 000340 146510 4$: BIT #340,CC :TEST PRIORITY <
9157 031266 001404 BEQ 5$ <
9158                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9159                                     : CONDITIONAL BRANCH INST. AND <
9160                                     : REPLACE THE MOVE INSTRUCTION <
9161                                     : WHICH FOLLOWS W/ 737 <
9162 031270 012742 000725 MOV #725,-(R2) :MOVE TO MAILBOX # ***** 725 ***** <
9163 031274 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9164 031276 000000 HALT :PRIORITY NOT ZERO <
9165 031300 012706 001000 5$: MOV #BUFF,SP <
9166 031304 012767 031322 146476 MOV #RETG,RTRAP <
9167 031312 012767 000357 146472 MOV #357,RTRAP+2 :SET NEW 'CC' AND PRIORITY <
9168 031320 000077 TRAPA :TRAP HERE <
9169 031322 RETG: <
9170 031322 100404 BMI 1$ <
9171                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9172                                     : CONDITIONAL BRANCH INST. AND <
9173                                     : REPLACE THE MOVE INSTRUCTION <
9174                                     : WHICH FOLLOWS W/ 721 <
9175 031324 012742 000726 MOV #726,-(R2) :MOVE TO MAILBOX # ***** 726 ***** <
9176 031330 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9177 031332 000000 HALT :N NOT SET <
9178 031334                                     1$: <
9179 031334 001404 BEQ 2$ <
9180                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9181                                     : CONDITIONAL BRANCH INST. AND <
9182                                     : REPLACE THE MOVE INSTRUCTION <
9183                                     : WHICH FOLLOWS W/ 714 <
9184 031336 012742 000727 MOV #727,-(R2) :MOVE TO MAILBOX # ***** 727 ***** <
9185 031342 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR <
9186 031344 000000 HALT :Z NOT SET <
9187 031346                                     2$: <
9188 031346 102404 BVS 3$ <
9189                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
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9190 ; ; CONDITIONAL BRANCH INST. AND <- - -
9191 ; ; REPLACE THE MOVE INSTRUCTION <- - -
9192 ; ; WHICH FOLLOWS W/ 707 <- - -
9193 031350 012742 000730 MOV #730,-(R2) ;MOVE TO MAILBOX # ***** 730 *****
9194 031354 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9195 031356 000000 HALT ;V NOT SET
9196 031360
9197 031360 103404 3$: BCS 4$
9198 ; ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <- - -
9199 ; ; CONDITIONAL BRANCH INST. AND <- - -
9200 ; ; REPLACE THE MOVE INSTRUCTION <- - -
9201 ; ; WHICH FOLLOWS W/ 702 <- - -
9202 031362 012742 000731 MOV #731,-(R2) ;MOVE TO MAILBOX # ***** 731 *****
9203 031366 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9204 031370 000000 HALT ;C NOT SET
9205 031372 016706 146400 4$: MOV CC,SP
9206 031376 042706 000017 BIC #17,SP
9207 031402 022706 000340 CMP #340,SP
9208 031406 001404 BEQ STPPA
9209 ; ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9210 ; ; CONDITIONAL BRANCH INST. AND <-
9211 ; ; REPLACE THE MOVE INSTRUCTION <-
9212 ; ; WHICH FOLLOWS W/ 667 <-
9213 STPP:
9214 031410 012742 000732 MOV #732,-(R2) ;MOVE TO MAILBOX # ***** 732 *****
9215 031414 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9216 031416 000000 HALT ;PRIORITY WAS CHANGED,OR WRONG $STNM
9217 031420 012767 000012 146362 STPPA: MOV #12,10
9218 031426 005067 146360 CLR 12
9219 ;*****
9220 ;TEST 311 TEST THAT A TRAP OCCURS FOR A 'TRAP' INSTRUCTION
9221 ;*****
9222 031432 005212 TS311: INC (R2) ;UPDATE TEST NUMBER
9223 031434 022712 000311 CMP #311,(R2) ;SEQUENCE ERROR?
9224 031440 001013 BNE TS312-10 ;BR TO ERROR HALT ON SEQ ERROR
9225 031442 012767 000012 146340 MOV #12,10
9226 031450 005067 146336 CLR 12
9227 031454 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
9228 031460 012767 031500 146346 MOV #RETA1,RTRAP1 ;RETURN LOCATION
9229 031466 104400 TRAP ;RESERVED INSTRUCTION, SHOULD TRAP
9230 031470 012742 000733 MOV #733,-(R2) ;MOVE TO MAILBOX # ***** 733 *****
9231 031474 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9232 031476 000000 HALT ;TRAP DIDN'T TRAP,OR WRONG $STNM
9233 RETA1:
9234 ;*****
9235 ;TEST 312 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
9236 ;*****
9237 031500 005212 TS312: INC (R2) ;UPDATE TEST NUMBER
9238 031502 022712 000312 CMP #312,(R2) ;SEQUENCE ERROR?
9239 031506 001011 BNE TS313-10 ;BR TO ERROR HALT ON SEQ ERROR
9240 031510 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
9241 031514 012767 031524 146312 MOV #RETB1,RTRAP1 ;RETURN POINTER
9242 031522 104400 TRAP ;RESERVED INSTRUCTION
9243 031524 020627 000774 RETB1: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
9244 031530 001404 BEQ TS313
9245 ; ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS

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9246                                     :          CONDITIONAL BRANCH INST. AND <==
9247                                     :          REPLACE THE MOVE INSTRUCTION <==
9248                                     :          WHICH FOLLOWS W/ 766          <==
9249 031532 012742 000734      MOV    #734,-(R2)      :MOVE TO MAILBOX # ***** 734 *****
9250 031536 005242      INC    -(R2)          :SET MSGTYP TO FATAL ERROR
9251 031540 000000      HALT                :NOT DECREMENTED TWO WORDS,OR WRONG $STNM
9252                                     :          OR SEQUENCE ERROR
9253 :*****
9254 :TEST 313      TEST THAT PROPER P.C. IS SAVED
9255 :*****
9256 031542 005212      TS313: INC    (R2)          :UPDATE TEST NUMBER
9257 031544 022712 000313      CMP    #313,(R2)      :SEQUENCE ERROR?
9258 031550 001012      BNE   TS314-10       :BR TO ERROR HALT ON SEQ ERROR
9259 031552 012706 001000      MOV    #BUFF,SP      :STACK POINTER SETUP
9260 031556 012767 031566 146250      MOV    #RETC1,RTRAP1 :RETURN FROM TRAP POINTER
9261 031564 104400      TRAP                :TRAP ON THIS INSTRUCTION
9262 031566 022767 031566 147200 RETC1: CMP    #.BUFF-4      :CHECK INCREMENTED P.C.
9263 031574 001404      BEQ   TS314
9264                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
9265                                     :          CONDITIONAL BRANCH INST. AND <--
9266                                     :          REPLACE THE MOVE INSTRUCTION <--
9267                                     :          WHICH FOLLOWS W/ 765          <--
9268 031576 012742 000735      MOV    #735,-(R2)      :MOVE TO MAILBOX # ***** 735 *****
9269 031602 005242      INC    -(R2)          :SET MSGTYP TO FATAL ERROR
9270 031604 000000      HALT                :INCORRECT P.C.,OR WRONG $STNM
9271                                     :          OR SEQUENCE ERROR
9272 :*****
9273 :TEST 314      TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
9274 :*****
9275 031606 005212      TS314: INC    (R2)          :UPDATE TEST NUMBER
9276 031610 022712 000314      CMP    #314,(R2)      :SEQUENCE ERROR?
9277 031614 001036      BNE   TS315-10       :BR TO ERROR HALT ON SEQ ERROR
9278 031616 012706 001000      MOV    #BUFF,SP      :SET UP
9279 031622 012767 031640 146204      MOV    #RETD1,RTRAP1 :SET UP
9280 031630 005067 146142      CLR    CC             :CLEAR CC AND PRIORITY
9281 031634 000257      CCC
9282 031636 104400      TRAP                :TRAP
9283 031640 026727 147132 000000 RETD1: CMP    BUFF-2,#0      :TEST THAT OLD STATUS WENT TO STACK
9284 031646 001404      BEQ   1$
9285                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9286                                     :          CONDITIONAL BRANCH INST. AND <
9287                                     :          REPLACE THE MOVE INSTRUCTION <
9288                                     :          WHICH FOLLOWS W/ 762          <
9289 031650 012742 000736      MOV    #736,-(R2)      :MOVE TO MAILBOX # ***** 736 *****
9290 031654 005242      INC    -(R2)          :SET MSGTYP TO FATAL ERROR
9291 031656 000000      HALT                :INCORRECT STATUS
9292 031660 012706 001000      1$: MOV    #BUFF,SP      :SET UP
9293 031664 012767 031702 146142      MOV    #RETE1,RTRAP1 :SET UP
9294 031672 012767 000357 146076      MOV    #357,CC        :SET PRIORITY
9295 031700 104400      TRAP                :SET CC
9296 031702 026727 147070 000357 RETE1: CMP    BUFF-2,#357    :COMPARES STATUS ON STACK
9297 031710 001404      BEQ   TS315
9298                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9299                                     :          CONDITIONAL BRANCH INST. AND <
9300                                     :          REPLACE THE MOVE INSTRUCTION <
9301                                     :          WHICH FOLLOWS W/ 741          <

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9302 031712 012742 000737      MOV    #737,-(R2)      ;MOVE TO MAILBOX # ***** 737 *****
9303 031716 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9304 031720 000000              HALT                   ;INCORRECT STATUS ON STACK,OR WRONG $TSTNM
9305                                ; OR SEQUENCE ERROR
9306                                ;*****
9307                                ;TEST 315      TEST THAT 'NEW' STATUS IS CORRECT
9308                                ;*****
9309 031722 005212              TS315: INC    (R2)      ;UPDATE TEST NUMBER
9310 031724 022712 000315      CMP    #315,(R2)      ;SEQUENCE ERROR?
9311 031730 001110              BNE    TS316-10       ;BR TO ERROR HALT ON SEQ ERROR
9312 031732 012706 001000      MOV    #BUFF,SP
9313 031736 012767 031752 146070  MOV    #RETF1,RTRAP1
9314 031744 005067 146066      CLR    RTRAP1+2      ;CLEAR FUTURE PRIORITY AND CC
9315 031750 104400              TRAP
9316 031752              RETF1:              ;TEST FOR 'C' CLEARED
9317 031752 '000004              BPL    1$            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9318                                ;          CONDITIONAL BRANCH INST. AND <
9319                                ;          REPLACE THE MOVE INSTRUCTION <
9320                                ;          WHICH FOLLOWS W' 766 <
9321                                ;
9322 031754 012742 000740      MOV    #740,-(R2)      ;MOVE TO MAILBOX # ***** 740 *****
9323 031760 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9324 031762 000000              HALT                   ;C NOT CLEARED
9325 031764              1$:
9326 031764 001004              BNE    2$            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9327                                ;          CONDITIONAL BRANCH INST. AND <
9328                                ;          REPLACE THE MOVE INSTRUCTION <
9329                                ;          WHICH FOLLOWS W/ 761 <
9330                                ;
9331 031766 012742 000741      MOV    #741,-(R2)      ;MOVE TO MAILBOX # ***** 741 *****
9332 031772 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9333 031774 000000              HALT                   ;Z NOT CLEARED
9334 031776              2$:
9335 031776 102004              BVC    3$            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9336                                ;          CCNDITIONAL BRANCH INST. AND <
9337                                ;          REPLACE THE MOVE INSTRUCTION <
9338                                ;          WHICH FOLLOWS W/ 754 <
9339                                ;
9340 032000 012742 000742      MOV    #742,-(R2)      ;MOVE TO MAILBOX # ***** 742 *****
9341 032004 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9342 032006 000000              HALT                   ;V NOT CLEARED
9343 032010              3$:
9344 032010 103004              BCC    4$            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9345                                ;          CONDITIONAL BRANCH INST. AND <-
9346                                ;          REPLACE THE MOVE INSTRUCTION <-
9347                                ;          WHICH FOLLOWS W/ 747 <-
9348                                ;
9349 032012 012742 000743      MOV    #743,-(R2)      ;MOVE TO MAILBOX # ***** 743 *****
9350 032016 005242              INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9351 032020 000000              HALT                   ;C NOT CLEARED
9352 032022 032767 000340 145746 4$:  BIT    #340,CC        ;TEST PRIORITY
9353 032030 001404              BEQ    5$            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
9354                                ;          CONDITIONAL BRANCH INST. AND <-
9355                                ;          REPLACE THE MOVE INSTRUCTION <-
9356                                ;          WHICH FOLLOWS W/ 737 <-
9357
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9358 032032 012742 000744      MOV      #744,-(R2)      ;MOVE TO MAILBOX # ***** 744 *****
9359 032036 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9360 032040 000000              HALT                    ;PRIORITY NOT ZERO
9361 032042 012706 001000      5$:    MOV      #BUFF,SP
9362 032046 012767 032064 145760  MOV      #RETG1,RTRAP1
9363 032054 012767 000357 145754  MOV      #357,RTRAP1+2 ;SET NEW 'CC' AND PRIORITY
9364 032062 104400              TRAP                    ;TRAP HERE
9365 032064              RETG1:
9366 032064 100404              BMI      1$
9367
9368
9369
9370
9371 032066 012742 000745      MOV      #745,-(R2)      ;MOVE TO MAILBOX # ***** 745 *****
9372 032072 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9373 032074 000000              HALT                    ;N NOT SET
9374 032076
9375 032076 001404              1$:    BEQ      2$
9376
9377
9378
9379
9380 032100 012742 000746      MOV      #746,-(R2)      ;MOVE TO MAILBOX # ***** 746 *****
9381 032104 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9382 032106 000000              HALT                    ;Z NOT SET
9383 032110
9384 032110 102404              2$:    BVS      3$
9385
9386
9387
9388
9389 032112 012742 000747      MOV      #747,-(R2)      ;MOVE TO MAILBOX # ***** 747 *****
9390 032116 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9391 032120 000000              HALT                    ;V NOT SET
9392 032122
9393 032122 103404              3$:    BCS      4$
9394
9395
9396
9397
9398 032124 012742 000750      MOV      #750,-(R2)      ;MOVE TO MAILBOX # ***** 750 *****
9399 032130 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9400 032132 000000              HALT                    ;C NOT SET
9401 032134 016706 145636      4$:    MOV      CC,SP
9402 032140 042706 000017      BIC      #17,SP
9403 032144 022706 000340      CMP      #340,SP
9404 032150 001404              BEQ      TS316
9405
9406
9407
9408
9409 032152 012742 000751      MOV      #751,-(R2)      ;MOVE TO MAILBOX # ***** 751 *****
9410 032156 005242              INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9411 032160 000000              HALT                    ;PRIORITY WAS CHANGED,OR WRONG $1STNM
9412
9413
;*****

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9414 :TEST 316 TEST THAT ALL COMBINATION OF "TRAP" WILL CAUSE A TRAP
9415 :*****
9416 032162 005212 TS316: INC (R2) ;UPDATE TEST NUMBER
9417 032164 022712 000316 CMP #316,(R2) ;SEQUENCE ERROR?
9418 032170 001011 BNE BR45 ;BR TO ERROR HALT ON SEQ ERROR
9419 :***** F11 **** ADD +376 TO SHORTEN TEST
9420 032172 012767 104776 000012 MOV #TRAP+376,RB1 ;INITIALIZE BASE TRAP INSTRUCTION
9421 032200 012767 032224 145626 MOV #RA1,34 ;RETURN FROM TRAP TO RA1
9422 032206 012706 001000 RC1: MOV #BUFF,SP ;SET UP STACK POINTER
9423 032212 104400 RB1: TRAP ;TRAP INST WILL BE MODIFIED TO TRAP+377
9424 032214 BR45:
9425 032214 012742 000752 MOV #752,-(R2) ;MOVE TO MAILBOX # ***** 752 *****
9426 032220 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9427 032222 000000 HALT ;PREVIOUS INST FAILED TO TRAP,OR WRONG $STNM
9428 032224 005267 177762 RA1: INC RB1 ;INCREMENT TRAP INSTRUCTION
9429 032230 022767 104777 177754 CMP #104777,RB1 ;TRAP+377 TO UPPER LIMIT
9430 032236 103363 BHIS RC1 ;HAVE WE TESTED ALL
9431 032240 012767 000036 145566 MOV #36,34
9432 032246 005067 145564 CLR 36
9433 :*****
9434 :TEST 317 TEST THAT A TRAP OCCURES ON AN "IOT" INSTRUCTION
9435 :*****
9436 032252 005212 TS317: INC (R2) ;UPDATE TEST NUMBER
9437 032254 022712 000317 CMP #317,(R2) ;SEQUENCE ERROR?
9438 032260 001006 BNE TS320-10 ;BR TO ERROR HALT ON SEQ ERROR
9439 032262 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
9440 032266 012767 032306 145524 MOV #RETA2,RTRAP2 ;RETURN LOCATION
9441 032274 000004 IOT ;RESERVE INSTRUCTION, SHOULD TRAP
9442 032276 012742 000753 MOV #753,-(R2) ;MOVE TO MAILBOX # ***** 753 *****
9443 032302 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9444 032304 000000 HALT ;IOT DIDN'T TRAP,OR WRONG $STNM
9445 032306 RETA2:
9446 :*****
9447 :TEST 320 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
9448 :*****
9449 032306 005212 TS320: INC (R2) ;UPDATE TEST NUMBER
9450 032310 022712 000320 CMP #320,(R2) ;SEQUENCE ERROR?
9451 032314 001011 BNE TS321-10 ;BR TO ERROR HALT ON SEQ ERROR
9452 032316 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
9453 032322 012767 032332 145470 MOV #RETB2,RTRAP2 ;RETURN POINTER
9454 032330 000094 IOT ;RESERVED INSTRUCTION
9455 032332 020627 000774 RETB2: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
9456 032336 001404 BEQ TS321
9457 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
9458 : CONDITIONAL BRANCH INST. AND <==
9459 : REPLACE THE MOVE INSTRUCTION <==
9460 : WHICH FOLLOWS W/ 766 <==
9461 032340 012742 000754 MOV #754,-(R2) ;MOVE TO MAILBOX # ***** 754 *****
9462 032344 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
9463 032346 000000 HALT ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
9464 : OR SEQUENCE ERROR
9465 :*****
9466 :TEST 321 TEST THAT PROPER P.C. IS SAVED
9467 :*****
9468 032350 005212 TS321: INC (R2) ;UPDATE TEST NUMBER
9469 032352 022712 000321 CMP #321,(R2) ;SEQUENCE ERROR?

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9470 032356 001012      BNE    TS322-10      ;BR TO ERROR HALT ON SEQ ERROR
9471 032360 012706 001000  MOV    #BUFF,SP      ;STACK POINTER SETUP
9472 032364 012767 032374 145426  MOV    #RETC2,RTRAP2 ;RETURN FROM TRAP POINTER
9473 032372 000004      IOT                    ;TRAP ON THIS INSTRUCTION
9474 032374 022767 032374 146372  RETC2: CMP    #.BUFF-4    ;CHECK FOR INCREMENTED P.C.
9475 032402 001404      BEQ    TS322          ;
9476                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <= --
9477                                     ;          CONDITIONAL BRANCH INST. AND < --
9478                                     ;          REPLACE THE MOVE INSTRUCTION < --
9479                                     ;          WHICH FOLLOWS W/ 765 < --
9480 032404 012742 000755      MOV    #755,-(R2)    ;MOVE TO MAILBOX # ***** 755 *****
9481 032410 005242      INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
9482 032412 000000      HALT                ;INCORRECT P.C.,OR WRONG $STNM
9483                                     ; OR SEQUENCE ERROR
9484 :*****
9485 :TEST 322      TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
9486 :*****
9487 032414 005212      TS322: INC    (R2)      ;UPDATE TEST NUMBER
9488 032416 022712 000322      CMP    #322,(R2)    ;SEQUENCE ERROR?
9489 032422 001037      BNE    TS323-10     ;BR TO ERROR HALT ON SEQ ERROR
9490 032424 012706 001000      MOV    #BUFF,SP      ;SET UP
9491 032430 012767 032446 145362  MOV    #RETD2,RTRAP2 ;SET UP
9492 032436 005067 145334      LR     CC            ;CLEAR CC AND PRIORITY
9493 032442 000257      CCC                    ;
9494 032444 000004      IOT                    ;TRAP
9495 032446 026727 146324 000000  RETD2: CMP    BUFF-2,#0 ;TEST THAT OLD STATUS WENT TO STACK
9496 032454 001404      BEQ    1$           ;
9497                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <= --
9498                                     ;          CONDITIONAL BRANCH INST. AND < --
9499                                     ;          REPLACE THE MOVE INSTRUCTION <= --
9500                                     ;          WHICH FOLLOWS W/ 762 < --
9501 032456 012742 000756      MOV    #756,-(R2)    ;MOVE TO MAILBOX # ***** 756 *****
9502 032462 005242      INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
9503 032464 000000      HALT                ;INCORRECT STATUS
9504 032466 012706 001000      1$:  MOV    #BUFF,SP      ;SET UP
9505 032472 012767 032512 145320  MOV    #RETE2,RTRAP2 ;SET UP
9506 032500 012767 000357 145270  MOV    #357,CC       ;SET PRIORITY
9507 032506 000277      SCC                    ;SET CC
9508 032510 000004      IOT                    ;TRAP
9509 032512 026727 146260 000357  RETE2: CMP    BUFF-2,#357 ;COMPARES STATUS ON STACK
9510 032520 001404      BEQ    TS323        ;
9511                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS < --
9512                                     ;          CONDITIONAL BRANCH INST. AND < --
9513                                     ;          REPLACE THE MOVE INSTRUCTION < --
9514                                     ;          WHICH FOLLOWS W/ 740 < --
9515 032522 012742 000757      MOV    #757,-(R2)    ;MOVE TO MAILBOX # ***** 757 *****
9516 032526 005242      INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
9517 032530 000000      HALT                ;INCORRECT STATUS ON STACK,OR WRONG $STNM
9518                                     ; OR SEQUENCE ERROR
9519 :*****
9520 :TEST 323      TEST THAT 'NEW' STATUS IS CORRECT
9521 :*****
9522 032532 005212      TS323: INC    (R2)      ;UPDATE TEST NUMBER
9523 032534 022712 000323      CMP    #323,(R2)    ;SEQUENCE ERROR?
9524 032540 001110      BNE    BR46         ;BR TO ERROR HALT ON SEQ ERROR
9525 032542 012706 001000      MOV    #BUFF,SP

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9526 032546 012767 032562 145244      MOV      #RETF2,RTRAP2
9527 032554 005067 145242      CLR      RTRAP2+2      ;CLEAR FUTURE PRIORITY AND CC
9528 032560 000004      IOT
9529 032562      RETF2:      ;TEST FOR 'C' CLEARED
9530 032562 100004      BPL      1$
9531      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9532      ;          CONDITIONAL BRANCH INST. AND <====
9533      ;          REPLACE THE MOVE INSTRUCTION <====
9534      ;          WHICH FOLLOWS W/ 766 <====
9535 032564 012742 000760      MOV      #760,-(R2)    ;MOVE TO MAILBOX # ***** 760 *****
9536 032570 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
9537 032572 000000      HALT
9538 032574      1$:      ;N NOT CLEARED
9539 032574 001004      BNE      2$
9540      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
9541      ;          CONDITIONAL BRANCH INST. AND <====
9542      ;          REPLACE THE MOVE INSTRUCTION <----
9543      ;          WHICH FOLLOWS W/ 761 <----
9544 032576 012742 000761      MOV      #761,-(R2)    ;MOVE TO MAILBOX # ***** 761 *****
9545 032602 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
9546 032604 000000      HALT
9547 032606      2$:      ;Z NOT CLEARED
9548 032606 102004      BVC      3$
9549      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <----
9550      ;          CONDITIONAL BRANCH INST. AND <====
9551      ;          REPLACE THE MOVE INSTRUCTION <====
9552      ;          WHICH FOLLOWS W/ 754 <====
9553 032610 012742 000762      MOV      #762,-(R2)    ;MOVE TO MAILBOX # ***** 762 *****
9554 032614 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
9555 032616 000000      HALT
9556 032620      3$:      ;V NOT CLEARED
9557 032620 103004      BCC      4$
9558      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9559      ;          CONDITIONAL BRANCH INST. AND <----
9560      ;          REPLACE THE MOVE INSTRUCTION <----
9561      ;          WHICH FOLLOWS W/ 747 <----
9562 032622 012742 000763      MOV      #763,-(R2)    ;MOVE TO MAILBOX # ***** 763 *****
9563 032626 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
9564 032630 000000      HALT
9565 032632 032767 000340 145136 4$:      BIT      #340,CC
9566 032640 001404      BEQ      5$          ;TEST PRIORITY
9567      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9568      ;          CONDITIONAL BRANCH INST. AND <====
9569      ;          REPLACE THE MOVE INSTRUCTION <====
9570      ;          WHICH FOLLOWS W/ 737 <====
9571 032642 012742 000764      MOV      #764,-(R2)    ;MOVE TO MAILBOX # ***** 764 *****
9572 032646 005242      INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
9573 032650 000000      HALT
9574 032652 012706 001000      5$:      MOV      #BUFF,SP
9575 032656 012767 032674 145134      MOV      #RETG2,RTRAP2
9576 032664 012767 000357 145130      MOV      #357,RTRAP2+2 ;SET NEW 'CC' AND PRIORITY
9577 032672 000004      IOT          ;TRAP HERE
9578 032674      RETG2:
9579 032674 100404      BMI      1$
9580      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9581      ;          CONDITIONAL BRANCH INST. AND <====

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9582                                     ;           REPLACE THE MOVE INSTRUCTION <====
9583                                     ;           WHICH FOLLOWS W/ 721 <====
9584 032676 012742 000765                MOV #765,-(R2) ;MOVE TO MAILBOX # ***** 765 *****
9585 032702 005242                       INC -(R2)      ;SET MSGTYP TO FATAL ERROR
9586 032704 000000                       HALT          ;N NOT SET
9587 032706                                1$:          BEQ 2$
9588 032706 001404
9589
9590                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9591                                     ;           CONDITIONAL BRANCH INST. AND <====
9592                                     ;           REPLACE THE MOVE INSTRUCTION <====
9593                                     ;           WHICH FOLLOWS W/ 714 <====
9593 032710 012742 000766                MOV #766,-(R2) ;MOVE TO MAILBOX # ***** 766 *****
9594 032714 005242                       INC -(R2)      ;SET MSGTYP TO FATAL ERROR
9595 032716 000000                       HALT          ;Z NOT SET
9596 032720                                2$:          BVS 3$
9597 032720 102404
9598
9599                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9600                                     ;           CONDITIONAL BRANCH INST. AND <====
9601                                     ;           REPLACE THE MOVE INSTRUCTION <====
9602                                     ;           WHICH FOLLOWS W/ 707 <====
9602 032722 012742 000767                MOV #767,-(R2) ;MOVE TO MAILBOX # ***** 767 *****
9603 032726 005242                       INC -(R2)      ;SET MSGTYP TO FATAL ERROR
9604 032730 000000                       HALT          ;V NOT SET
9605 032732                                3$:          BCS 4$
9606 032732 103404
9607
9608                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9609                                     ;           CONDITIONAL BRANCH INST. AND <====
9610                                     ;           REPLACE THE MOVE INSTRUCTION <====
9611                                     ;           WHICH FOLLOWS W/ 702 <====
9611 032734 012742 000770                MOV #770,-(R2) ;MOVE TO MAILBOX # ***** 770 *****
9612 032740 005242                       INC -(R2)      ;SET MSGTYP TO FATAL ERROR
9613 032742 000000                       HALT          ;C NOT SET
9614 032744 016706 145026                4$:          MOV CC,SP
9615 032750 042706 000017                BIC #17,SP
9616 032754 022706 000340                CMP #340,SP
9617 032760 001404                       BEQ BR46A
9618
9619                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9620                                     ;           CONDITIONAL BRANCH INST. AND <====
9621                                     ;           REPLACE THE MOVE INSTRUCTION <====
9622                                     ;           WHICH FOLLOWS W/ 667 <====
9622 032762                                BR46:
9623 032762 012742 000771                MOV #771,-(R2) ;MOVE TO MAILBOX # ***** 771 *****
9624 032766 005242                       INC -(R2)      ;SET MSGTYP TO FATAL ERROR
9625 032770 000000                       HALT          ;PRIORITY WAS CHANGED,OR WRONG $STNM
9626 032772 012767 000022 145020 BR46A: MOV #22,20
9627 033000 005067 145016                CLR 22        ;HALT
9628
9629 ;*****
9630 ;TEST 324 TEST THAT A TRAP OCCURS ON AN EMT INSTRUCTION
9631 ;*****
9631 033004 005212                                TS324: INC (R2) ;UPDATE TEST NUMBER
9632 033006 022712 000324                CMP #324,(R2) ;SEQUENCE ERROR?
9633 033012 001006                                BNE TS325-10 ;BR TO ERROR HALT ON SEQ ERROR
9634 033014 012706 001000                MOV #BUFF,SP ;STACK POINTER SETUP
9635 033020 012767 033040 145002                MOV #RETA3,RTRAP3 ;RETURN LOCATION
9636 033026 104000                                EMT ;RESERVE INSTRUCTION, SHOULD TRAP
9637 033030 012742 000772                MOV #772,-(R2) ;MOVE TO MAILBOX # ***** 772 *****

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```
9638 033034 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
9639 033036 000000          HALT                    ;EMT DIDN'T TRAP,OR WRONG $STNM
9640 033040
9641
9642
9643
9644 033040 005212          RETA3:
:*****
:TEST 325          TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
:*****
9645 033042 022712 000325    TS325:  INC      (R2)          ;UPDATE TEST NUMBER
9646 033046 001011          CMP      #325,(R2)      ;SEQUENCE ERROR?
9647 033050 012706 001000    BNE     TS326-10        ;BR TO ERROR HALT ON SFQ ERROR
9648 033054 012767 033064 144746  MOV     #BUFF,SP        ;STACK POINTER SETUP
9649 033062 104000          MOV     #RETB3,RTRAP3  ;RETURN POINTER
9650 033064 020627 000774    EMT                    ;RESERVED INSTRUCTION
9651 033070 001404          RETB3:  CMP      SP,#BUFF-4 ;TEST DECREMENT OF SP
          BEQ     TS326
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
:          CONDITIONAL BRANCH INST. AND <===
:          REPLACE THE MOVE INSTRUCTION <===
:          WHICH FOLLOWS W/ 766 <===
9656 033072 012742 000773    MOV     #773,-(R2)     ;MOVE TO MAILBOX # ***** 773 *****
9657 033076 005242          INC      -(R2)
9658 033100 000000          HALT                    ;SET MSGTYP TO FATAL ERROR
9659
9660
9661
9662
9663 033102 005212          ;TEST 326          TEST THAT PROPER P.C. IS SAVED
9664 033104 022712 000326    TS326:  INC      (R2)          ;UPDATE TEST NUMBER
9665 033110 001012          CMP     #326,(R2)      ;SEQUENCE ERROR?
9666 033112 012706 001000    BNE     TS327-10        ;BR TO ERROR HALT ON SEQ ERROR
9667 033116 012767 033126 144704  MOV     #BUFF,SP        ;STACK POINTER SETUP
9668 033124 104000          MOV     #RETC3,RTRAP3  ;RTURN FROM TRAP POINTER
9669 033126 022767 033126 145640  EMT                    ;TRAP ON THIS INSTRUCTION
9670 033134 001404          RETC3:  CMP     #,BUFF-4  ;CHECK FOR INCREMENTED P.C.
          BEQ     TS327
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
:          CONDITIONAL BRANCH INST. AND <==
:          REPLACE THE MOVE INSTRUCTION <==
:          WHICH FOLLOWS W/ 765 <==
9675 033136 012742 000774    MOV     #774,-(R2)     ;MOVE TO MAILBOX # ***** 774 *****
9676 033142 005242          INC      -(R2)
9677 033144 000000          HALT                    ;SET MSGTYP TO FATAL ERROR
9678
9679
9680
9681
9682 033146 005212          ;TEST 327          TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
9683 033150 022712 000327    TS327:  INC      (R2)          ;UPDATE TEST NUMBER
9684 033154 001037          CMP     #327,(R2)      ;SEQUENCE ERROR?
9685 033156 012706 001000    BNE     TS330-10        ;BR TO ERROR HALT ON SEQ ERROR
9686 033162 012767 033200 144640  MOV     #BUFF,SP        ;SET UP
9687 033170 005067 144602    MOV     #RETD3,RTRAP3  ;SET UP
9688 033174 000257          CLR     CC              ;CLEAR CC AND PRIORITY
9689 033176 104000          CCC
9690 033200 026727 145572 000000  RETD3:  EMT                    ;TRAP
          CMP     BUFF-2,#0 ;TEST THAT OLD STATUS WENT TO STACK
          BEQ     1$
:
: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
:          CONDITIONAL BRANCH INST. AND <==
9693
```

```

9694                                     :          REPLACE THE MOVE INSTRUCTION
9695                                     :          WHICH FOLLOWS W/ 762
9696 033210 012742 000775             MOV    #775,-(R2)      ;MOVE TO MAILBOX # ***** 775 *****
9697 033214 005242                     INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9698 033216 000000                     HALT                   ;INCORRECT STATUS
9699 033220 012706 001000             1$:   MOV    #BUFF,SP    ;SET UP
9700 033224 012767 033244 144576     MOV    #RETE3,RTRAP3  ;SET UP
9701 033232 012767 000357 144536     MOV    #357,CC        ;SET PRIORITY
9702 033240 000277                     SCC                    ;SET CC
9703 033242 104000                     EMT                    ;TRAP
9704 033244 026727 145526 000357     RETE3: CMP    BUFF-2,#357 ;COMPARES STATUS ON STACK
9705 033252 001404                     BEQ    TS330
9706                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
9707                                     :          CONDITIONAL BRANCH INST. AND <====
9708                                     :          REPLACE THE MOVE INSTRUCTION <====
9709                                     :          WHICH FOLLOWS W/ 740 <====
9710 033254 012742 000776             MOV    #776,-(R2)      ;MOVE TO MAILBOX # ***** 776 *****
9711 033260 005242                     INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9712 033262 000000                     HALT                   ;INCORRECT STATUS ON STACK,OR WRONG $STNM
9713                                     : OR SEQUENCE ERROR
9714 :*****
9715 :TEST 330 TEST THAT 'NEW' STATUS IS CORRECT
9716 :*****
9717 033264 005212                     TS330: INC    (R2)      ;UPDATE TEST NUMBER
9718 033266 022712 000330             CMP    #330,(R2)      ;SEQUENCE ERROR?
9719 033272 001106                     BNE    TS331-10        ;BR TO ERROR HALT ON SEQ ERROR
9720 033274 012706 001000             MOV    #BUFF,SP
9721 033300 012767 033314 144522     MOV    #RETF3,RTRAP3
9722 033306 005067 144520             CLR    RTRAP3+2      ;CLEAR FUTURE PRIORITY AND CC
9723 033312 104000                     EMT
9724 033314                     RETF3:
9725 033314 100004                     BPL    1$             ;TEST FOR 'C' CLEARED
9726                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
9727                                     :          CONDITIONAL BRANCH INST. AND <====
9728                                     :          REPLACE THE MOVE INSTRUCTION <====
9729                                     :          WHICH FOLLOWS W/ 766 <====
9730 033316 012742 000777             MOV    #777,-(R2)      ;MOVE TO MAILBOX # ***** 777 *****
9731 033322 005242                     INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9732 033324 000000                     HALT                   ;C NOT CLEARED
9733                                     :
9734 033326 001004                     1$:   BNE    2$
9735                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
9736                                     :          CONDITIONAL BRANCH INST. AND <====
9737                                     :          REPLACE THE MOVE INSTRUCTION <====
9738                                     :          WHICH FOLLOWS W/ 761 <====
9739 033330 012742 001000             MOV    #1000,-(R2)     ;MOVE TO MAILBOX # ***** 1000 *****
9740 033334 005242                     INC    -(R2)          ;SET MSGTYP TO FATAL ERROR
9741 033336 000000                     HALT                   ;Z NOT CLEARED
9742 033340                     2$:
9743 033340 102004                     BVC    3$
9744                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
9745                                     :          CONDITIONAL BRANCH INST. AND <====
9746                                     :          REPLACE THE MOVE INSTRUCTION <====
9747                                     :          WHICH FOLLOWS W/ 754 <====
9748 033342 012742 001001             MOV    #1001,-(R2)     ;MOVE TO MAILBOX # ***** 1001 *****
9749 033346 005242                     INC    -(R2)          ;SET MSGTYP TO FATAL ERROR

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9750 033350 000000          HALT          ;V NOT CLEARED
9751 033352          3$:          BCC          4$
9752 033352 103004          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9753          ;                   CONDITIONAL BRANCH INST. AND <====
9754          ;                   REPLACE THE MOVE INSTRUCTION <====
9755          ;                   WHICH FOLLOWS W/ 747 <====
9756          ;
9757 033354 012742 001002    MOV          #1002,-(R2) ;MOVE TO MAILBOX # ***** 1002 *****
9758 033360 005242          INC          -(R2) ;SET MSGTYP TO FATAL ERROR
9759 033362 000000          HALT          ;C NOT CLEARED
9760 033364 032767 000340 144404 4$:    BIT          #340,CC ;TEST PRIORITY
9761 033372 001404          BEQ          5$
9762          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9763          ;                   CONDITIONAL BRANCH INST. AND <====
9764          ;                   REPLACE THE MOVE INSTRUCTION <====
9765          ;                   WHICH FOLLOWS W/ 737 <====
9766 033374 012742 001003    MOV          #1003,-(R2) ;MOVE TO MAILBOX # ***** 1003 *****
9767 033400 005242          INC          -(R2) ;SET MSGTYP TO FATAL ERROR
9768 033402 000000          HALT          ;PRIORITY NOT ZERO
9769 033404 012706 001000 5$:    MOV          #BUFF,SP
9770 033410 012767 033426 144412    MOV          #RETG3,RTRAP3
9771 033416 012767 000357 144406    MOV          #357,RTRAP3+2 ;SET NEW 'CC' AND PRIORITY
9772 033424 104000          EMT          ;TRAP HERE
9773 033426          RETG3:
9774 033426 100404          BMI          1$
9775          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9776          ;                   CONDITIONAL BRANCH INST. AND <====
9777          ;                   REPLACE THE MOVE INSTRUCTION <====
9778          ;                   WHICH FOLLOWS W/ 721 <====
9779 033430 012742 001004    MOV          #1004,-(R2) ;MOVE TO MAILBOX # ***** 1004 *****
9780 033434 005242          INC          -(R2) ;SET MSGTYP TO FATAL ERROR
9781 033436 000000          HALT          ;N NOT SET
9782 033440          1$:
9783 033440 001404          BEQ          2$
9784          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9785          ;                   CONDITIONAL BRANCH INST. AND <====
9786          ;                   REPLACE THE MOVE INSTRUCTION <====
9787          ;                   WHICH FOLLOWS W/ 714 <====
9788 033442 012742 001005    MOV          #1005,-(R2) ;MOVE TO MAILBOX # ***** 1005 *****
9789 033446 005242          INC          -(R2) ;SET MSGTYP TO FATAL ERROR
9790 033450 000000          HALT          ;Z NOT SET
9791 033452          2$:
9792 033452 102404          BVS          3$
9793          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9794          ;                   CONDITIONAL BRANCH INST. AND <====
9795          ;                   REPLACE THE MOVE INSTRUCTION <====
9796          ;                   WHICH FOLLOWS W/ 707 <====
9797 033454 012742 001006    MOV          #1006,-(R2) ;MOVE TO MAILBOX # ***** 1006 *****
9798 033460 005242          INC          -(R2) ;SET MSGTYP TO FATAL ERROR
9799 033462 000000          HALT          ;V NOT SET
9800 033464          3$:
9801 033464 103404          BCS          4$
9802          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
9803          ;                   CONDITIONAL BRANCH INST. AND <====
9804          ;                   REPLACE THE MOVE INSTRUCTION <====
9805          ;                   WHICH FOLLOWS W/ 702 <====

```

```

9806 033466 012742 001007      MOV    #1007,-(R2)      ;MOVE TO MAILBOX # ***** 1007 *****
9807 033472 005242              INC    -(R2)           ;SET MSGTYP TO FATAL ERROR
9808 033474 000000              HALT                    ;C NOT SET
9809 033476 000257              CCC
9810 033500 022767 000340 144270 4S:  CMP    #340,CC
9811 033506 001404              BEQ    TS331

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <===
; CONDITIONAL BRANCH INST. AND <===
; REPLACE THE MOVE INSTRUCTION <===
; WHICH FOLLOWS W/ 671 <===

```

```

9816 033510 012742 001010      MOV    #1010,-(R2)     ;MOVE TO MAILBOX # ***** 1010 *****
9817 033514 005242              INC    -(R2)           ;SET MSGTYP TO FATAL ERROR
9818 033516 000000              HALT                    ;PRIORITY WAS CHANGED,OR WRONG $STNM
9819                                     ; OR SEQUENCE ERROR

```

```

;*****
;TEST 331 TEST THAT ALL COMBINATION OF EMT WILL CAUSE A TRAP
;*****

```

```

9823 033520 005212              TS331: INC    (R2)           ;UPDATE TEST NUMBER
9824 033522 022712 000331      CMP    #331,(R2)       ;SEQUENCE ERROR?
9825 033526 001011              BNE    BR47            ;BR TO ERROR HALT ON SEQ ERROR
9826                                     ;**** F11 **** ADD +376 TO SHORTEN TEST
9827 033530 012767 104376 000012  MOV    #EMT+376,RB      ;INITIALIZE BASE EMT INSTRUCTION
9828 033536 012767 033562 144264  MOV    #RA,30           ;RETURN FROM TRAP TO RA
9829 033544 012706 001000      RC:   MOV    #BUFF,SP   ;SET UP STACK POINTER
9830 033550 104000              RB:   EMT              ;TRAP INST. WILL BE MODIFIED TO EMT+377
9831 033552
9832 033552 012742 001011      BR47: MOV    #1011,-(R2)   ;MOVE TO MAILBOX # ***** 1011 *****
9833 033556 005242              INC    -(R2)           ;SET MSGTYP TO FATAL ERROR
9834 033560 000000              HALT                    ;PREVIOUS INST FAILED TO TRAP,OR WRONG $STNM
9835 033562 005267 177762      RA:   INC    RB         ;INCREMENT TRAP INSTRUCTION
9836 033566 022767 104377 177754  CMP    #104377,RB      ;EMT+377 TO EMT?
9837 033574 103363              BHIS  RC              ;HAVE WE TESTED ALL
9838                                     ;YES
9839 033576 012767 000032 144224  MOV    #32,30          ;/.+
9840 033604 005067 144222      CLR    32              ;HALT

```

```

;*****
;TEST 332 TEST THAT A TRAP OCCURES ON AN 'TRACE-TRT' INSTRUCTION
;*****

```

```

9844 033610 005212              TS332: INC    (R2)           ;UPDATE TEST NUMBER
9845 033612 022712 000332      CMP    #332,(R2)       ;SEQUENCE ERROR?
9846 033616 001006              BNE    TS333-10        ;BR TO ERROR HALT ON SEQ ERROR
9847 033620 012706 001000      MOV    #BUFF,SP        ;STACK POINTER SETUP
9848 033624 012767 033644 144162  MOV    #RETA4,RTRAP4   ;RETURN LOCATION
9849 033632 000003              TRT                    ;RESERVED INSTRUCTION, SHOULD TRAP
9850 033634 012742 001012      MOV    #1012,-(R2)     ;MOVE TO MAILBOX # ***** 1012 *****
9851 033640 005242              INC    -(R2)           ;SET MSGTYP TO FATAL ERROR
9852 033642 000000              HALT                    ;TRT DIDN'T TRAP,OR WRONG $STNM
9853 033644
9854
9855
9856
9857 033644 005212              RETA4:

```

```

;*****
;TEST 333 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
;*****

```

```

9858 033646 022712 000333      TS333: INC    (R2)           ;UPDATE TEST NUMBER
9859 033652 001011              CMP    #333,(R2)       ;SEQUENCE ERROR?
9860 033654 012706 001000      BNE    TS334-10        ;BR TO ERROR HALT ON SEQ ERROR
9861 033660 012767 033670 144126  MOV    #BUFF,SP        ;STACK POINTER SETUP
                                MOV    #RETB4,RTRAP4   ;RETURN POINTER

```

```
9862 033666 000003
9863 033670 020627 000774
9864 033674 001404
9865
9866
9867
9868
9869 033676 012742 001013
9870 033702 005242
9871 033704 000000
9872
9873
9874
9875
9876 033706 005212
9877 033710 022712 000334
9878 033714 001012
9879 033716 012706 001000
9880 033722 012767 033732 144064
9881 033730 000003
9882 033732 022767 033732 145034
9883 033740 001404
9884
9885
9886
9887
9888 033742 012742 001014
9889 033746 005242
9890 033750 000000
9891
9892
9893
9894
9895 033752 005212
9896 033754 022712 000335
9897 033760 001037
9898 033762 012706 001000
9899 033766 012767 034004 144020
9900 033774 005067 143776
9901 034000 000257
9902 034002 000003
9903 034004 026727 144766 000000
9904
9905 034012 001404
9906
9907
9908
9909
9910 034014 012742 001015
9911 034020 005242
9912 034022 000000
9913 034024 012706 001000
9914 034030 012767 034050 143756
9915 034036 012767 000357 143732
9916 034044 000277
9917 034046 000003
```

TRT :RESERVED INSTRUCTION
RETB4: CMP SP,#BUFF-4 :TEST DECREMENT OF SP
BEQ TS334

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
: CONDITIONAL BRANCH INST. AND
: REPLACE THE MOVE INSTRUCTION
: WHICH FOLLOWS W/ 766

MOV #1013,-(R2) :MOVE TO MAILBOX # ***** 1013 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :NOT DECREMENTED TWO WORDS,OR WRONG \$STNM
: OR SEQUENCE ERROR

:TEST 334 TEST THAT PROPER P.C. IS SAVED

TS334: INC (R2) :UPDATE TEST NUMBER
CMP #334,(R2) :SEQUENCE ERROR?
BNE TS335-10 :BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP :STACK POINTER SETUP
MOV #RETC4,RTRAP4 :RETURN FROM TRAP POINTER
TRT :TRAP ON THIS INSTRUCTION
RETC4: CMP #,BUFF-4 :CHECK FOR INCREMENTED P.C.
BEQ TS335

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
: CONDITIONAL BRANCH INST. AND
: REPLACE THE MOVE INSTRUCTION
: WHICH FOLLOWS W/ 765

MOV #1014,-(R2) :MOVE TO MAILBOX # ***** 1014 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :INCORRECT P.C.,OR WRONG \$STNM
: OR SEQUENCE ERROR

:TEST 335 TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK

TS335: INC (R2) :UPDATE TEST NUMBER
CMP #335,(R2) :SEQUENCE ERROR?
BNE TS336-10 :BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP :SET UP
MOV #RETD4,RTRAP4 :SET UP
CLR CC :CLEAR CC AND PRIORITY
CCC
TRT :TRAP
RETD4: CMP BUFF-2,#0 :TEST THAT OLD STATUS WENT TO STACK
BEQ 1\$:TEST FOR ALL ZEROS

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
: CONDITIONAL BRANCH INST. AND
: REPLACE THE MOVE INSTRUCTION
: WHICH FOLLOWS W/ 762

MOV #1015,-(R2) :MOVE TO MAILBOX # ***** 1015 *****
INC -(R2) :SET MSGTYP TO FATAL ERROR
HALT :INCORRECT STATUS
1\$: MOV #BUFF,SP :SET UP
MOV #RETE4,RTRAP4 :SET UP
MOV #357,CC :SET PRIORITY
SCC :SET-SET CC
TRT :TRAP

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T335 TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK

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9918 034050 026727 144722 000357 RETE4: CMP      BUFF-2,#357      ;COMPARES STATUS ON STACK
9919 034056 001404          BEQ      TS336          ;
9920          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9921          ; CONDITIONAL BRANCH INST. AND <==
9922          ; REPLACE THE MOVE INSTRUCTION <-
9923          ; WHICH FOLLOWS W/ 740 <-
9924 034060 012742 001016          MOV      #1016,-(R2) ;MOVE TO MAILBOX # ***** 1016 *****
9925 034064 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
9926 034066 000000          HALT     ;INCORRECT STATUS ON STACK,OR WRONG $ISTNM
9927          ; OR SEQUENCE ERROR
9928          ;*****
9929          ;TEST 336 TEST THAT 'NEW' STATUS IS CORRECT
9930          ;*****
9931 034070 005212          TS336: INC      (R2)      ;UPDATE TEST NUMBER
9932 034072 022712 000336          CMP      #336,(R2)   ;SEQUENCE ERROR?
9933 034076 001110          BNE     BR51        ;BR TO ERROR HALT ON SEQ ERROR
9934 034100 012706 001000          MOV     #BUFF,SP
9935 034104 012767 034120 143702      MOV     #RETF4,RTRAP4
9936 034112 005067 143700          CLR     RTRAP4+2    ;CLEAR FUTURE PRIORITY AND CC
9937 034116 000003          TRT
9938 034120          RETF4:          ;TEST FOR 'C' CLEARED
9939 034120 100004          BPL     1$
9940          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9941          ; CONDITIONAL BRANCH INST. AND <-
9942          ; REPLACE THE MOVE INSTRUCTION <-
9943          ; WHICH FOLLOWS W/ 766 <-
9944 034122 012742 001017          MOV     #1017,-(R2) ;MOVE TO MAILBOX # ***** 1017 *****
9945 034126 005242          INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
9946 034130 000000          HALT     ;C NOT CLEARED
9947 034132          1$:
9948 034132 001004          BNE     2$
9949          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9950          ; CONDITIONAL BRANCH INST. AND <==
9951          ; REPLACE THE MOVE INSTRUCTION <-
9952          ; WHICH FOLLOWS W/ 761 <-
9953 034134 012742 001020          MOV     #1020,-(R2) ;MOVE TO MAILBOX # ***** 1020 *****
9954 034140 005242          INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
9955 034142 000000          HALT     ;Z NOT CLEARED
9956 034144          2$:
9957 034144 102004          BVC     3$
9958          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9959          ; CONDITIONAL BRANCH INST. AND <==
9960          ; REPLACE THE MOVE INSTRUCTION <==
9961          ; WHICH FOLLOWS W/ 754 <-
9962 034146 012742 001021          MOV     #1021,-(R2) ;MOVE TO MAILBOX # ***** 1021 *****
9963 034152 005242          INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
9964 034154 000000          HALT     ;V NOT CLEARED
9965 034156          3$:
9966 034156 103004          BCC     4$
9967          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
9968          ; CONDITIONAL BRANCH INST. AND <---
9969          ; REPLACE THE MOVE INSTRUCTION <-
9970          ; WHICH FOLLOWS W/ 747 <-
9971 034160 012742 001022          MOV     #1022,-(R2) ;MOVE TO MAILBOX # ***** 1022 *****
9972 034164 005242          INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
9973 034166 000000          HALT     ;C NOT CLEARED

```


9974	034170	032767	000340	143600	4\$:	BIT	#340,CC		;TEST PRIORITY	
9975	034176	001404				BEQ	5\$			
9976									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
9977									CONDITIONAL BRANCH INST. AND	<====
9978									REPLACE THE MOVE INSTRUCTION	<====
9979									WHICH FOLLOWS W/ 737	<====
9980	034200	012742	001023			MOV	#1023,-(R2)		;MOVE TO MAILBOX # ***** 1023 *****	
9981	034204	005242				INC	-(R2)		;SET MSGTYP TO FATAL ERROR	
9982	034206	000000				HALT			;PRIORITY NOT ZERO	
9983	034210	012706	001000		5\$:	MOV	#BJFF,SP			
9984	034214	012767	034232	143572		MOV	#RETG4,RTRAP4			
9985	034222	012767	000357	143566		MOV	#357,RTRAP4+2		;SET NEW 'CC' AND PRIORITY	
9986	034230	000003				TRT			;TRAP HERE	
9987	034232					RETG4:				
9988	034232	100404				BMI	1\$			
9989									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
9990									CONDITIONAL BRANCH INST. AND	<====
9991									REPLACE THE MOVE INSTRUCTION	<====
9992									WHICH FOLLOWS W/ 721	<====
9993	034234	012742	001024			MOV	#1024,-(R2)		;MOVE TO MAILBOX # ***** 1024 *****	
9994	034240	005242				INC	-(R2)		;SET MSGTYP TO FATAL ERROR	
9995	034242	000000				HALT			;N NOT SET	
9996	034244				1\$:					
9997	034244	001404				BEQ	2\$			
9998									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
9999									CONDITIONAL BRANCH INST. AND	<====
10000									REPLACE THE MOVE INSTRUCTION	<====
10001									WHICH FOLLOWS W/ 714	<====
10002	034246	012742	001025			MOV	#1025,-(R2)		;MOVE TO MAILBOX # ***** 1025 *****	
10003	034252	005242				INC	-(R2)		;SET MSGTYP TO FATAL ERROR	
10004	034254	000000				HALT			;Z NOT SET	
10005	034256				2\$:					
10006	034256	102404				BVS	3\$			
10007									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
10008									CONDITIONAL BRANCH INST. AND	<====
10009									REPLACE THE MOVE INSTRUCTION	<====
10010									WHICH FOLLOWS W/ 707	<====
10011	034260	012742	001026			MOV	#1026,-(R2)		;MOVE TO MAILBOX # ***** 1026 *****	
10012	034264	005242				INC	-(R2)		;SET MSGTYP TO FATAL ERROR	
10013	034266	000000				HALT			;V NOT SET	
10014	034270				3\$:					
10015	034270	103404				BCS	4\$			
10016									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
10017									CONDITIONAL BRANCH INST. AND	<====
10018									REPLACE THE MOVE INSTRUCTION	<====
10019									WHICH FOLLOWS W/ 702	<====
10020	034272	012742	001027			MOV	#1027,-(R2)		;MOVE TO MAILBOX # ***** 1027 *****	
10021	034276	005242				INC	-(R2)		;SET MSGTYP TO FATAL ERROR	
10022	034300	000000				HALT			;C NOT SET	
10023	034302	016706	143470		4\$:	MOV	CC,SP			
10024	034306	042706	000017			BIC	#17,SP			
10025	034312	022706	000340			CMF	#340,SP			
10026	034316	001404				BEQ	BR51A			
10027									; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS	<====
10028									CONDITIONAL BRANCH INST. AND	<====
10029									REPLACE THE MOVE INSTRUCTION	<====

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10030 : WHICH FOLLOWS W/ 667
10031 034320 BR51:
10032 034320 012742 001030 MOV #1030,-(R2) ;MOVE TO MAILBOX # ***** 1030 *****
10033 034324 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
10034 034326 000000 HALT ;PRIORITY WAS CHANGED,OR WRONG $STNM
10035 034330 012767 000016 143456 BR51A: MOV #16,14
10036 034336 005067 143454 CLR 16
10037
10038 ;PDP-11 ILLEGAL AND ADDRESS INSTRUCTION TEST
10039 ;ALL INSTRUCTIONS THAT ARE RESERVED
10040 ;SHOULD TRAP TO LOCATION 4, AND THE
10041 ;PC THAT POINTS TO THE TRAPPING INSTRUCTION
10042 ;SHOULD BE PLACED ON THE STACK
10043
10044 ;*****
10045 ;TEST 337 TEST THAT A TRAP OCCURS ON AN ILLEGAL INSTRUCTION
10046 ;*****
10047 034342 005212 TS337: INC (R2) ;UPDATE TEST NUMBER
10048 034344 022712 000337 CMP #337,(R2) ;SEQUENCE ERROR?
10049 034350 001006 BNE TS340-10 ;BR TO ERROR HALT ON SEQ ERROR
10050 034352 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
10051 034356 012767 034376 143420 MOV #RETA5,RTRAP5 ;RETURN LOCATION
10052 034364 000100 JMP %0 ;ILLEGAL INSTRUCTION, SHOULD TRAP
10053 034366 012742 001031 MOV #1031,-(R2) ;MOVE TO MAILBOX # ***** 1031 *****
10054 034372 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
10055 034374 000000 HALT ;ILLEGAL INSTRUCTION DIDN'T TRAP,OR WRONG $STNM
10056 034376
10057 RETA5:
10058 ;*****
10059 ;TEST 340 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
10060 ;*****
10061 034376 005212 TS340: INC (R2) ;UPDATE TEST NUMBER
10062 034400 022712 000340 CMP #340,(R2) ;SEQUENCE ERROR?
10063 034404 001011 BNE TS341-10 ;BR TO ERROR HALT ON SEQ ERROR
10064 034406 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
10065 034412 012767 034422 143364 MOV #RETB5,RTRAP5 ;RETURN POINTER
10066 034420 000100 JMP %0 ;RESERVED INSTRUCTION
10067 034426 020627 000774 RETB5: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
10068 034426 001404 BEQ TS341
10069 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
10070 ; CONDITIONAL BRANCH INST. AND <
10071 ; REPLACE THE MOVE INSTRUCTION <
10072 ; WHICH FOLLOWS W/ 766 <
10073 034430 012742 001032 MOV #1032,-(R2) ;MOVE TO MAILBOX # ***** 1032 *****
10074 034434 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
10075 034436 000000 HALT ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
10076 ; OR SEQUENCE ERROR
10077 ;*****
10078 ;TEST 341 TEST THAT PROPER P.C. IS SAVED
10079 ;*****
10080 034440 005212 TS341: INC (R2) ;UPDATE TEST NUMBER
10081 034442 022712 000341 CMP #341,(R2) ;SEQUENCE ERROR?
10082 034446 001012 BNE TS342-10 ;BR TO ERROR HALT ON SEQ ERROR
10083 034450 012706 001000 MOV #BUFF,SP ;STACK POINTER SETUP
10084 034454 012767 034464 143322 MOV #RETC5,RTRAP5 ;RETURN FROM TRAP POINTER
10085 034462 000100 JMP %0 ;TRAP ON THIS INSTRUCTION
034464 022767 034464 144302 RETC5: CMP #.,BUFF-4 ;CHECK FOR INCREMENTED P.C.
```

```

10086 034472 001404          BEQ      TS342
10087
10088
10089
10090
10091 034474 012742 001033    MOV      #1033,-(R2)
10092 034500 005242          INC      -(R2)
10093 034502 000000          HALT
10094
10095
10096
10097
10098 034504 005212          TS342:  INC      (R2)
10099 034506 022712 000342    CMP      #342,(R2)
10100 034512 001037          BNE     TS343-10
10101 034514 012706 001000    MOV      #BUFF,SP
10102 034520 012767 034536 143256  MOV      #RETD5,RTRAP5
10103 034526 005067 143244    CLR      CC
10104 034532 000257          CCC
10105 034534 000100          JMP      %0
10106 034536 026727 144234 000000  RETD5:  CMP      BUFF-2,#0
10107 034544 001404          BEQ      1$
10108
10109
10110
10111
10112 034546 012742 001034    MOV      #1034,-(R2)
10113 034552 005242          INC      -(R2)
10114 034554 000000          HALT
10115 034556 012706 001000 1$:      MOV      #BUFF,SP
10116 034562 012767 034602 143214  MOV      #RETE5,RTRAP5
10117 034570 012767 000357 143200  MOV      #357,CC
10118 034576 000277          SCC
10119 034600 000100          JMP      %0
10120 034602 026727 144170 000357  RETE5:  CMP      BUFF-2,#357
10121 034610 001404          BEQ      TS343
10122
10123
10124
10125
10126 034612 012742 001035    MOV      #1035,-(R2)
10127 034616 005242          INC      -(R2)
10128 034620 000000          HALT
10129
10130
10131
10132
10133 034622 005212          TS343:  INC      (R2)
10134 034624 022712 000343    CMP      #343,(R2)
10135 034630 001106          BNE     TS344-10
10136 034632 012706 001000    MOV      #BUFF,SP
10137 034636 012767 034652 143140  MOV      #RETF5,RTRAP5
10138 034644 005067 143136    CLR      RTRAP5+2
10139 034650 000100          JMP      %0
10140 034652          RETF5:
10141 034652 100004          BPL      1$

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 765 <====
; MOVE TO MAILBOX # ***** 1033 *****
; SET MSGTYP TO FATAL ERROR
; INCORRECT P.C. OR WRONG $STNM
; OR SEQUENCE ERROR

```

```

*****
:TEST 342 TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
*****

```

```

; UPDATE TEST NUMBER
; SEQUENCE ERROR?
; BR TO ERROR HALT ON SEQ ERROR
; SET UP
; SET UP
; CLEAR CC AND PRIORITY
; TRAP
; TEST THAT OLD STATUS WENT TO STACK

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 762 <====

```

```

; MOVE TO MAILBOX # ***** 1034 *****
; SET MSGTYP TO FATAL ERROR
; INCORRECT STATUS
; SET UP
; SET UP
; SET PRIORITY
; SET CC
; TRAP
; COMPARES STATUS ON STACK

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
; CONDITIONAL BRANCH INST. AND <====
; REPLACE THE MOVE INSTRUCTION <====
; WHICH FOLLOWS W/ 740 <====

```

```

; MOVE TO MAILBOX # ***** 1035 *****
; SET MSGTYP TO FATAL ERROR
; INCORRECT STATUS ON STACK,OR WRONG $STNM
; OR SEQUENCE ERROR

```

```

*****
:TEST 343 TEST THAT 'NEW' STATUS IS CORRECT
*****

```

```

; UPDATE TEST NUMBER
; SEQUENCE ERROR?
; BR TO ERROR HALT ON SEQ ERROR
; CLEAR FUTURE PRIORITY AND CC
; TEST FOR 'C' CLEARED

```



```
10198 034776 1$:  
10199 034776 001404 BEQ 2$  
10200 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
10201 : CONDITIONAL BRANCH INST. AND <====  
10202 : REPLACE THE MOVE INSTRUCTION <====  
10203 : WHICH FOLLOWS W/ 714 <====  
10204 035000 012742 001044 MOV #1044,-(R2) :MOVE TO MAILBOX # ***** 1044 *****  
10205 035004 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR  
10206 035006 000000 HALT :Z NOT SET  
10207 035010 2$:  
10208 035010 102404 BVS 3$  
10209 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
10210 : CONDITIONAL BRANCH INST. AND <====  
10211 : REPLACE THE MOVE INSTRUCTION <====  
10212 : WHICH FOLLOWS W/ 707 <====  
10213 035012 012742 001045 MOV #1045,-(R2) :MOVE TO MAILBOX # ***** 1045 *****  
10214 035016 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR  
10215 035020 000000 HALT :V NOT SET  
10216 035022 3$:  
10217 C35022 103404 BCS 4$  
10218 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
10219 : CONDITIONAL BRANCH INST. AND <====  
10220 : REPLACE THE MOVE INSTRUCTION <====  
10221 : WHICH FOLLOWS W/ 702 <====  
10222 035024 012742 001046 MOV #1046,-(R2) :MOVE TO MAILBOX # ***** 1046 *****  
10223 035030 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR  
10224 035032 000000 HALT :C NOT SET  
10225 035034 016706 142736 4$:  
10226 035040 022706 000357 MOV CC,SP  
10227 035044 001404 CMP #357,SP  
10228 BEQ TS344  
10229 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
10230 : CONDITIONAL BRANCH INST. AND <====  
10231 : REPLACE THE MOVE INSTRUCTION <====  
10232 : WHICH FOLLOWS W/ 671 <====  
10232 035046 012742 001047 MOV #1047,-(R2) :MOVE TO MAILBOX # ***** 1047 *****  
10233 035052 005242 INC -(R2) :SET MSGTYP TO FATAL ERROR  
10234 035054 000000 HALT :PRIORITY WAS CHANGED,OR WRONG $STNM  
10235 : OR SEQUENCE ERROR  
10236 :*****  
10237 :TEST 344 TEST THAT A TRAP OCCURES ON ALL ILLEGAL INSTRUCTION  
10238 :*****  
10239 035056 005212 TS344: INC (R2) :UPDATE TEST NUMBER  
10240 035060 022712 000344 CMP #344,(R2) :SEQUENCE ERROR?  
10241 035064 001006 BNE TS345-10 :BR TO ERROR HALT ON SEQ ERROR  
10242 035066 012706 001000 MOV #BUFF,SP :STACK POINTER SETUP  
10243 035072 012767 035112 142704 MOV #RETH5,RTRAP5 :RETURN LOCATION  
10244 035100 004000 JSR %0,%0 :RESERVED INSTRUCTION, SHOULD TRAP  
10245 035102 012742 001050 MOV #1050,-(R2) :MOVE TO MAILBOX # ***** 1050 *****  
10246 035106 005242 INC -(R2) :SET MSGTYP TO FATAL FROR  
10247 035110 000000 HALT :DIDN'T TRAP,OR WRONG $STNM  
10248 035112  
10249 :*****  
10250 :TEST 345 TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION  
10251 :*****  
10252 035112 005212 TS345: INC (R2) :UPDATE TEST NUMBER  
10253 035114 022712 000345 CMP #345,(R2) :SEQUENCE ERROR?
```

```

10254 035120 001011          BNE      TS346-10          ;BR TO ERROR HALT ON SEQ ERROR
10255 035122 012706 001000  MOV      #BUFF,SP        ;STACK POINTER SETUP
10256 035126 012767 035136 142650  MOV      #RETJ,RTRAP5    ;RETURN POINTER
10257 035134 004000          JSR      %0,%0           ;RESERVED INSTRUCTION
10258 035136 020627 000774  RETJ:   CMP      SP,#BUFF-4 ;TEST DECREMENT OF SP
10259 035142 001404          BEQ      TS346
10260          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10261          ;          CONDITIONAL BRANCH INST. AND <====
10262          ;          REPLACE THE MOVE INSTRUCTION <====
10263          ;          WHICH FOLLOWS W/ 766 <====
10264 035144 012742 001051  MOV      #1051,-(R2)     ;MOVE TO MAILBOX # ***** 1051 *****
10265 035150 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10266 035152 000000          HALT     ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
10267          ; OR SEQUENCE ERROR
10268          ;*****
10269          ;TEST 346 TEST THAT PROPER P.C. IS SAVED
10270          ;*****
10271 035154 005212  TS346:  INC      (R2)          ;UPDATE TEST NUMBER
10272 035156 022712 000346  CMP      #346,(R2)      ;SEQUENCE ERROR?
10273 035162 001012          BNE      TS347-10      ;BR TO ERROR HALT ON SEQ ERROR
10274 035164 012706 001000  MOV      #BUFF,SP        ;STACK POINTER SETUP
10275 035170 012767 035200 142606  /        #RETK,RTRAP5    ;RETURN FROM TRAP POINTER
10276 035176 004000  INSTK:  JSR      %0,%0           ;TRAP ON THIS INSTRUCTION
10277 035200 022767 035200 143566  RETK:   CMP      #INSTK+2,BUFF-4 ;CHECK FOR INCREMEND P.C.
10278 035206 001404          BEQ      TS347
10279          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
10280          ;          CONDITIONAL BRANCH INST. AND <---
10281          ;          REPLACE THE MOVE INSTRUCTION <---
10282          ;          WHICH FOLLOWS W/ 765 <---
10283 035210 012742 001052  MOV      #1052,-(R2)     ;MOVE TO MAILBOX # ***** 1052 *****
10284 035214 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10285 035216 000000          HALT     ;INCORRECT P.C.,OR WRONG $STNM
10286          ; OR SEQUENCE ERROR
10287          ;*****
10288          ;TEST 347 TEST THAT 'OLD' CC AND PRIORITY ARE PLACED ON STACK
10289          ;*****
10290          ;*****
10291 035221) 005212  TS347:  INC      (R2)          ;UPDATE TEST NUMBER
10292 035222 022712 000347  CMP      #347,(R2)      ;SEQUENCE ERROR?
10293 035226 001037          BNE      TS350-10      ;BR TO ERROR HALT ON SEQ ERROR
10294 035230 012706 001000  MOV      #BUFF,SP        ;SET UP
10295 035234 012767 035252 142542  MOV      #RETL,RTRAP5    ;SET UP
10296 035242 005067 142530  CLR      CC             ;CLEAR CC AND PRIORITY
10297 035246 000257          CCC
10298 035250 004000          JSR      %0,%0           ;TRAP
10299 035252 026727 143520 000000  RETL:  CMP      BUFF-2,#0 ;TEST THAT OLD STATUS WENT TO STACK
10300 035260 001404          BEQ      1$
10301          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
10302          ;          CONDITIONAL BRANCH INST. AND <---
10303          ;          REPLACE THE MOVE INSTRUCTION <---
10304          ;          WHICH FOLLOWS W/ 762 <---
10305 035262 012742 001053  MOV      #1053,-(R2)     ;MOVE TO MAILBOX # ***** 1053 *****
10306 035266 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10307 035270 000000          HALT     ;INCORRECT STATUS
10308 035272 012706 001000  1$:    MOV      #BUFF,SP        ;SET UP
10309 035276 012767 035316 142500  MOV      #RETM,RTRAP5    ;SET UP

```

```

10310 035304 012767 000357 142464      MOV      #357,CC      ;SET PRIORITY
10311 035312 000277                SCC                ;SET CC
10312 035314 004000                JSR      %0,%0        ;TRAP
10313 035316 026727 143454 000357 RETM:  CMP      BUFF-2,#357 ;COMPARES STATUS ON STACK
10314 035324 001404                BEQ      TS350
10315
10316
10317
10318
10319 035326 012742 001054      MOV      #1054,-(R2) ;MOVE TO MAILBOX # ***** 1054 *****
10320 035332 005242                INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
10321 035334 000000                HALT              ;INCORRECT STATUS ON STACK,OR WRONG $STAM
10322
10323
10324
10325
10326 035336 005212                TS350: INC      (R2)        ;UPDATE TEST NUMBER
10327 035340 022712 000350      CMP      #350,(R2)   ;SEQUENCE ERROR?
10328 035344 001105                BNE     TS351-10     ;BR TO ERROR HALT ON SEQ ERROR
10329 035346 012706 001000      MOV      #BUFF,SP
10330 035352 012767 035366 142424      MOV      #RETN,RTRAP5
10331 035360 005067 142422      CLR      RTRAP5+2   ;CLEAR FUTURE PRIORITY AND CC
10332 035364 004000                JSR      %0,%0
10333 035366                RETN:
10334 035366 100004      BPL      1$        ;TEST FOR 'C' CLEARED
10335
10336
10337
10338
10339 035370 012742 001055      MOV      #1055,-(R2) ;MOVE TO MAILBOX # ***** 1055 *****
10340 035374 005242                INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
10341 035376 000000                HALT              ;C NOT CLEARED
10342 035400                1$:
10343 035400 001004      BNE     2$
10344
10345
10346
10347
10348 035402 012742 001056      MOV      #1056,-(R2) ;MOVE TO MAILBOX # ***** 1056 *****
10349 035406 005242                INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
10350 035410 000000                HALT              ;Z NOT CLEARED
10351 035412                2$:
10352 035412 102004      BVC     3$
10353
10354
10355
10356
10357 035414 012742 001057      MOV      #1057,-(R2) ;MOVE TO MAILBOX # ***** 1057 *****
10358 035420 005242                INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
10359 035422 000000                HALT              ;V NOT CLEARED
10360 035424                3$:
10361 035424 103004      BCC     4$
10362
10363
10364
10365

```

```
10366 035426 012742 001060      MOV      #1060,-(R2)      ;MOVE TO MAILBOX # ***** 1060 *****
10367 035432 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10368 035434 000000              HALT                    ;C NOT CLEARED
10369 035436 016700 142334      4$:      MOV      CC,%0      ;TEMP STORAGE
10370 035442 001404              BEQ      5$
10371                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10372                                ;          CONDITIONAL BRANCH INST. AND <====
10373                                ;          REPLACE THE MOVE INSTRUCTION <====
10374                                ;          WHICH FOLLOWS W/ 740 <====
10375 035444 012742 001061      MOV      #1061,-(R2)      ;MOVE TO MAILBOX # ***** 1061 *****
10376 035450 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10377 035452 000000              HALT                    ;PRIORITY NOT ZERO
10378 035454 012706 001000      5$:      MOV      #BUFF,SP
10379 035460 012767 035476 142316  MOV      #RETO,RTRAP5
10380 035466 012767 000357 142312  MOV      #357,RTRAP5+2   ;SET NEW 'CC' AND PRIORITY
10381 035474 004000              JSR      %0,%0           ;TRAP HERE
10382 035476              RETO:
10383 035476 100404              BMI      1$
10384                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10385                                ;          CONDITIONAL BRANCH INST. AND <====
10386                                ;          REPLACE THE MOVE INSTRUCTION <====
10387                                ;          WHICH FOLLOWS W/ 722 <====
10388 035500 012742 001062      MOV      #1062,-(R2)      ;MOVE TO MAILBOX # ***** 1062 *****
10389 035504 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10390 035506 000000              HALT                    ;N NOT SET
10391 035510
10392 035510 001404      1$:      BEQ      2$
10393
10394                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10395                                ;          CONDITIONAL BRANCH INST. AND <====
10396                                ;          REPLACE THE MOVE INSTRUCTION <====
10397                                ;          WHICH FOLLOWS W/ 715 <====
10397 035512 012742 001063      MOV      #1063,-(R2)      ;MOVE TO MAILBOX # ***** 1063 *****
10398 035516 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10399 035520 000000              HALT                    ;Z NOT SET
10400 035522
10401 035522 102404      2$:      BVS      3$
10402
10403                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10404                                ;          CONDITIONAL BRANCH INST. AND <====
10405                                ;          REPLACE THE MOVE INSTRUCTION <====
10406                                ;          WHICH FOLLOWS W/ 710 <====
10406 035524 012742 001064      MOV      #1064,-(R2)      ;MOVE TO MAILBOX # ***** 1064 *****
10407 035530 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10408 035532 000000              HALT                    ;V NOT SET
10409 035534
10410 035534 103404      3$:      BCS      4$
10411
10412                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10413                                ;          CONDITIONAL BRANCH INST. AND <====
10414                                ;          REPLACE THE MOVE INSTRUCTION <====
10415                                ;          WHICH FOLLOWS W/ 703 <====
10415 035536 012742 001065      MOV      #1065,-(R2)      ;MOVE TO MAILBOX # ***** 1065 *****
10416 035542 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
10417 035544 000000              HALT                    ;C NOT SET
10418 035546 016700 142224      4$:      MOV      CC,%0
10419 035552 022700 000357      CMP      #357,%0
10420 035556 001404              BEQ      TS351
10421                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
```



```
10422      :                                     :          CONDITIONAL BRANCH INST. AND <====
10423      :                                     :          REPLACE THE MOVE INSTRUCTION <====
10424      :                                     :          WHICH FOLLOWS W/ 672          <====
10425 035580 012742 001066      MOV      #1066,-(R2)      ;MOVE TO MAILBOX # ***** 1066 *****
10426 035584 005242      INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10427 035586 000000      HALT                    ;PRIORITY WAS CHANGED,OR WRONG $STNM
10428      :                                     :          OR SEQUENCE ERROR
10429
10430      :*****
10431      :TEST 351      TEST THAT DECREMENT R6 TO A VALUE LESS THAN 400 TRAPS
10432      :*****
10433 035570 005212      TS351:  INC      (R2)          ;UPDATE TEST NUMBER
10434 035572 022712 000351      CMP      #351,(R2)      ;SEQUENCE ERROR?
10435 035576 001006      BNE     TS352-10        ;BR TO ERROR HALT ON SEQ ERROR
10436 035600 012706 000150      MOV      #150,%6        ;R6 = 150
10437 035604 012767 035624 142172      MOV      #TDEC1,4      ;STACK OVERFLOW TRAP POINTER
10438 035612 005746      TST     -(6)           ;WITH R6 = 150 SHOULD TRAP
10439 035614 012742 001067      MOV      #1067,-(R2)    ;MOVE TO MAILBOX # ***** 1067 *****
10440 035620 005242      INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10441 035622 000000      HALT                    ;SHOULD HAVE TRAPPED,OR WRONG $STNM
10442 035624      TDEC1:
10443
10444      :*****
10445      :TEST 352      TEST FOR DECREMENT OF R6 ON OVERFLOW TRAP
10446      :*****
10447 035624 005212      TS352:  INC      (R2)          ;UPDATE TEST NUMBER
10448 035626 022712 000352      CMP      #352,(R2)      ;SEQUENCE ERROR?
10449 035632 001011      BNE     TS353-10        ;BR TO ERROR HALT ON SEQ ERROR
10450 035634 012706 000150      MOV      #150,%6        ;R6 = 150
10451 035640 012767 035650 142136      MOV      #TDEC2,4      ;TRAP POINTER
10452 035646 005746      TST     -(6)           ;WITH R6 = 150 SHOULD TRAP
10453 035650 020627 000142      TDEC2:  CMP      %6,#142  ;DID R6 DECREMENT
10454 035654 001404      BEQ     TS353
10455      :
10456      : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
10457      :          CONDITIONAL BRANCH INST. AND <
10458      :          REPLACE THE MOVE INSTRUCTION <-
10459      :          WHICH FOLLOWS W/ 766          <-
10459 035656 012742 001070      MOV      #1070,-(R2)    ;MOVE TO MAILBOX # ***** 1070 *****
10460 035662 005242      INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
10461 035664 000000      HALT                    ;R6 NOT = 142,OR WRONG $STNM
10462      :          OR SEQUENCE ERROR
10463
10464      :*****
10465      :TEST 353      TEST DIFFERENT TYPES OF OVERFLOW
10466      :*****
10467 035666 005212      TS353:  INC      (R2)          ;UPDATE TEST NUMBER
10468 035670 022712 000353      CMP      #353,(R2)      ;SEQUENCE ERROR?
10469 035674 001041      BNE     TS354-10        ;BR TO ERROR HALT ON SEQ ERROR
10470 035676 012706 000150      MOV      #150,%6        ;
10471 035702 005067 142240      CLR     146             ;STATUS WORD OF LOC 10
10472 035706 012767 035716 142070      MOV      #TDEC3,4      ;RETURN TO LOC 4
10473 035714 005246      INC     -(6)           ;
10474 035716 005767 142224      TDEC3:  TST     146
10475 035722 001004      BNE     1$             ;
10476      :          TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <=
10477      :          CONDITIONAL BRANCH INST. AND <=
```

```

10478
10479
10480 035724 012742 001071      MOV    #1071,-(R2)
10481 035730 005242              INC    -(R2)
10482 035732 000000              HALT
10483 035734 012705 001000      1$:  MOV    #1000,%5
10484 035740 012706 000400      MOV    #400,%6
10485 035744 012767 035764 142032  MOV    #TDEC4,4
10486 035752 124645              CMPB  -(6),-(5)
10487 035754 012742 001072      MOV    #1072,-(R2)
10488 035760 005242              INC    -(R2)
10489 035762 000000              HALT
10490 035764 012706 000400      TDEC4: MOV    #400,%6
10491 035770 012767 036010 142006  MOV    #TDEC7,4
10492 035776 134546              BITB  -(5),-(6)
10493 036000
10494 036000 012742 001073      TDEC6: MOV    #1073,-(R2)
10495 036004 005242              INC    -(R2)
10496 036006 000000              HALT
10497 036010
10498
10499
10500
10501
10502 036010 005212
10503 036012 022712 000354      TS354: INC    (R2)
10504 036016 001011              CMP    #354,(R2)
10505 036020 012706 000400              BNE   VDEC2
10506 036024 012767 036042 141756  MOV    #400,%6
10507 036032 012767 036052 141744  MOV    #VDEC2,10
10508 036040 000077              MOV    #VDEC1,4
10509 036042
10510 036042 012742 001074      VDEC2: MOV    #1074,-(R2)
10511 036046 005242              INC    -(R2)
10512 036050 000000              HALT
10513 036052 012767 000012 141730  VDEC1: MOV    #10+2,10
10514
10515
10516
10517 036060 005212
10518 036062 022712 000355      TS355: INC    (R2)
10519 036066 001011              CMP    #355,(R2)
10520 036070 012706 000400              BNE   VDEC4
10521 036074 012767 036112 141716  MOV    #400,%6
10522 036102 012767 036122 141674  MOV    #VDEC4,20
10523 036110 000004              MOV    #VDEC3,4
10524 036112
10525 036112 012742 001075      VDEC4: MOV    #1075,-(R2)
10526 036116 005242              INC    -(R2)
10527 036120 000000              HALT
10528 036122 012767 000022 141670  VDEC3: MOV    #20+2,20
10529
10530
10531
10532 036130 005212
10533 036132 022712 000356      TS356: INC    (R2)

```

```

;
; REPLACE THE MOVE INSTRUCTION <===
; WHICH FOLLOWS W/ 764 <==
; MOVE TO MAILBOX # ***** 1071 *****
; SET MSGTYP TO FATAL ERROR
; INCREMENT OPERATION NOT INHIBITED
;
; MOVE TO MAILBOX # ***** 1072 *****
; SET MSGTYP TO FATAL ERROR
; STACK = 400 AND DECREMENTED, SHOULD TRAP
;
; MOVE TO MAILBOX # ***** 1073 *****
; SET MSGTYP TO FATAL ERROR
; NO STACK OVERFLOW,OR WRONG $STNM
;
;*****
;TEST 354 TEST THAT AN 77 CAUSES AN OVERFLOW TRAP
;*****
;*****
;UPDATE TEST NUMBER
;SEQUENCE ERROR?
;BR TO ERROR HALT ON SEQ ERROR
;SET UP STACK TO OVERFLOW
;SET UP 77 VECTOR
;SEI UP OVERFLOW VECTOR
;THIS TRAP SHOULD CAUSE OVERFLOW
;
;MOVE TO MAILBOX # ***** 1074 *****
;SET MSGTYP TO FATAL ERROR
;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
;*****
;TEST 355 TEST THAT AN IOT CAUSES AN OVERFLOW TRAP
;*****
;*****
;UPDATE TEST NUMBER
;SEQUENCE ERROR?
;BR TO ERROR HALT ON SEQ ERROR
;SET UP STACK TO OVERFLOW
;SET UP IOT VECTOR
;SET UP OVERFLOW VECTOR
;THIS TRAP SHOULD CAUSE OVERFLOW
;
;MOVE TO MAILBOX # ***** 1075 *****
;SET MSGTYP TO FATAL ERROR
;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
;*****
;TEST 356 TEST THAT AN EMT CAUSES AN OVERFLOW TRAP
;*****
;*****
;UPDATE TEST NUMBER
;SEQUENCE ERROR?

```

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T356 TEST THAT AN EMT CAUSES AN OVERFLOW TRAP

SEQ 0211

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10534 036136 001011          BNE      VDEC6          ;BR TO ERROR HALT ON SEQ ERROR
10535 036140 012706 000400    MOV      #400,%6        ;SET UP STACK TO OVERFLOW
10536 036144 012767 036162 141656  MOV      #VDEC6,30      ;SET UP EMT VECTOR
10537 036152 012767 036172 141624  MOV      #VDEC5,4       ;SET UP OVERFLOW VECTOR
10538 036160 104000          EMT                    ;THIS TRAP SHOULD CAUSE OVERFLOW
10539 036162          VDEC6:
10540 036162 012742 001076    MOV      #1076,-(R2)    ;MOVE TO MAILBOX # ***** 1076 *****
10541 036166 005242          INC      -(R2)         ;SET MSGTYP TO FATAL ERROR
10542 036170 000000          HALT                    ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
10543 036172 012767 000032 141630  VDEC5: MOV      #30+2,30
10544          ;*****
10545          :TEST 357          TEST THAT AN TRAP CAUSES AN OVERFLOW TRAP
10546          ;*****
10547 036200 005212          TS357: INC      (R2)          ;UPDATE TEST NUMBER
10548 036202 022712 000357    CMP      #357,(R2)     ;SEQUENCE ERROR?
10549 036206 001011          BNE      VDEC8          ;BR TO ERROR HALT ON SEQ ERROR
10550 036210 012706 000400    MOV      #400,%6        ;SET UP STACK TO OVERFLOW
10551 036214 012767 036232 141612  MOV      #VDEC8,34      ;SET UP TRAP VECTOR
10552 036222 012767 036242 141554  MOV      #VDEC7,4       ;SET UP OVERFLOW VECTOR
10553 036230 104400          TRAP                    ;THIS TRAP SHOULD CAUSE OVERFLOW
10554 036232          VDEC8:
10555 036232 012742 001077    MOV      #1077,-(R2)    ;MOVE TO MAILBOX # ***** 1077 *****
10556 036236 005242          INC      -(R2)         ;SET MSGTYP TO FATAL ERROR
10557 036240 000000          HALT                    ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
10558 036242 012767 000036 141564  VDEC7: MOV      #34+2,34
10559          ;*****
10560          :TEST 360          TEST THAT AN TRT CAUSES AN OVERFLOW TRAP
10561          ;*****
10562 036250 005212          TS360: INC      (R2)          ;UPDATE TEST NUMBER
10563 036252 022712 000360    CMP      #360,(R2)     ;SEQUENCE ERROR?
10564 036256 001011          BNE      VDEC10         ;BR TO ERROR HALT ON SEQ ERROR
10565 036260 012706 000400    MOV      #400,%6        ;SET UP STACK TO OVERFLOW
10566 036264 012767 036302 141522  MOV      #VDEC10,14     ;SET UP TRT VECTOR
10567 036272 012767 036312 141504  MOV      #VDEC9,4       ;SET UP OVERFLOW VECTOR
10568 036300 000003          TRT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
10569 036302          VDEC10:
10570 036302 012742 001100    MOV      #1100,-(R2)    ;MOVE TO MAILBOX # ***** 1100 *****
10571 036306 005242          INC      -(R2)         ;SET MSGTYP TO FATAL ERROR
10572 036310 000000          HALT                    ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
10573 036312 012767 000016 141474  VDEC9: MOV      #14+2,14
10574          ;*****
10575          :TEST 361          TEST THAT AN ILLA CAUSES AN OVERFLOW TRAP
10576          ;*****
10577 036320 005212          TS361: INC      (R2)          ;UPDATE TEST NUMBER
10578 036322 022712 000361    CMP      #361,(R2)     ;SEQUENCE ERROR?
10579 036326 001011          BNE      VDEC11         ;BR TO ERROR HALT ON SEQ ERROR
10580 036330 012706 000400    MOV      #400,%6        ;SET UP STACK TO OVERFLOW
10581 036334 012767 036352 141446  MOV      #VDEC11,10     ;SET UP ILLA VECTOR
10582 036342 012767 036362 141434  MOV      #VDEC12,4      ;SET UP OVERFLOW VECTOR
10583 036350 004700          ILLA                    ;THIS TRAP SHOULD CAUSE OVERFLOW
10584 036352          VDEC11:
10585 036352 012742 001101    MOV      #1101,-(R2)    ;MOVE TO MAILBOX # ***** 1101 *****
10586 036356 005242          INC      -(R2)         ;SET MSGTYP TO FATAL ERROR
10587 036360 000000          HALT                    ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
10588 036362 012767 000012 141420  VDEC12: MOV      #10+2,10
10589 036370 020627 000370    CMP      %6,#370       ;STACK PUSHED FOUR WORDS?

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10591 036374 001404 BEQ TS362
10592
10593
10594
10595 036376 012742 001102 MOV #1102,-(R2)
10596 036402 005242 INC -(R2)
10597 036404 000000 HALT
10598
10599
10600 :*****
10601 :TEST 362 TEST THAT AN ILLB CAUSES AN OVERFLOW TRAP
10602 :*****
10602 036406 005212 TS362: INC (R2)
10603 036410 022712 000362 CMP #362,(R2)
10604 036414 001011 BNE VDEC13
10605 036416 012706 000400 MOV #400,%6
10606 036422 012767 036440 141360 MOV #VDEC13,10
10607 036430 012767 036450 141346 MOV #VDEC14,4
10608 036436 000100 ILLB
10609 036440
10610 036440 012742 001103 VDEC13: MOV #1103,-(R2)
10611 036444 005242 INC -(R2)
10612 036446 000000 HALT
10613 036450 012767 000012 141332 VDEC14: MOV #10+2,10
10614
10615 :*****
10616 :TEST 363 TEST FOR FALSE OVERFLOW TRAP
10617 :*****
10618 036456 005212 TS363: INC (R2)
10619 036460 022712 000363 CMP #363,(R2)
10620 036464 001023 BNE FOVER
10621
10622 036466 012767 036534 141310 MOV #FOVER,4
10623 036474 012706 001002 MOV #1002,%6
10624 036500 005746 TST -(6)
10625 036502 012706 002002 MOV #2002,%6
10626 036506 005746 TST -(6)
10627 036510 012706 004002 MOV #4002,%6
10628 036514 005746 TST -(6)
10629 036516 012706 010002 MOV #10002,%6
10630 036522 005746 TST -(6)
10631 036524 012706 020000 MOV #20000,%6
10632 036530 005746 TST -(6)
10633 036532 000404 BR STP
10634
10635 : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
10636 : CONDITIONAL BRANCH INST. AND <--
10637 : REPLACE THE MOVE INSTRUCTION <==
10638 : WHICH FOLLOWS W/ 754 <===
10639 036534 FOVER: MOV #1104,-(R2)
10640 036540 005242 INC -(R2)
10641 036542 000000 HALT

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <==
; WHICH FOLLOWS W/ 754 <===
; MOVE TO MAILBOX # ***** 1102 *****
; SET MSGTYP TO FATAL ERROR
; TRAP OVERFLOW DID NOT OCCUR
; OR SEQUENCE ERROR

```

```

; UPDATE TEST NUMBER
; SEQUENCE ERROR?
; BR TO ERROR HALT ON SEQ ERROR
; SET UP STACK TO OVERFLOW
; SET UP ILLB VECTOR
; SET UP OVERFLOW VECTOR
; THIS TRAP SHOULD CAUSE OVERFLOW
; MOVE TO MAILBOX # ***** 1103 *****
; SET MSGTYP TO FATAL ERROR
; TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM

```

```

; UPDATE TEST NUMBER
; SEQUENCE ERROR?
; BR TO ERROR HALT ON SEQ ERROR
; SET UP OVERFLOW POINTER
; SHOULD NOT OVERFLOW
; SHOULD NOT OVERFLOW
; SHOULD NOT OVERFLOW
; SHOULD NOT OVERFLOW
; SHOULD NOT OVERFLOW

```

```

; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <---
; CONDITIONAL BRANCH INST. AND <--
; REPLACE THE MOVE INSTRUCTION <==
; WHICH FOLLOWS W/ 754 <===
; MOVE TO MAILBOX # ***** 1104 *****
; SET MSGTYP TO FATAL ERROR
; IT OVERFLOWED,OR WRONG $STNM

```

```
10642 036544 012767 000006 141232 STP:  MOV #6,4
10643 036552 005067 141230          CLR  6
10644                                     :*****
10645 :TEST 364      TEST THAT BIT 4 PSW WILL CAUSE A TRAP TO 14
10646 :*****
10647 036556 005212          TS364:  INC  (R2)          ;UPDATE TEST NUMBER
10648 036560 022712 000364          CMP  #364,(R2)       ;SEQUENCE ERROR?
10649 036564 001013          BNE  TS365-10       ;BR TO ERROR HALT ON SEQ ERROR
10650 036566 012706 001000          MOV  #BUFF,SP
10651 036572 012767 036624 141214          MOV  #RETAT,RTRAP4 ;SET UP TO TRAP TO 14
10652 036600 012746 000020          MOV  #20,-(SP)     ;PUSH T BIT
10653 036604 012746 036612          MOV  #.+6,-(SP)   ;PUSH PC
10654 036610 000002          RTI                ;SET T BIT
10655 036612 000240          NOP                ;TRAP HERE
10656 036614 012742 001105          MOV  #1105,-(R2)  ;MOVE TO MAILBOX # ***** 1105 *****
10657 036620 005242          INC  -(R2)        ;SET MSGTYP TO FATAL ERROR
10658 036622 000000          HALT              ;TRACE BIT DID NOT TRAP!,OR WRONG $TESTN
10659 036624
10660          RETAT:
10661 :*****
10662 :TEST 365      TEST STACK POINTER DECREMENTS
10663 :*****
10663 036624 005212          TS365:  INC  (R2)          ;UPDATE TEST NUMBER
10664 036626 022712 000365          CMP  #365,(R2)       ;SEQUENCE ERROR?
10665 036632 001022          BNE  TS366-10       ;BR TO ERROR HALT ON SEQ ERROR
10666 036634 012706 001000          MOV  #BUFF,SP
10667 036640 012767 036672 141146          MOV  #RETBT,RTRAP4 ;PUSH T BIT
10668 036646 012746 000020          MOV  #20,-(SP)     ;PUSH PC
10669 036652 012746 036660          MOV  #.+6,-(SP)   ;SET T BIT
10670 036656 000002          RTI                ;TRAP HERE
10671 036660 000240          NOP                ;MOVE TO MAILBOX # ***** 1106 *****
10672 036662 012742 001106          MOV  #1106,-(R2)  ;SET MSGTYP TO FATAL ERROR
10673 036666 005242          INC  -(R2)        ;TRACE BIT DID NOT TRAP!
10674 036670 000000          HALT
10675 036672 020627 000774          RETBT:  CMP  SP,#BUFF-4
10676 036676 001404          BEQ  TS366
10677                                     :
10678                                     : TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
10679                                     :          CONDITIONAL BRANCH INST. AND <--
10680                                     :          REPLACE THE MOVE INSTRUCTION <--
10681                                     :          WHICH FOLLOWS W/ 755 <--
10681 036700 012742 001107          MOV  #1107,-(R2)  ;MOVE TO MAILBOX # ***** 1107 *****
10682 036704 005242          INC  -(R2)        ;SET MSGTYP TO FATAL ERROR
10683 036706 000000          HALT              ;STACK POINTER WAS NOT PUSHED BY TRAP,OR WRONG $TESTN
10684                                     : OR SEQUENCE ERROR
10685 :*****
10686 :TEST 366      TEST FOR PROPER PC ON STACK
10687 :*****
10688 036710 005212          TS366:  INC  (R2)          ;UPDATE TEST NUMBER
10689 036712 022712 000366          CMP  #366,(R2)       ;SEQUENCE ERROR?
10690 036716 001016          BNE  TS367-10       ;BR TO ERROR HALT ON SEQ ERROR
10691 036720 012706 001000          MOV  #BUFF,SP
10692 036724 012767 036744 141062          MOV  #RETCT,RTRAP4 ;PUSH T BIT
10693 036732 012746 000020          MOV  #20,-(SP)     ;PUSH PC
10694 036736 012746 036744          MOV  #.+6,-(SP)   ;SET T BIT
10695 036742 000002          RTI                ;TRAP HERE
10696
10697 036744 022767 036744 142022          RETCT:  CMP  #.,BUFF-4
```

10703 036754 012742 001110
10704 036760 005242
10705 036762 000000
10712 036764 005212
10713 036766 022712 000367
10714 036772 001015
10716 036774 012706 001000
10717 037000 005001
10718 037002 012746 000020
10719 037006 012746 037022
10720 037012 012767 037036 140774
10721 037020 000006
10722 037022 000240
10723 037024 001404
10728 037026 012742 001111
10729 037032 005242
10730 037034 000000
10733 037036
10737 037036 005212
10738 037040 022712 000370
10739 037044 001030
10740 037046 012705 177777
10741 037052 012706 001000
10742 037056 012746 000020
10743 037062 012746 037100
10744 037066 012767 037116 140720
10745 037074 005001
10746 037076 000006
10747 037100 005201
10748 037102 005205
10749 037104 001762
10750 037106 012742 001112
10751 037112 005242
10752 037114 000000
10753 037116 005301

BEQ TS367
MOV #1110,-(R2)
INC -(R2)
HALT
TS367: INC (R2)
CMP #367,(R2)
BNE TS370-10
MOV #BUFF,SP
CLR R1
MOV #20,-(SP)
MOV #RTT1,-(SP)
MOV #RTT2,14
RTT1: NOP
BEQ TS370
MOV #1111,-(R2)
INC -(R2)
HALT
RTT2:
TS370: INC (R2)
CMP #370,(R2)
BNE TS371-10
MOV #177777,%5
RTT5: MOV #BUFF,SP
MOV #20,-(SP)
MOV #RTT3,-(SP)
MOV #RTT4,14
CLR R1
RTT3: INC R1
INC %5
BEQ RTT5
MOV #1112,-(R2)
INC -(R2)
HALT
RTT4: DEC R1

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
: CONDITIONAL BRANCH INST. AND <=====
: REPLACE THE MOVE INSTRUCTION <=====
: WHICH FOLLOWS W/ 761 <=====
: MOVE TO MAILBOX # ***** 1110 *****
: SET MSGTYP TO FATAL ERROR
: CORRECT PC WAS NOT SAVED ON STACK,OR WRONG \$TESTN
: OR SEQUENCE ERROR

: TEST 367 TEST THAT RTT POPS T- RTT

: UPDATE TEST NUMBER
: SEQUENCE ERROR?
: BR TO ERROR HALT ON SEQ ERROR

: CLEAR R1

: TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
: CONDITIONAL BRANCH INST. AND <
: REPLACE THE MOVE INSTRUCTION <
: WHICH FOLLOWS W/ 762 <
: MOVE TO MAILBOX # ***** 1111 *****
: SET MSGTYP TO FATAL ERROR
: T-BIT DID NOT TRAP,OR WRONG \$TESTN
: OR SEQUENCE ERROR

: TEST 370 TEST THAT RTT ALLOWS ONE INST. BEFORE TRAP

: UPDATE TEST NUMBER
: SEQUENCE ERROR?
: BR TO ERROR HALT ON SEQ ERROR

: CLEAR R0
: SET T-BIT

: DO THIS TEST NO MORE THAN 2 TIMES
: MOVE TO MAILBOX # ***** 1112 *****
: SET MSGTYP TO FATAL ERROR
: DID NOT TRAP
: SEE IF RTT ALLOWS 1 INST.

```
10754 037120 001406 BEQ RTT6  
10755 037122 005205 INC %5 ;DO THIS TEST NO MORE THAN TWO TIMES  
10756 037124 001752 BEQ RTT5 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
10757 ; CONDITIONAL BRANCH INST. AND <====  
10758 ; REPLACE THE MOVE INSTRUCTION <====  
10759 ; WHICH FOLLOWS W/ 747 <====  
10760 ;  
10761 037126 012742 001113 MOV #1113,-(R2) ;MOVE TO MAILBOX # ***** 1113 *****  
10762 037132 005247 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
10763 037134 000000 HALT ;RTT DID NOT ALLOW 1 INST.,OR WRONG $TESTN  
10764 037136  
RTT6:  
*****  
:TEST 371 TEST THAT RTI DOES NOT ALLOW 1 INST.  
*****  
TS371: INC (R2) ;UPDATE TEST NUMBER  
CMP #371,(R2) ;SEQUENCE ERROR?  
BNE TS372-10 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #BUFF,SP  
MOV #20,-(SP)  
MOV #RTI1,-(SP)  
MOV #RTI2,14  
CLR R1  
RTI ;SET T-BIT  
INC R1 ;RTI SHOULD NOT ALLOW THIS  
MOV #1114,-(R2) ;MOVE TO MAILBOX # ***** 1114 *****  
INC -(R2) ;SET MSGTYP TO FATAL ERROR  
HALT ;T- BIT DID NOT CAUSE TRAP  
RTI2: TST R1  
;RTI SHOULD NOT ALLOW 1 INST. BEFORE TRAP  
BEQ TS372  
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====  
; CONDITIONAL BRANCH INST. AND <====  
; REPLACE THE MOVE INSTRUCTION <====  
; WHICH FOLLOWS W/ 755 <====  
;  
10788 037212 012742 001115 MOV #1115,-(R2) ;MOVE TO MAILBOX # ***** 1115 *****  
10789 037216 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR  
10790 037220 000000 HALT ;RTI DID ALLOW 1 INST. BEFORE TRAP,OR WRONG $TESTN  
; OR SEQUENCE ERROR  
*****  
:TEST 372 TEST TRAP ON TRAP THAT TRACE BIT TRAPS ARE INHIBITED ON TRAP INST  
*****  
TS372: INC (R2) ;UPDATE TEST NUMBER  
CMP #372,(R2) ;SEQUENCE ERROR?  
BNE BR70 ;BR TO ERROR HALT ON SEQ ERROR  
MOV #BUFF,%6  
MOV #TRACE,14 ;TRACE TRAP  
CLR #16  
CLR #22  
MOV #TONT1,20 ;IOT TRAP  
MOV #20,-(SP) ;PUSH T BIT  
MOV #.+6,-(SP) ;PUSH PC  
RTI  
IOT  
TRACE:  
;TRAP, NEW CC HAVE TRACE RESET
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T372 TEST TRAP ON TRAP THAT TRACE BIT TRAPS ARE INHIBITED ON TRAP INST
081 037276 012742 001116 MOV #1116,-(R2) ;MOVE TO MAILBOX # ***** 1116 *****
082 037302 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
083 037304 000000 HALT ;TRACE TRAP WAS NOT INHIBITED
084 037306 012742 001117 BR70: MOV #1117,-(R2) ;MOVE TO MAILBOX # ***** 1117 *****
085 037312 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
086 037314 000000 HALT ;WRONG TSTNM,OR WRONG $TSTNM
087 037316 012767 000016 140470 TONT1: MOV #16,14
088 037324 012767 000022 140466 MOV #22,20
*****
:TEST 373 TEST THAT THE TRACE BIT IS SAVED IN THE STACK
*****
0822 037332 005212 TS373: INC (R2) ;UPDATE TEST NUMBER
0823 037334 022712 000373 CMP #373,(R2) ;SEQUENCE ERROR?
0824 037340 001020 BNE STP3 ;BR TO ERROR HALT ON SEQ ERROR
0825 0373-2 012706 001000 MOV #BUFF,%6 ;SET UP STACK POINTER
0826 037346 012767 037372 140440 MOV #TRC1,14 ;TRACE TRAP RETURN
0827 037354 005067 140436 CLR 16
0828 037360 012746 000020 MOV #20,-(SP) ;SET THE T BIT
0829 037364 012746 037372 MOV #TRC1,-(SP)
0830 037370 000002 RTI
0831 037372 036727 141400 000020 TRC1: BIT BUFF-2,#20 ;CHECK FOR T BIT ON STACK
0832 037400 001004 BNE STP3D
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
; CONDITIONAL BRANCH INST. AND <
; REPLACE THE MOVE INSTRUCTION <
; WHICH FOLLOWS W/ 757 <
0837 037402 STP3: MOV #1120,-(R2) ;MOVE TO MAILBOX # ***** 1120 *****
0838 037406 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
0839 037410 000000 HALT ;T BIT NOT SAVED ON THE STACK,OR WRONG $TSTNM
0841 037412 012767 000016 140374 STP3D: MOV #10,14
*****
:THIS ROUTINE TESTS THAT NO LEGAL ADDRESS TRAPS AND THAT AN ILLEGAL
:ADDRESS TRAPS TO LOCATION 4. THIS WILL RUN ON 30K SYSTEM. BUT IF
:SWITCH REGISTER BIT 1=0, THEN THE MEMORY FROM 28K-30K IS NOT LOOKED
:AT, SINCE IT MAY HAVE I/O DEVICES. IF SWR BIT 1=1, THEN THAT AREA IS
:CHECKED. (IT SHOULD EITHER ALL TRAP OR ALL NOT TRAP). LOC 160000
:IS NO LONGER GUARANTEED TO TRAP, SINCE IT MAY CONTAIN MEMORY. LOCATION
:177700 (THE UNIBUS ADDRESS FOR RO ON OLDER SYSTEMS) IS USED FOR FORCING
:A TIMEOUT IN THE EVENT THAT THERE WAS NO TIMEOUT FROM 0K-28K OR 30K.
:THIS ROUTINE TESTS MEMORY UNTIL IT DOES A NXM STOP
*****
:TEST 374 TEST NON-EXISTENT ADDRESS TRAPS
*****
0856 037420 005212 TS374: INC (R2) ;UPDATE TEST NUMBER
0857 037422 022712 000374 CMP #374,(R2) ;SEQUENCE ERROR?
0858 037424 001150 BNE TS375-10 ;BR TO ERROR HALT ON SEQ ERROR
0859 037430 042737 010000 037500 BIC #10000,@#HICORE ;SET HIGHT CORE LIMIT TO 160000
0860 037436 032777 000002 170010 BIT #2,@SWR ;CHECK IF BIT 1 IS CLEARED
0861 037444 001403 BEQ 1$ ;BRANCH IF IT IS, LEAVE LIMIT-160000
0862 037446 052737 010000 037500 BIS #10000,@#HICORE ;SET UPPER CORE LIMIT TO 30K (170000)
0863 037454 005000 1$: CLR RO
0864 037456 005067 140324 CLR 6
0865 037462 012767 037570 140314 MOV #ATRAP,4 ;SET JP ADDRESS TRAP ENTRANCE

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10865 037470 012706 001000      MOV      #BUFF,SP      ;SET STACK POINTER
10867 037474 105720      NOR:    TSTB      (0)+  ;IF OUTSIDE OF CORE, TRAP TO 4
10868 037476 020027      CMP      RO,(PC)+    ;IS POINTER INSIDE 28K (30K) CORE
10869 037500 160000      HICORE: .WORD     160000 ;MAY BE CHANGED TO 170000 IF 30K
10870 037502 103774      BLO     NOR          ;TEST THE REST OF CORE
10871 037504 012737 037526 000004    MOV      #ROTRAP,@#4  ;SET UP NEW VECTOR POINTER
10872 037512 105737 177700      TSTB    @#177700     ;SHOULD CAUSE A TRAP
10873 037516
10874 037516 012742 001121      MOV      #1121,-(R2)  ;MOVE TO MAILBOX # ***** 1121 *****
10875 037522 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
10876 037524 000000      HALT
10877      ;TRAP TO HERE IF FORCING TRAP BY TESTING 177700
10878 037526 106767 140244      ROTRAP: MFFS     STATUS ;
10879 037532 005767 140240      TST     STATUS      ;TEST PSW
10880 037536 001404      BEQ     1$          ;
10881      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
10882      ; CONDITIONAL BRANCH INST. AND <==
10883      ; REPLACE THE MOVE INSTRUCTION <==
10884      ; WHICH FOLLOWS W/ 733 <==
10885 037540 012742 001122      MOV      #1122,-(R2)  ;MOVE TO MAILBOX # ***** 1122 *****
10886 037544 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
10887 037546 000000      HALT
10888 037550 026727 141220 037516 1$:  CMP      BUFF-4,#TRPADR ;TEST OLD PC AT STACK
10889 037556 001453      BEQ     TRAPB       ;
10890      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
10891      ; CONDITIONAL BRANCH INST. AND <
10892      ; REPLACE THE MOVE INSTRUCTION <
10893      ; WHICH FOLLOWS W/ 723 <
10894 037560 012742 001123      MOV      #1123,-(R2)  ;MOVE TO MAILBOX # ***** 1123 *****
10895 037564 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
10896 037566 000000      HALT
10897      ;RETURN HERE ON AN ADDRESS TRAP FROM MEMORY BELOW 28K (OR 30K)
10898 037570 005300      ATRAP:  DEC     RO    ;
10899 037572 010067 000032      MOV      RO,CORH     ;MOVE THE FIRST NXM LOCATION IN CORH
10900      ;THIS ROUTINE DOES NXM TRAPS UNTIL IT FINDS AN EXISTENT MEMORY LOCATION
10901 037576 013700 037500      MOV      @#HICORE,RO ;SET UP THE HIGHEST MEM LOCATION
10902 037602 005300      DEC     RO          ;MAKE 1 LESS THAN THE HIGHEST CORE BOUNDARY
10903 037604 000402      BR      NOSUB       ;DON'T SUBTRACT 1K FIRST TIME
10904 037606 162700 001000      CTRAP:  SUB     #1000,RO ;SUBTRACT 1K OCTAL BYTE FROM ADDRESS
10905      ;TO SPEED UP TESTING
10906 037612 012767 037644 140164      NOSUB:  MOV      #BTRAP,4 ;SET UP THE VECTOR
10907 037620 012706 001000      MOV      #BUFF,SP
10908 037624 005710      TST     (RO)        ;DOES THIS MEMORY EXIST?
10909      ;IF NXM, TRAP TO BTRAP
10910 037626 020027      DTRAP1: CMP     RO,(PC)+ ;IF EXISTS, IS THIS THE SAME TRAP THAT CAUSED
10911      ;TRAP TO ATRAP
10912 037630 000000      CORH:   .WORD     C
10913 037632 101425      BLOS   TRAPB
10914      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
10915      ; CONDITIONAL BRANCH INST. AND <====
10916      ; REPLACE THE MOVE INSTRUCTION <====
10917      ; WHICH FOLLOWS W/ 675 <====
10918 037634 012742 001124      MOV      #1124,-(R2)  ;MOVE TO MAILBOX # ***** 1124 *****
10919 037640 005242      INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
10920 037642 000000      HALT
10921      ;CONTENTS OF RO SHOULD BE LESS THAN OR EQUAL TO CORH
10921      ;IF THIS COMPARISON FAILS IT MEANS

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10922                                     ; THAT SOME LEGAL ADDRESS TRAPPED, OR
10923                                     ; THAT AN ILLEGAL ADDRESS DID NOT TRAP
10924 037644 106767 140126      BTRAP: MFPS      STATUS
10925 037650 005767 140122      TST          STATUS
10926 037654 001404      BEQ          1$
10927                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
10928                                     ;          CONDITIONAL BRANCH INST. AND
10929                                     ;          REPLACE THE MOVE INSTRUCTION
10930                                     ;          WHICH FOLLOWS W/ 664
10931 037656 012742 001125      MOV          #1125, -(R2) ; MOVE TO MAILBOX # ***** 1125 *****
10932 037662 005242      INC          -(R2)      ; SET MSGTYP TO FATAL ERROR
10933 037664 000000      HALT        ; NEW PSW SHOULD HAVE BEEN ZERO
10934 037666 026727 141102 037626 1$: CMP          BUFF-4, #DTRAP1 ; CHECK IF TRAP PC IS OK
10935 037674 001744      BEQ          CTRAP
10936                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS
10937                                     ;          CONDITIONAL BRANCH INST. AND
10938                                     ;          REPLACE THE MOVE INSTRUCTION
10939                                     ;          WHICH FOLLOWS W/ 654
10940 037676      AUTO1:
10941 037676 012742 001126      MOV          #1126, -(R2) ; MOVE TO MAILBOX # ***** 1126 *****
10942 037702 005242      INC          -(R2)      ; SET MSGTYP TO FATAL ERROR
10943 037704 000000      HALT        ; OLD PC WAS NOT SAVED OR WRONG $TESTN
10944 037706 012767 000006 140070 TRAPB: MOV          #6, 4 ; RESET TRAP CATCHER
10945 037714 005067 140066      CLR          6 ; RESET TRAP CATCHER
10946
10947
10948                                     ; THIS ROUTINE WILL FIGURE OUT IF YOU HAVE A DL11W
10949 037720 005067 000020      CLR          PROFTE
10950 037724 012706 001000      MOV          #BUFF, SP ; SET UP THE STACK POINTER
10951 037730 012767 037746 140046      MOV          #DL11W, 4 ; SET UP THE TRAP VECTOR
10952 037736 005767 137622      TST          TPS ; TEST THE PUNCH STATUS REGISTER
10953 037742 000403      BR          DL11W1
10954 037744 000000      PROFTE: 000000
10955 037746 005267 177772      DL11W: INC          PROFTE ; INCR IF NO DL11W
10956 037752 012767 000006 140024      DL11W1: MOV          #6, 4
10957
10958 037760      SKP104:
10959                                     ; *****
10960                                     ; TEST 375 TEST THAT A TTY INTERRUPT CAUSES AN OVERFLOW TRAP
10961                                     ; *****
10962 037760 005212      TS375: INC          (R2) ; UPDATE TEST NUMBER
10963 037762 022712 000375      CMP          #375, (R2) ; SEQUENCE ERROR?
10964 037766 001037      BNE          TDEC8 ; BR TO ERROR HALT ON SEQ ERROR
10965 037770 005767 177750      TST          PROFTE
10966 037774 001047      BNE          R7TRX
10967 037776 122767 000001 140314      CMPB        #APTENV, $ENV ; RUNNING IN APT MODE?
10968 040004 001003      BNE          2$ ; IF NOT, DO THIS TEST
10969 040006 005767 140274      TST          $PASS ; IS THIS THE FIRST PASS?
10970 040012 001040      BNE          R7TRX ; IF NOT FIRST PASS, SKIP TEST
10971 040014      2$:
10972 040014 000005      RESET
10973 040016 012767 000340 137752      MOV          #340, STATUS ; LOCK OUT INTERRUPT
10974 040024 012706 000400      MOV          #400, %6 ; SET UP STACK TO OVERFLOW
10975 040030 012767 040076 137746      MOV          #TDEC77, 4 ; SET UP OVERFLOW TRAP
10976 040036 012767 040066 140020      MOV          #TDEC8, 64 ; SET UP INTERRUPT VECTOR
10977 040044 012767 000100 137512      MOV          #100, TTCSR ; SET INTERRUPT ENABLE

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10978 040052 005067 137720 CLR STATUS ;ALLOW INTERRUPT TO OCCUR
10979 040056 012742 001127 MOV #1127,-(R2) ;MOVE TO MAILBOX # ***** 1127 *****
10980 040062 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
10981 040064 000000 HALT ;NO INTERRUPT OCCURRED
10982 040066 TDEC8:
10983 040066 012742 001130 MOV #1130,-(R2) ;MOVE TO MAILBOX # ***** 1130 *****
10984 040072 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
10985 040074 000000 HALT ;OVERFLOW TRAP DID NOT OCCUR OR WRONG $STNM
10986 040076 005067 137462 TDEC77: CLR TTCSR ;CLEAR INTERRUPT ENABLE
10987 040102 012767 000006 137674 MOV #6,4
10988 040110 005067 137672 CLR 6
10989 040114 R7TRX:
10990 *****
10991 :TEST 376 TEST THAT A PENDING INTERRUPT OCCURS BEFORE TRAP
10992 *****
10993 040114 005212 TS376: INC (R2) ;UPDATE TEST NUMBER
10994 040116 022712 000376 CMP #376,(R2) ;SEQUENCE ERROR?
10995 040122 001045 BNE BR71 ;BR TO ERROR HALT ON SEQ ERROR
10996 040124 005767 177614 TST PROFTE
10997 040130 001053 BNE NODL
10998 040132 122767 000001 140160 CMPB #APTENV,$ENV ;RUNING IN APT MODE?
10999 040140 001003 BNE 2$ ;IF NOT, DO THIS TEST
11000 040142 005767 140140 TST $PASS ;IS THIS THE FIRST PASS?
11001 040146 001044 BNE NODL ;IF NOT FIRST PASS, SKIP TEST
11002 040150 2$:
11003 040150 012706 001000 MOV #BUFF,%6
11004 040154 012767 000340 137614 MOV #340,STATUS ;SET TO A HIGH PRIORITY LEVEL
11005 040162 012767 040226 137674 MOV #TR0,64
11006 040170 012767 000100 137366 MOV #100,TTCSR ;INTERRUPT FOR TTY PUNCH/PRINTER
11007 040176 012767 040236 137630 MOV #BR71,34 ;TRAP VECTOR
11008 040204 012767 040246 137652 MOV #TR2,64 ;TTY VECTOR
11009 040212 012767 000340 137616 MOV #340,36 ;IF TRAP TRAPS, MOVE 340 TO PRIORITY
11010 040220 005067 137552 CLR STATUS ;SHOULD INTERRUPT AT END OF CLR INST
11011 040224 104400 TRAP ;TTY INTERRUPT SHOULD OVERRIDE TRAP
11012 040226 TR0:
11013 040226 012742 001131 MOV #1131,-(R2) ;MOVE TO MAILBOX # ***** 1131 *****
11014 040232 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
11015 040234 000000 HALT ;TTY SHOULDN'T HAVE INTERRUPTED
11016 040236 BR71:
11017 040236 012742 001132 MOV #1132,-(R2) ;MOVE TO MAILBOX # ***** 1132 *****
11018 040242 005242 INC -(R2) ;SET MSGTYP TO FATAL ERROR
11019 040244 000000 HALT ;TRAP OCCURRED FIRST,OR WRONG $STNM
11020 040246 005067 137564 TR2: CLR 36
11021 040252 042767 000100 137304 BIC #100,TTCSR
11022 040260 NODL:
11023 *****
11024 :TEST 377 TEST THAT A PENDING INTERRUPT, INTERRUPTS BETWEEN TRAPS
11025 *****
11026 040260 005212 TS377: INC (R2) ;UPDATE TEST NUMBER
11027 040262 022712 000377 CMP #377,(R2) ;SEQUENCE ERROR?
11028 040266 001043 BNE TR5 ;BR TO ERROR HALT ON SEQ ERROR
11029 040270 005767 177450 TST PROFTE
11030 040274 001063 BNE NODL1
11031 040276 122767 000001 140014 CMPB #APTENV,$ENV ;RUNING IN APT MODE?
11032 040304 001003 BNE 2$ ;IF NOT, DO THIS TEST
11033 040306 005767 137774 TST $PASS ;IS THIS THE FIRST PASS?
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11034 040312 001054          BNE      NODL1          ;IF NOT FIRST PASS, SKIP TEST
11035 040314          2$:      MOV      #BUFF,%6
11036 040314 012706 001000          MOV      #340,STATUS
11037 040320 012767 000340 137450          MOV      #100,ITCSR
11038 040326 012767 000100 137230          MOV      #TR3,34          ;TRAP
11039 040334 012767 040374 137472          MOV      #TR4,64          ;TTY OUTPUT
11040 040342 012767 040406 137514          MOV      #340,66          ;TTY OUTPUT PRIORITY
11041 040350 012767 000340 137510          MOV      #TR5,20          ;IOT
11042 040356 012767 040376 137434          MOV      #340,22          ;IOT PRIORITY
11043 040364 012767 000340 137430          TRAP          ;THE ACT OF TRAPPING LOWER PRIORITY
11044 040372 104400          TR3:     IOT          ;INTERRUPT SHOULD OCCUR IN PLACE OF IOT TRAP
11045 040374 000004          TR5:
11046 040376          MOV      #1133,-(R2)      ;MOVE TO MAILBOX # ***** 1133 *****
11047 040376 012742 001133          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
11048 040402 005242          HALT          ;NO INTERRUPT BETWEEN TRAPS,OR WRONG $STNM
11049 040404 010000          TR4:     CLR      22          ;CLR IOT PRIORITY
11050 040406 005067 137410          CLR      66
11051 040412 005067 137450          MOV      #36,34
11052 040416 012767 000036 137410          MOV      #66,64
11053 040424 012767 000066 137432          MOV      #22,20
11054 040432 012767 000022 137360          CLR      ITCSR
11055 040440 005067 137120          NODL1:
11056 040444
11057
11058 ;*****
11059 ;TEST 400 TEST THAT 'RESET' GOES TO OUTSIDE WORLD
11060 ;*****
11061 040444 005212          TS400:  INC      (R2)          ;UPDATE TEST NUMBER
11062 040446 022712 000400          CMP      #400,(R2)      ;SEQUENCE ERROR?
11063 040452 001030          BNE     TS401-10        ;BR TO ERROR HALT ON SEQ ERROR
11064 040454 005767 177264          TST     PROFTE
11065 040460 001031          BNE     NODL2
11066 040462 122767 000001 137630          CMPB   #APTENV,$ENV    ;RUNNING IN APT MODE?
11067 040470 001003          BNE     1$             ;IF NO DO TEST.
11068 040472 005767 137610          TST     $PASS          ;IF YES THEN ARE WE ON FIRST PASS?
11069 040476 001022          BNE     NODI2          ;IF IN APT MODE AND FIRST PASS, SKIP TEST.
11070 040500 016700 137056          1$:     MOV      TKB,R0      ;MAKE SURE RECEIVER DONE IS SET
11071 040504 012767 000100 137046          MOV      #100,TRCSR    ;SET INTERRUPT ENABLE
11072 040512 000005          RESET          ;SHOULD CLEAR INTERRUPT ENABLE
11073 040514 032767 000100 137036          BIT     #100,TRCSR     ;TEST FOR CLEAR
11074 040522 001410          BEQ     TS401
11075          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
11076          ; CONDITIONAL BRANCH INST. AND <====
11077          ; REPLACE THE MOVE INSTRUCTION <====
11078          ; WHICH FOLLOWS W/ 753 <====
11079 040524 012742 001134          MOV      #1134,-(R2)    ;MOVE TO MAILBOX # ***** 1134 *****
11080 040530 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
11081 040532 000000          HALT          ;RESET FAILED TO CLEAR TRCSR
11082          ; OR SEQUENCE ERROR
11083 040534 012742 001135          MOV      #1135,-(R2)    ;MOVE TO MAILBOX # ***** 1135 *****
11084 040540 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
11085 040542 000000          HALT          ;WRONG $STNM
11086 040544          NODL2:
11087 ;*****
11088 ;TEST 401 TEST THAT RESET HAS NO EFFECT ON THE TRACE TRAP
11089 ;*****
```

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11090 040544 005212
11091 040546 022712 000401
11092 040552 001023
11093 040554 122767 000001 137536
11094 040562 001003
11095 040564 005767 137516
11096 040570 001027
11097 040572 012706 001000
11098 040576 012767 040632 137210
11099 040604 012746 000020
11100 040610 012746 040616
11101 040614 000006
11102 040616 000005
11103 040620 000005
11104 040622
11105 040622 012742 001136
11106 040626 005242
11107 040630 000000
11108 040632 005067 137140
11109 040636 005067 137154
11110 040642 012767 000016 137144
11111 040650
11112
11113
11114
11115 040650 005212
11116 040652 022712 000402
11117 040656 001060
11118 040660 005767 177060
11119 040664 001063
11120 040666 122767 000001 137424
11121 040674 001003
11122 040676 005767 137404
11123 040702 001054
11124 040704
11125 040704 000005
11126 040706 012706 001000
11127 040712 012767 040740 137144
11128 040720 005067 137052
11129 040724 012767 000357 137134
11130 040732 052767 000300 136624
11131 040740 026727 137032 000357
11132 040746 001404
11133
11134
11135
11136
11137 040750 012742 001137
11138 040754 005242
11139 040756 000000
11140 040760 000005
11141 040762 012706 001000
11142 040766 012767 041012 137070
11143 040774 005067 137066
11144 041000 012767 000157 136770
11145 041006 105167 136552

TS401: INC (R2) ;UPDATE TEST NUMBER
      CMP #401,(R2) ;SEQUENCE ERROR?
      BNE RESET3 ;BR TO ERROR HALT ON SEQ ERROR
      CMPB #APTENV,$ENV ;RUNNING IN APT MODE?
      BNE 2$ ;IF NO DO TEST.
      TST $PASS ;IF YES THEN ARE WE ON FIRST PASS?
      BNE SKTST2 ;IF IN APT MODE AND FIRST PASS, SKIP TEST.
2$: MOV #BUFF,%6 ;SET STACK
   MOV #RESET2,14 ;SET UP TRACE VECTOR
   MOV #20,-(R6) ;SET THE T-BIT ON STACK
   MOV #1$,-(R6) ;MOVE NEW PC ON STACK
1$: RESET ;SHOULD HAVE NO EFFECT
   RESET ;NO EFFECT
RESET3: MOV #1136,-(R2) ;MOVE TO MAILBOX # ***** 1136 *****
      INC -(R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;TRACE TRAP FAILED,OR WRONG $STNM
RESET2: CLR STATUS ;CLEAR TRACK
      CLR 16 ;TRACE STATUS
      MOV #16,14
SKTST2:
;*****
;TEST 402 TEST THAT WHEN TTY INTERRUPTS IT POPS NEW STATUS
;*****
TS402: INC (R2) ;UPDATE TEST NUMBER
      CMP #402,(R2) ;SEQUENCE ERROR?
      BNE TTY11 ;BR TO ERROR HALT ON SEQ ERROR
      TST PROFIE
      BNE NODL3
      CMPB #APTENV,$ENV ;RUNING IN APT MODE?
      BNE 2$ ;IF NOT, DO THIS TEST
      TST $PASS ;IS THIS THE FIRST PASS?
      BNE NODL3 ;IF NOT FIRST PASS, SKIP TEST
2$: RESET
   MOV #BUFF,%6 ;SET UP STACK
   MOV #TTY3,64 ;INTERRUPT VECTOR
   CLR STATUS ;DROP PROCESSOR PRIORITY
   MOV #357,66 ;HIGH PRIORITY ON INTERRUPT
   BIS #300,TTCSR ;SHOULD SET INTERRUPT ENABLE & INTERRUPT
TTY3: CMP STATUS,#357
      BEQ 1$
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <==
; CONDITIONAL BRANCH INST. AND <=
; REPLACE THE MOVE INSTRUCTION <--
; WHICH FOLLOWS W/ 743 <=
1$: MOV #1137,-(R2) ;MOVE TO MAILBOX # ***** 1137 *****
   INC -(R2) ;SET MSGTYP TO FATAL ERROR
   HALT ;INTERRUPT DID NOT POP CORRECT STATUS
1$: RESET ;CLR INTERRUPT ENABLE
   MOV #BUFF,%6 ;STACK SET UP
   MOV #TTY4,64 ;INTERRUPT VECTOR
   CLR 66 ;CLR NEW STATUS
   MOV #157,STATUS ;PROCESSOR STATUS
   COMB TTCSR ;SET INTERRUPT ENABLE

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11146 041012 005767 136760      TTY4:  TST      STATUS
11147 041016 001404              BEQ      TTT37
11148                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
11149                               ;          CONDITIONAL BRANCH INST. AND <====
11150                               ;          REPLACE THE MOVE INSTRUCTION <====
11151                               ;          WHICH FOLLOWS W/ 717 <====
11152 041020      TTY11:
11153 041020 012742 001140      MOV      #1140,-(R2) ;MOVE TO MAILBOX # ***** 1140 *****
11154 041024 005242      INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
11155 041026 000000      HALT                    ;INCORRECT STATUS,OR WRONG $STNM
11156 041030 105167 136530      TTT37:  COMB      TTCSR
11157 041034      NODL3:
11158
11159
11160 :*****
11161 :TEST 403      TEST THE 'WAIT' INSTRUCTION
11162 :*****
11162 041034 005212      TS403:  INC      (R2)      ;UPDATE TEST NUMBER
11163 041036 022712 000403      CMP      #403,(R2)    ;SEQUENCE ERROR?
11164 041042 001062      BNE     STP4         ;BR TO ERROR HALT ON SEQ ERROR
11165 041044 122767 000001 137246      CMPB    #APTENV,$ENV  ;RUNING IN APT MODE?
11166 041052 001003      BNE     1$          ;IF NOT, DO THIS TEST
11167 041054 005767 137226      TST     $PASS       ;IS THIS THE FIRST PASS?
11168 041060 001057      BNE     STP4E       ;IF NOT FIRST PASS, SKIP TEST
11169 041062
11170 041062 042767 000100 136474      1$:     BIC      #100,TPS    ;CLEAR INTERRUPT ENABLE
11171 041070 012706 001000      MOV     #BUFF,SP    ;SET UP THE STACK
11172 041074 012767 041162 136762      MOV     #WATE,64    ;SET UP THE INTERRUPT VECTOR
11173 041102 005067 136760      CLR     66
11174 041106 105767 136452      WATE1:  TSTB     TPS    ;WAIT FOR READY
11175 041112 100375      BPL     WATE1       ;TO BE UP
11176 041114 012767 000015 136444      MOV     #15,TPB    ;DO A CARRIAGE RETURN
11177 041122 105767 136436      WATE2:  TSTB     TPS    ;WAIT FOR READY TO COME UP
11178 041126 100375      BPL     WATE2
11179 041130 012767 000015 136430      MOV     #15,TPB    ;DO ANOTHER CARRIAGE RETURN
11180 041136 052767 000100 136420      BIS     #100,TPS   ;SET THE INTERRUPT ENABLE
11181 041144 005067 136626      CLR     STATUS     ;CLEAR THE PSW
11182 041150 000001      WATE3:  WAIT                    ;WAIT FOR THE INTERRUPT
11183 041152 012742 001141      MOV     #1141,-(R2) ;MOVE TO MAILBOX # ***** 1141 *****
11184 041156 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
11185 041160 000000      HALT                    ;WAIT INSTRUCTION DID NOT LOOP
11186 041162 005767 136610      WATE:   TST     STATUS ;IS THE PSW CORRECT?
11187 041166 001404      BEQ     1$
11188                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
11189                               ;          CONDITIONAL BRANCH INST. AND <-
11190                               ;          REPLACE THE MOVE INSTRUCTION <-
11191                               ;          WHICH FOLLOWS W/ 725 <-
11192 041170 012742 001142      MOV     #1142,-(R2) ;MOVE TO MAILBOX # ***** 1142 *****
11193 041174 005242      INC     -(R2)      ;SET MSGTYP TO FATAL ERROR
11194 041176 000000      HALT                    ;NEW PSW SHOULD HAVE BEEN ZERO
11195 041200 026727 137570 041152 1$:     CMP     BUFF-4,#WATE3+2 ;IS THE OLD PC SAVED
11196 041206 001404      BEQ     STP4E
11197
11198                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <= -
11199                               ;          CONDITIONAL BRANCH INST. AND <--
12000                               ;          REPLACE THE MOVE INSTRUCTION <--
12001                               ;          WHICH FOLLOWS W/ 715 <-
1201 041210      STP4:

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11202 041210 012742 001143      MOV      #1143,-(R2)      ;MOVE TO MAILBOX # ***** 1143 *****
11203 041214 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
11204 041216 000000              HALT                    ;OLD PC WAS NOT SAVED OR WRONG $TESTN
11205 041220
11206
11207      STP4E:
11208      ;*****
11209      ;TEST 404      TEST THAT USING REGISTER ADDR (17770C) CAUSES TIME OUT.
11210      ;*****
11209 041220 005212      TS404:  INC      (R2)           ;UPDATE TEST NUMBER
11210 041222 022712 000404      CMP      #404,(R2)       ;SEQUENCE ERROR?
11211 041226 001017      BNE     TS405-10        ;BR TO ERROR HALT ON SEQ ERROR
11212
11213      ;
11214      ;REGISTER ADDRESS (177700-177717) CAUSE TIME OUT WHEN USED
11215      ;AS PROGRAM ADDRESS BY THE CPU.
11216 041230 012706 00'000      MOV      #BUFF,SP       ;SET STACK POINTER
11217 041234 012737 041256 000004  MOV      #RETR1,@#RTRAP5 ;SET TRAP RETURN ADDR
11218 041242 005737 177700      PCN1:  TST      @#177700   ;BAD ADDR REFERENCE, TRAP TO 4
11219 041246 012742 001144      MOV      #1144,-(R2)     ;MOVE TO MAILBOX # ***** 1144 *****
11220 041252 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
11221 041254 000000              HALT                    ;REFERENCING 177700 DID NOT CAUSE TIME OUT
11222 041256 022767 041246 137510  RETR1:  CMP      #PCN1+4,BUFF-4 ;PROPER PC STORED ON STACK?
11223 041264 001404      BEQ     TS405
11224
11225      ;
11226      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
11227      ;          CONDITIONAL BRANCH INST. AND <
11228      ;          REPLACE THE MOVE INSTRUCTION <
11229      ;          WHICH FOLLOWS W/ 760 <
11228 041266 012742 001145      MOV      #1145,-(R2)     ;MOVE TO MAILBOX # ***** 1145 *****
11229 041272 005242              INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
11230 041274 000000              HALT                    ;OLD PC WAS NOT SAVED IN STACK
11231
11232      ;
11233      ; OR SEQUENCE ERROR
11234
11235      ;*****
11236      ;ODD ADDRESS USED BY A 'WORD' INSTRUCTION SHOULD NOT
11237      ;CAUSE A TRAP, BUT THE LOW ORDER ADDRESS BIT WOULD BE IGNORED.
11238      ;*****
11239      ;TEST 405      TEST ODD ADDRESS TRAP IS NOT IMPLEMENTED.
11240      ;*****
11239 041276 005212      TS405:  INC      (R2)           ;UPDATE TEST NUMBER
11240 041300 022712 000405      CMP      #405,(R2)       ;SEQUENCE ERROR?
11241 041304 001013      BNE     TS406-10        ;BR TO ERROR HALT ON SEQ ERROR
11242
11243 041306 012737 041334 000004  MOV      #RETR2,@#RTRAP5 ;SET TRAP RETURN ADDR
11244 041314 005037 000000      CLR     @#0             ;PUT ALL 0 IN LOC 0
11245 041320 005337 000001      DEC     @#1             ;DECREMENT ODD ADDRESS, SHOULD NOT TRAP
11246 041324 022737 177777 000000      CMP      #-1,@#0        ;WORD LOC 0 HAS ALL ONES?
11247 041332 001404      BEQ     TS406
11248
11249      ;
11250      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <--
11251      ;          CONDITIONAL BRANCH INST. AND <--
11252      ;          REPLACE THE MOVE INSTRUCTION <--
11253      ;          WHICH FOLLOWS W/ 764 < --
11252 041334      RETR2:  MOV      #1146,-(R2)     ;MOVE TO MAILBOX # ***** 1146 *****
11253 041334 012742 001146      INC      -(R2)           ;SET MSGTYP TO FATAL ERROR
11254 041340 005242              HALT                    ;LOC 0 DID NOT STORE -1,OR ODD ADDR REFERENCE CAUSE TRAP
11255 041342 000000
11256
11257      ;
11258      ; OR SEQUENCE ERROR
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11266 041344 005212
11267 041346 022712 000406
11268 041352 001016
11269 041354 012737 041402 000004
11270 041362 012700 177700
11271 041366 012720 001234
11272 041372 012742 001147
11273 041376 005242
11274 041400 000000
11275 041402 022700 177702
11276 041406 001404
11277
11278
11279
11280
11281 041410 012742 001150
11282 041414 005242
11283 041416 000000
11284
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11297 041420 005212
11298 041422 022712 000407
11299 041426 001062
11300 041430 012737 041506 000004
11301 041436 012737 000340 000006
11302 041444 012737 041476 000010
11303 041452 012737 000340 000012
11304 041460 012706 177700
11305 041464 000077
11306 041466 012742 001151
11307 041472 005242
11308 041474 000000
11309 041476
11310 041476 012742 001152
11311 041502 005242
11312 041504 000000
11313 041506 022737 041466 000000

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:*****
:USING ADDRESS 177700 IN MODE 2, CAUSES BUS ERROR, BUT
:THE REGISTER IN USE WILL BE INCREMENTED.
:*****
:TEST 406 TEST THAT IN MODE 2, BAD ADDRESS REFERENCE CAUSES BUS ERROR.
:*****
TS406: INC (R2) ;UPDATE TEST NUMBER
CMP #406,(R2) ;SEQUENCE ERROR?
BNE TS407-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #RETR3,@#RTRAP5 ;SET TRAP RETURN ADDR
MOV #177700,R0 ;STORES BAD MEMORY REFERENCE
MOV #1234,(R0)+ ;BAD ADDR REFERENCE, TRAP TO LOC 4
MOV #1147,-(R2) ;MOVE TO MAILBOX # ***** 1147 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;ADDRESSING 177700 DID NOT CAUSE TRAP
RETR3: CMP #177702,R0 ;WAS R0 INCREMENTED?
BEQ TS407
; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
; CONDITIONAL BRANCH INST. AND <-
; REPLACE THE MOVE INSTRUCTION <-
; WHICH FOLLOWS W/ 761 <-
MOV #1150,-(R2) ;MOVE TO MAILBOX # ***** 1150 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;R0 WAS NOT INCREMENTED
; OR SEQUENCE ERROR
:*****
:
: AFTER THE FIRST BUS ERROR WAS ENCOUNTERED, AN ATTEMPT WAS MADE
: TO PUSH PC AND PS INTO THE STACK. HOWEVER, IF THE STACK POINTER
: WAS BAD, A DOUBLE BUS ERROR OCCURED. THE STACK POINTER WOULD
: THEN BE SET TO LOCATION 4, OLD PC AND PS WERE PUSHED INTO
: LOCATIONS 0 AND 2. THE PROCESSOR WOULD TRAP TO 4 AND CONTINUE
: EXECUTION.
:*****
:TEST 407 TEST FOR DOUBLE BUS ERROR.
:*****
TS407: INC (R2) ;UPDATE TEST NUMBER
CMP #407,(R2) ;SEQUENCE ERROR?
BNE TS410-10 ;BR TO ERROR HALT ON SEQ ERROR
MOV #DBE1,@#RTRAP5 ;SET TRAP RETURN ADDR
MOV #340,@#6 ;SET UP PS
MOV #DBE2,@#RTRAP ;SET TRAP RETURN ADDR
MOV #340,@#12 ;SET UP PS
MOV #177700,SP ;SET ILLEGAL SP
DBE: TRAPA ;ILLEGAL INSTRUCTION
MOV #1151,-(R2) ;MOVE TO MAILBOX # ***** 1151 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;DOUBLE BUS ERROR DID NOT CAUSE TRAP
DBE2: MOV #1152,-(R2) ;MOVE TO MAILBOX # ***** 1152 *****
INC -(R2) ;SET MSGTYP TO FATAL ERROR
HALT ;TRAP TO WRONG LOCATION
DBE1: CMP #DBE+2,@#0 ;OLD PC GOT SAVED?

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```
11314 041514 001404          BEQ      DBE3
11315                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
11316                          ;          CONDITIONAL BRANCH INST. AND <====
11317                          ;          REPLACE THE MOVE INSTRUCTION <====
11318                          ;          WHICH FOLLOWS W/ 744 <====
11319 041516 012742 001153    MOV      #1153,-(R2) ;MOVE TO MAILBOX # ***** 1153 *****
11320 041522 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
11321 041524 000000          HALT                    ;OLD PC DID NOT GET SAVEDD
11322 041526 022737 000340 000002 DBE3:  CMP      #340,@#2    ;CORRECT PS SAVED?
11323 041534 001404          BEQ      DBE4
11324                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
11325                          ;          CONDITIONAL BRANCH INST. AND <====
11326                          ;          REPLACE THE MOVE INSTRUCTION <====
11327                          ;          WHICH FOLLOWS W/ 734 <====
11328 041536 012742 001154    MOV      #1154,-(R2) ;MOVE TO MAILBOX # ***** 1154 *****
11329 041542 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
11330 041544 000000          HALT                    ;CORRECT PS DID NOT GET SAVE
11331 041546 022706 000000    DBE4:  CMP      #0,SP      ;SP POINTS TO LOC 0?
11332 041552 001404          BEQ      DBE5
11333                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <====
11334                          ;          CONDITIONAL BRANCH INST. AND <====
11335                          ;          REPLACE THE MOVE INSTRUCTION <====
11336                          ;          WHICH FOLLOWS W/ 725 <====
11337 041554 012742 001155    MOV      #1155,-(R2) ;MOVE TO MAILBOX # ***** 1155 *****
11338 041560 005242          INC      -(R2)      ;SET MSGTYP TO FATAL ERROR
11339 041562 000000          HALT                    ;SP IS NOT POINTING TO LOC 0
11340 041564 012737 027324 000004 DBE5:  MOV      #T04,@#RTRAP5 ;RESET TIMEOUT VECTOR
11341 041572 012737 027334 000010    MOV      #T010,@#RTRAP ;RESET ILLEGAL INST. VECTOR
11342 041600 012706 001000    MOV      #STBOT,SP    ;RESET SP
11343
11344
11345
11346 :*****
11347 :TEST 410      TEST MFPT
11348 041604 005212          TS410: INC      (R2)      ;UPDATE TEST NUMBER
11349 041606 022712 000410    CMP      #410,(R2)    ;SEQUENCE ERROR?
11350 041612 001023          BNE     TS411-10    ;BR TO ERROR HALT ON SEQ ERROR
11351 ;THIS TESTS THE MFPT INSTRUCTION- MOVE FROM PROCESSOR TYPE
11352 ;UPON EXECUTION, R0 WILL RECEIVE THE PROCESSOR MODEL CODE
11353 ;WHICH IS '000003' FOR F11.
11354 MFPT=000007
11355 041614 012706 001000    MOV      #STBOT,R6    ;INIT. SP
11356 041620 013746 000010    MOV      @#10,-(SP)   ;SAVE TRAP VECTOR
11357 041624 012737 041654 000010    MOV      #1$,@#10    ;SET UP ILLEGAL INSTRUCTION TRAP
11358 041632 010046          MOV      R0,-(SP)    ;SAVE R0
11359 041634 000007          MFPT                ;GET PROCESSOR MODEL
11360 041636 010037 041664    MOV      R0,@#CPUTYP ;STORE IT
11361 041642 012600          MOV      (SP)+,R0    ;RESTORE R0
11362 041644 022737 000003 041664    CMP      #3,@#CPUTYP ;CHECK MODEL TYPE
11363 041652 001405          BEQ      XXT
11364                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <
11365                          ;          CONDITIONAL BRANCH INST. AND <
11366                          ;          REPLACE THE MOVE INSTRUCTION <
11367                          ;          WHICH FOLLOWS W/ 757 <
11368 041654          1$:
11369 041654 012742 001156    MOV      #1156,-(R2) ;MOVE TO MAILBOX # ***** 1156 *****
```

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11370 041660 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
11371 041662 000000          HALT                    ;ILLEGAL INSTR TRAP OR WRONG MODEL TYPE
11372
11373 041664 000000          CPU TYP: .WORD 0
11374 041666                      XXT:
11375 041666 012637 000010      MOV      (SP)+,@#10      ;RESTORE TRAP VECTOR
11376
11377          ;*****
11378          ;THIS TEST WILL CHECK THE SERVICE ROUTINE FOR A CONTROL CHIP ERROR.
11379          ;THIS IS DONE BY EXECUTING INSTRUCTIONS WHICH JUMP TO NON-EXISTENT
11380          ;CONTROL-CHIP. THE TEST THEREFORE DOES A 'FIS' INSTRUCTION. THE
11381          ;CTLERR TRAPS TO LOCATION 10.
11382          ;THE RESET LINE IS ALSO ASSERTED FOR 1 CYCLE.
11383          ;*****
11384          ;TEST 411      TEST CTLERR SERVICE ROUTINE
11385          ;*****
11385 041672 005212          TS411:  INC      (R2)          ;UPDATE TEST NUMBER
11386 041674 022712 000411      CMP      #411,(R2)      ;SEQUENCE ERROR?
11387 041700 001013          BNE     TS412-10        ;BR TO ERROR HALT ON SEQ ERROR
11388 041702 012706 001000      MOV      #STBOT,R6      ;INIT STACK POINTER
11389 041706 012737 041734 000010  MOV      #1$,@#10        ;SET UP RETURN ADDR FROM TRAP
11390 041714 012737 000340 000012  MOV      #340,@#12      ;SET TRAP PRIORITY=7
11391 041722 075006          FADD     R6              ;EXECUTE FIS INSTR..SHOULD CAUSE CTLERR
11392 041724 012742 001157      MOV      #1157,-(R2)    ;MOVE TO MAILBOX # ***** 1157 *****
11393 041730 005242          INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
11394 041732 000000          HALT
11395 041734 012706 001000      1$:     MOV      #STBOT,R6      ;RE-INIT STACK POINTER
11396
11397          ;*****
11398          ;TEST 412      TEST THAT ALL RESERVED INSTRUCTIONS TRAP
11399          ;*****
11400 041740 005212          TS412:  INC      (R2)          ;UPDATE TEST NUMBER
11401 041742 022712 000412      CMP      #412,(R2)      ;SEQUENCE ERROR?
11402 041746 001140          BNE     RET4            ;BR TO ERROR HALT ON SEQ ERROR
11403 041750 042767 000100 135606  BIC      #100,TPS
11404 041756 012737 042004 000244  MOV      #TRAP244,@#244 ; SET UP TO SEE IF
11405 041764 013767 000010 000044  MOV      @#10,TENSAVE   ; THIS PROCESSOR HAS THE
11406 041772 012737 042014 000010  MOV      #TRAP10,@#10  ; FLOATING POINT OPTION
11407 042000 170007          .WORD   170007         ; AN ILLEGAL FPP INSTRUCTION
11408 042002 000416          BR      AROUND         ; THE FOLLOWING
11409 042004          TRAP244:             ; IF FPP IN--
11410 042004 013767 042402 000400  MOV      @#FPP,FINISH  ; RESET END OF TABLE POINTER
11411 042012 000002          RTI                    ; AND RETURN
11412 042014          TRAP10:             ; LEAVE THE TABLE ALONE
11413 042014 000002          RTI                    ; AND RETURN
11414
11415 042016 042777 000004 165430  CISTRP: BIC      #4,@SWR ;CLEAR CIS OPTION BIT IN SWR
11416 042024 012716 042072      MOV      #CONCIS,(SP) ;CHANGE RETURN ADDRESS TO CONCIS LOCATION
11417 042030 000002          RTI                    ;RETURN
11418
11419 042032 000000          CISADR: .WORD 0        ;DATA FOR CIS INSTRUCTION
11420 042034 000000          .WORD 0
11421
11422 042036 000000          TENSARE: .WORD 0      ; A PLACE TO STORE CONTENTS OF 10
11423
11424 042040          AROUND:             ; CONTINUATION POINT
11425 042040 012737 000246 000244  MOV      #246,@#244    ; RESTORE THE TRAP VECTOR

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11426 042046 012737 042016 000010      MOV      #CISTRP,@#10      ;SET UP TO SEE IF
11427                                     ; THIS PROCESSOR HAS THE CIS OPTION
11428 042054 076144      .WORD    076144            ; EXECUTE A CMPCI INSTRUCTION
11429 042056 042032      .WORD    CISADR           ; OPERANDS
11430 042060 042032      .WORD    CISADR           ;
11431 042062 000000      .WORD    0                ; FOR CIS
11432 042064 052777 000004 165362      BIS      #4,@SWR          ; INSTRUCTION
11433 042072                                     ; SET CIS PRESENT FLAG IN SWR
11434 042072 016737 177740 000010      MOV      TENSARE,@#10     ; RESTORE THE ILLEGAL INST. VECTOR
11435 042100 012703 042272      MOV      #TABLE,TAB      ;TABLE POINTER
11436 042104 012305      GIN1:   MOV      (TAB)+,FIRST ;FIRST OR CURRENT INSTRUCTION
11437 042106 012301      MOV      (TAB)+,LAST    ;LAST INSTRUCTION OR GROUP
11438 042110 020537 042346      CMP      FIRST,@#CIS     ;HAVE WE TESTED UP TO THE CIS INSTRUCTION SPACE
11439 042114 001007      BNE     1$              ;IF NO CONTINUE TESTING
11440 042116 032777 000004 165330      BIT      #4,@SWR        ;IF YES,CHECK IF CIS CHIPS PRESENT
11441 042124 001403      BEQ     1$              ;IF THEY ARE NOT CONTINUE TESTING
11442 042126 012703 042402      MOV      #FPP,TAB       ;IF CIS HERE SKIP CIS INSTRUCTION SPACE
11443 042132 000764      BR      GIN1
11444 042134 020567 000252      1$:    CMP      FIRST,FINISH ;TESTED ALL
11445 042140 001415      BEQ     GIN3            ;YES BRANCH
11446 042142 010567 000246      MOV      FIRST,INST     ;SET UP INST
11447 042146 005267 000242      GIN2:   INC      INST
11448 042152 012767 042204 135630      MOV      #RET,10        ;SET UP RETURN FROM TRAP
11449 042160 012706 001000      MOV      #BUFF,SP      ;SET UP STACK POINTER
11450 042164 005067 135606      CLR     CC              ;CLEAR PRIORITY
11451 042170 000167 000220      JMP     INST            ;EXECUTE RESERVED INSTRUCTION
11452 042174 012700 000370      GIN3:   MOV      #370,R0  ;RESET RESERVED AREA 370-402
11453 042200 000167 000320      JMP     THRPRT         ;JUMP TO EIS TEST
11454
11455      ;TRAPPING SHOULD SEND YOU HERE
11456 042204 020627 000774      RET:    CMP      SP,#BUFF-4 ;TEST DECREMENT OF SP
11457 042210 001404      BEQ     RET1
11458 042212 012742 001160      MOV     #1160,-(R2)     ;MOVE TO MAILBOX # ***** 1160 *****
11459 042216 005242      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
11460 042220 000000      HALT
11461 042222 026727 136546 042416      RET1:   CMP      BUFF-4,#INST+2 ;LOC OF INST UNINCREMENTED
11462 042230 001404      BEQ     RET2
11463 042232 012742 001161      MOV     #1161,-(R2)     ;MOVE TO MAILBOX # ***** 1161 *****
11464 042236 005242      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
11465 042240 000000      HALT
11466 042242 005767 136530      RET2:   TST      BUFF-2
11467 042246 001404      BEQ     RET3
11468
11469      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS <-
11470      ; CONDITIONAL BRANCH INST. AND <-
11471      ; REPLACE THE MOVE INSTRUCTION <-
11472      ; WHICH FOLLOWS W/ 637 <-
11473 042250 012742 001162      RET4:   MOV      #1162,-(R2) ;MOVE TO MAILBOX # ***** 1162 *****
11474 042254 005242      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
11475 042256 000000      HALT
11476 042260 026701 000130      RET3:   CMP      INST,LAST ;CONDITION CODFS SET ON TRAP OR WRONG $TSTNM
11477 042264 001707      BEQ     GIN1            ;SET UP NEW GROUP
11478 042266 000167 177654      JMP     GIN2            ;FINISH OLD GROUP
11479                                     ;END OF INSTRUCTION GROUP
11480 042272 000007      TABLE: 7              ;END OF OPERATE
11481 042274 000077      77

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11482	042276	000207	207		
11483	042300	000227	227		
11484	042302	006777	6777		
11485	042304	007777	7777		
11486	042306	075037	075037		
11487	042310	076017	76017		
11488	042312	076032	76032		
11489	042314	076037	76037		
11490	042316	076045	76045		
11491	042320	076047	76047		
11492	042322	076077	76077		
11493	042324	076127	76127		
11494	042326	076132	76132		
11495	042330	076137	76137		
11496	042332	076145	76145		
11497	042334	076147	76147		
11498	042336	076157	76157		
11499	042340	076167	76167		
11500	042342	076177	76177		
11501	042344	076777	76777		
11502	042346	076017	76017	CIS:	
11503	042350	076032	76032		
11504	042352	076037	76037		
11505	042354	076045	76045		
11506	042356	076047	76047		
11507	042360	076077	76077		
11508	042362	076127	76127		
11509	042364	076132	76132		
11510	042366	076137	76137		
11511	042370	076145	76145		
11512	042372	076147	76147		
11513	042374	076157	76157		
11514	042376	076167	76167		
11515	042400	076177	76177		
11516	042402	167777	167777	FPP:	: START OF THE FPP INSTRUCTIONS
11517	042404	177700	177700		
11518	042406	177716	177716		
11519	042410	177777	177777		
11520	042412	042412		FINISH:	:END FLAG
11521	042414	000000	HALT	INST:	:WILL CONTINUE RESERVED INST
11522	042416	000000	HALT		:SHOULD TRAP TO LOC 10
11523	042420	000000	HALT		:LOC 10 SHOULD SEND YOU TO
11524	042422	000000	HALT		:RET
11525	042424	000000	HALT		

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.SBTTL ** STARTING OF EIS TEST **
.REPT 0

PART THREE: EIS INSTRUCTION TESTS

ABSTRACT

THIS PROGRAM TESTS THE F11 EXTENDED INSTRUCTION SET
<ASH, ASHC, MUL, AND DIV> USING REGISTERS 0-5 AT-
LEAST ONCE WITH EACH INSTRUCTION.

SWITCH SETTINGS

IF NO HARDWARE SWITCH REGISTER IS AVAILABLE, THE PROGRAM
AUTOMATICALLY USES THE CONTENTS OF LOC. 176 AS THE SOFTWARE
SWITCH REGISTER. THE USER SHOULD SET THIS LOCATION BEFORE
STARTING THE PROGRAM.

BIT #	OCTAL VALUE	FUNCTION
15	100000.....	HALT ON ERROR
13	020000.....	INHIBIT ERROR PRINTOUT

AN 8 BIT BYTE \$ENVM [I.E. LOCATION 321] HAS BEEN USED TO DEFINE
THE OPERATING MODE. ALL TYPEOUTS CAN BE SUPPRESSED BY MAKING
BIT 5 OF BYTE \$ENVM HIGH, IN OTHER WORDS BY PLACING A 20000 IN
LOCATION 320

.ENDR

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11564
11565
11566           000000          DUMMY=  0
11567           000001          ERRNM=  1
11568           000051          F=      5
11569           000176          N=     176
11570           001000          SW09= 1000
11571           002000          SW10= 2000
11572           004000          SW11= 4000
11573           010000          SW12= 10000
11574
11575  042426          COUNT:
11576           042430          . =COUNT+2
11577  042430          PSWORD:
11578           042432          . =PSWORD+2
11579  042432          TEMP1:
11580           042434          . =TEMP1+2
11581  042434          TEMP2:
11582           042436          . =TEMP2+2
11583  042436          TEMP3:
11584           042440          . =TEMP3+2
11585  042440          TEMP4:
11586           042442          . =TEMP4+2
11587  042442          000000          TEMPS: .WORD
11588  042444          000000          TEMP6: .WORD
11589  042446           000          TYPCNT: .BYTE
11590  042447           000          $TPCNT: .BYTE
11591  042450          000007          S0:    7
11592  042452          177771          S1:   -7
11593  042454          042452          S2:    S1
11594  042456          177772          S3:   -6
11595  042460          177777          S4:   -1
11596  042462          040000          S5:  40000
11597  042464          042462          S6:    S5
11598  042466          040000          S7:  40000
11599  042470          177776          S8:   -2
11600  042472          000002          S9:    2
11601  042474          042472          S10:   S9
11602  042476          000002          S11:    2
11603  042500          000064          TTYOUT: 64
11604  042502          177566          $TPB:  177566
11605  042504          177564          $TPS:  177564
11606  042506          005015          $CRLF: .ASCIIZ <15><12>/ /
11607  042514          006412          POWER: .ASCIIZ <12><15>/POWER/
11608  042522          000122
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11619  042524  012705  000304          THRPR: MOV    # $TESTN,R5    ;MAKE R5 POINT TO THE LOCATION $TESTN
  
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11620	042530	005037	042426	CLR	@#COUNT	:CLEAR THE COUNTER
11621	042534	012715	000001	MOV	#1,(R5)	:INITIALIZE TEST NUMBER
11622	042540	012706	001000	MOV	#STBOT,SP	:** STACK AT STBOT **
11623	042544	012737	000001	MOV	#1,@#TEMP1	:TEMP1=1
11624	042552	005037	042434	CLR	@#TEMP2	:TEMP2=0
11625	042556	012737	000001	MOV	#1,@#TEMP3	:TEMP3=1
11626	042564	005037	042440	CLR	@#TEMP4	:TEMP4=0
11627	042570	012737	062470	MOV	#STRAP,@#34	:SET UP TRAP INSTRUCTION VECTOR
11628	042576	012737	000340	MOV	#340,@#36	:AND VECTOR PLUS TWO
11629	042604	106427	000000	MTPS	#0	:CLEAR PROCESSOR PRIORITY BITS IN PSW
11630						
11631						

: ASH INSTRUCTION TESTS
:*****

: TESTS 1-36
:*****

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11645 042610 010767 135356          ASTART: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
11646 042614 013700 042432          MOV      @#TEMP1,%0 ;LOAD R0 WITH THE CONTENTS OF TEMP1
11647 042620 032737 000001 000306  BIT      #1,@#SPASS ;IS IT AN EVEN PASS ?
11648 042626 001004          BNE     2$          ;IF NOT THEN GO TO 2$
11649 042630 013701 042434          MOV      @#TEMP2,R1 ;OTHERWISE EXECUTE THE INSTRUCTION
11650                                     ;IN MODE 0 USING R1
11651 042634 072001          ASH     R1,R0
11652 042636 000402          BR      4$
11653 042640 072067 177570          2$: ASH     TEMP2,%0 ;SHIFT R0 BY THE NUMBER SPECIFIED BY TEMP2
11654 042644 106737 042430          4$: MFPS  @#PSWORD ;SAVE PS
11655 042650 123737 042440 042430  CMPB   @#TEMP4,@#PSWORD;IS THE PS - TEMP4 ?
11656 042656 001403          BEQ    .+10
11657 042660 004767 016020          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11658                                     ;THE PS IS NOT EQUAL TO 0
11659 042664 000001          1      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11660                                     ;BY (013746 000172 000207)
11661
11662 042666 005237 042426          INC     @#COUNT ;INCREMENT THE COUNTER
11663 042672 023700 042436          CMP     @#TEMP3,%0 ;IS THE RESULT IN R0 EQUAL TO TEMP3?
11664 042676 001403          BEQ    .+10
11665 042700          6$:
11666 042700 004767 016000          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11667                                     ;EITHER INCORRECT R0 OR INCORRECT SEQUENCE
11668 042704 000002          2      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11669                                     ;BY (013746 000172 000207)
11670
11671 042706 021537 042426          CMP     (R5),@#COUNT ;IS THE TEST NUMBER EQUAL TO THE
11672                                     ;COUNTER?
11673 042712 001372          BNE    6$          ;IF NOT GO TO THE HLT ABOVE
11674 042714 005215          INC     (R5)
11675 042716 010767 135250          MOV     PC,LPADR ;STORE ERROR LOOP ADDRESS
11676 042722 021527 000037          CMP     (R5),#37 ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT
11677                                     ;BY 14. AND RIGHT BY 14.?
11678 042726 002011          BGE    8$
11679 042730 005237 042434          INC     @#TEMP2
11680 042734 006367 177476          ASL    TEMP3 ;SHIFT TEMP3 LEFT.
11681 042740 021527 000020          CMP     (R5),#20 ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
11682 042744 001004          BNE    REGR1
11683 042746 000167 001010          JMP    NEGAT ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11684 042752 004767 001032          8$: JSR    PC,TST37 ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11685 042756 010767 135210          REGR1: MOV     PC,LPADR ;STORE ERROR LOOP ADDRESS
11686 042762 013701 042432          MOV     @#TEMP1,%1 ;LOAD R1 WITH THE CONTENTS OF TEMP1
11687 042766 032737 000001 000306  BIT     #1,@#SPASS ;IS IT AN EVEN PASS ?

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11688	042774	001004		BNE	2\$:IF NOT THEN GO TO 2\$
11689	042776	013702	042434	MOV	@#TEMP2,R2	:OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
11690	043002	072102		ASH	R2,R1	:USING R1
11691	043004	000402		BR	4\$	
11692	043006	072167	177422	2\$:	ASH	TEMP2,%1 :SHIFT R1 BY THE NUMBER SPECIFIED BY TEMP2
11693	043012	106737	042430	4\$:	MFPS	@#PSWORD :SAVE PS
11694	043016	123737	042440	042430	(MPB	@#TEMP4,@#PSWORD;IS THE PS = TEMP4 ?
11695	043024	001403		BEQ	+.10	
11696	043026	004767	015652	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
11697						:THE PS IS NOT EQUAL TO 0
11698	043032	000003		3		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11699						:BY (013746 000172 000207)
11700						
11701	043034	005237	042426	INC	@#COUNT	:INCREMENT THE COUNTER
11702	043040	023701	042436	CMP	@#TEMP3,%1	:IS THE RESULT IN R1 EQUAL TO TEMP3?
11703	043044	001403		BEQ	+.10	
11704	043046			6\$:		
11705	043046	004767	015632	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
11706						:EITHER INCORRECT R1 OR INCORRECT SEQUENCE
11707	043052	000004		4		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11708						:BY (013746 000172 000207)
11709						
11710	043054	021537	042426	CMP	(R5),@#COUNT	:IS THE TEST NUMBER EQUAL TO THE COUNTER?
11711	043060	001372		BNE	6\$	:IF NOT GO TO THE HLT ABOVE
11712	043062	005215		INC	(R5)	
11713	043064	010767	135102	MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
11714	043070	021527	000037	CMP	(R5),#37	:HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT
11715						:BY 14. AND RIGHT BY 14.?
11716	043074	002011		BGE	8\$	
11717	043076	005237	042434	INC	@#TEMP2	
11718	043102	006367	177330	ASL	TEMP3	:SHIFT TEMP3 LEFT
11719	043106	021527	000020	CMP	(R5),#20	:HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
11720	043112	001004		BNE	REGR2	
11721	043114	000167	000642	JMP	NEGAT	:IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11722	043120	004767	000664	8\$:	JSR	PC,TST37 :IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11723	043124	010767	135042	REGR2:	MOV	PC,LPADR :STORE ERROR LOOP ADDRESS
11724	043130	013702	042432	MOV	@#TEMP1,%2	:LOAD R2 WITH THE CONTENTS OF TEMP1
11725	043134	032737	000001	000306	BIT	#1,@#SPASS :IS IT AN EVEN PASS ?
11726	043142	001004		BNE	2\$	:IF NOT THEN GO TO 2\$
11727	043144	013703	042434	MOV	@#TEMP2,R3	:OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
11728	043150	072203		ASH	R3,R2	:USING R2
11729	043152	000402		BR	4\$	
11730	043154	072267	177254	2\$:	ASH	TEMP2,%2 :SHIFT R2 BY THE NUMBER SPECIFIED BY TEMP2
11731	043160	106737	042430	4\$:	MFPS	@#PSWORD :SAVE PS
11732	043164	123737	042440	042430	(MPB	@#TEMP4,@#PSWORD;IS THE PS = TEMP4 ?
11733	043172	001403		BEQ	+.10	
11734	043174	004767	015504	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
11735						:THE PS IS NOT EQUAL TO 0
11736	043200	000005		5		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11737						:BY (013746 000172 000207)
11738						
11739	043202	005237	042426	INC	@#COUNT	
11740	043206	023702	042436	CMP	@#TEMP3,%2	:IS THE RESULT IN R2 EQUAL TO TEMP3.
11741	043212	001403		BEQ	+.10	
11742	043214			6\$:		
11743	043214	004767	015464	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	

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11744                                     ;EITHER INCORRECT R2 OR INCORRECT SEQUENCE
11745 043220 000006                       6      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11746                                     ;BY (013746 000172 000207)
11747
11748 043222 021537 042426                CMP      (R5),@#COUNT ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
11749 043226 001372                       BNE      6$           ;IF NOT GO TO THE HLT ABOVE
11750 043230 005215                       INC      (R5)
11751 043232 010767 134734                MOV      PC,LPADR     ;STORE ERROR LOOP ADDRESS
11752 043236 021527 000037                CMP      (R5),#37    ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED
11753                                     ;LEFT BY 14, AND RIGHT BY 14.?
11754 043242 002011                       BGE      8$
11755 043244 005237 042434                INC      @#TEMP2
11756 043250 006367 177162                ASL      TEMP3       ;SHIFTED TEMP3 LEFT
11757 043254 021527 000020                CMP      (R5),#20    ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
11758 043260 001004                       BNE      REGR3
11759 043262 000167 000474                JMP      NEGAT       ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11760 043266 004767 000516                JSR      PC,TST37    ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11761 043272 010767 134674                MOV      PC,LPADR     ;STORE ERROR LOOP ADDRESS
11762 043276 013703 042732                MOV      @#TEMP1,%3 ;LOAD R3 WITH THE CONTENTS OF TEMP1
11763 043302 032737 000001 000306        BIT      #1,@#SPASS ;IS IT AN EVEN PASS ?
11764 043310 001004                       BNE      2$           ;IF NOT THEN GO TO 2$
11765 043312 013704 042434                MOV      @#TEMP2,R4 ;OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
11766 043316 072304                       ASH      R4,R3       ;USING R3
11767 043320 000402                       BR       4$
11768 043322 072367 177106                2$: ASH      TEMP2,%3 ;SHIFT R3 BY THE NUMBER SPECIFIED BY TEMP2
11769 043326 106737 042430                4$: MFPS      @#PSWORD ;SAVE PS
11770 043332 123737 042440 042430        CMPB    @#TEMP4,@#PSWORD;IS THE PS = TEMP4 ?
11771 043340 001403                       BEQ      .+10
11772 043342 004767 015336                JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11773                                     ;THE PS IS NOT EQUAL TO 0.
11774 043346 000007                       7      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11775                                     ;BY (013746 000172 000207)
11776
11777 043350 005237 042426                INC      @#COUNT
11778 043354 023703 042436                CMP      @#TEMP3,%3 ;IS THE RESULT IN R3 EQUAL TO TEMP3?
11779 043360 001403                       BEQ      .+10
11780 043362                                     0$:
11781 043362 004767 015316                JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11782                                     ;EITHER INCORRECT R3 OR INCORRECT SEQUENCE
11783 043366 000010                       10     ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11784                                     ;BY (013746 000172 000207)
11785
11786 043370 021537 042426                CMP      (R5),@#COUNT ;IS THE TEST NUMBER EQUAL TO THE COUNTER?
11787 043374 001372                       BNE      6$           ;IF NOT GO TO THE HLT ABOVE
11788 043376 005215                       INC      (R5)
11789 043400 010767 134566                MOV      PC,LPADR     ;STORE ERROR LOOP ADDRESS
11790 043404 021527 000037                CMP      (R5),#37    ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED
11791                                     ;LEFT BY 14, AND RIGHT BY 14.?
11792 043410 002010                       BGE      8$
11793 043412 005237 042434                INC      @#TEMP2
11794 043416 006367 177014                ASL      TEMP3       ;SHIFT TEMP3 LEFT?
11795 043422 021527 000020                CMP      (R5),#20    ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
11796 043426 001003                       BNE      REGR4
11797 043430 000554                       BR       NEGAT       ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11798 043432 004767 000352                8$: JSR      PC,TST37 ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11799 043436 010767 134530                REGR4: MOV      PC,LPADR ;STORE ERROR LOOP ADDRESS
```

11800	043442	013704	042432		MOV	@#TEMP1,%4	:LOAD R4 WITH THE CONTENTS OF TEMP1
11801	043446	010501			MOV	R5,R1	:SAVE R5
11802	043450	032737	000001	000306	BIT	#1,@#SPASS	:IS IT AN EVEN PASS ?
11803	043456	001004			BNE	2\$	:IF NOT THEN GO TO 2\$
11804	043460	013705	042434		MOV	@#TEMP2,R5	:OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
11805	043464	072405			ASH	R5,R4	:USING R4
11806	043466	000402			BR	4\$	
11807	043470	072467	176740		2\$: ASH	TEMP2,%4	:SHIFT R4 BY THE NUMBER SPECIFIED BY TEMP2
11808	043474	106737	042430		4\$: MFPS	@#PSWORD	:SAVE PS
11809	043500	123737	042440	042430	CMPB	@#TEMP4,@#PSWORD	:IS PS = TEMP4 ?
11810	043506	001403			BEQ	+.10	
11811	043510	004767	015170		JSR	PC,\$HLT	:SEEN AN ERROR, GO TO THE HALT ROUTINE
11812							:THE PS IS NOT EQUAL TO 0
11813	043514	000011			11		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11814							:BY (013746 000172 000207)
11815							
11816	043516	005237	042426		INC	@#COUNT	
11817	043522	023704	042436		CMP	@#TEMP3,%4	:IS THE RESULT IN R4 EQUAL TO TEMP3?
11818	043526	001403			BEQ	+.10	
11819	043530				6\$: JSR	PC,\$HLT	:SEEN AN ERROR, GO TO THE HALT ROUTINE
11820	043530	004767	015150				:EITHER INCORRECT R4 OR INCORRECT SEQUENCE
11821							:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11822	043534	000012			12		:BY (013746 000172 000207)
11823							
11824							
11825	043536	010105			MOV	R1,R5	:RESTORE R5
11826	043540	021537	042426		CMP	(R5),@#COUNT	:IS THE TEST NUMBER EQUAL TO THE COUNTER?
11827	043544	001371			BNE	6\$	:IF NOT GO TO THE HLT ABOVE
11828	043546	005215			INC	(R5)	
11829	043550	010767	134416		MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
11830	043554	021527	000037		CMP	(R5),#37	:HAS THE CONTENTS OF REGISTERS BEEN
11831							:SHIFTED LEFT BY 14. AND RIGHT BY 14.?
11832	043560	002010			BGE	8\$	
11833	043562	005237	042434		INC	@#TEMP2	
11834	043566	006367	176644		ASL	TEMP3	:SHIFT TEMP3 LEFT
11835	043572	021527	000020		CMP	(R5),#20	:HAS THE CONTENTS OF REGISTER BEEN SHIFTED BY 14.?
11836	043576	001003			BNE	REGR5	
11837	043600	000470			BR	NEGAT	:IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11838	043602	004767	000202		8\$: JSR	PC,TST37	:IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11839	043606	010767	134360		REGR5: MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
11840	043612	010501			MOV	R5,R1	:SAVE R5
11841	043614	013705	042432		MOV	@#TEMP1,%5	:LOAD R5 WITH THE CONTENTS OF TEMP1
11842	043620	032737	000001	000306	BIT	#1,@#SPASS	:IS IT AN EVEN PASS ?
11843	043626	001004			BNE	2\$	:IF NOT THEN GO TO 2\$
11844	043630	013700	042434		MOV	@#TEMP2,R0	:OTHERWISE EXECUTE ASH INSTRUCTION IN MODE 0
11845	043634	072500			ASH	R0,R5	:USING R5
11846	043636	000402			BR	4\$	
11847	043640	072567	176570		2\$: ASH	TEMP2,%5	:SHIFT R5 BY THE NUMBER SPECIFIED BY TEMP2
11848	043644	106737	042430		4\$: MFPS	@#PSWORD	:SAVE PS
11849	043650	123737	042440	042430	CMPB	@#TEMP4,@#PSWORD	:IS PS = TEMP4 ?

11850	043656	001403		BEQ	.+10	
11851	043660	004767	015020	JSR	PC,\$HLT;	SEEN AN ERROR, GO TO THE HALT ROUTINE
11852						:THE PS IS NOT EQUAL TO 0.
11853	043664	000013		13		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11854						:BY (013746 000172 000207)
11855						
11856	043666	005237	042426	INC	@#COUNT	
11857	043672	023705	042436	CMP	@#TEMP3,%5	:IS THE RESULT IN R5 EQUAL TO TEMP3?
11858	043676	001403		BEQ	.+10	
11859	043700					
11860	043700	004767	015000	JSR	PC,\$HLT;	SEEN AN ERROR, GO TO THE HALT ROUTINE
11861						:EITHER INCORRECT R5 OR INCORRECT SEQUENCE
11862	043704	000014		14		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11863						:BY (013746 000172 000207)
11864						
11865	043706	021137	042426	CMP	(R1),@#COUNT	:IS THE TEST NUMBER EQUAL TO THE COUNTER?
11866	043712	001372		BNE	6\$	:IF NOT GO TO THE HLT ABOVE
11867	043714	010105		MOV	R1,R5	:RESTORE R5
11868	043716	005215		INC	(R5)	
11869	043720	010767	134246	MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
11870	043724	021527	000037	CMP	(R5),#37	:HAS THE CONTENTS OF REGISTERS BEEN SHIFTED

6\$:

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11871                                     ;LEFT BY 14. AND RIGHT BY 14.?
11872 043730 002010                       BGE      8$                                     ;IF SO GO AND CONTINUE THE REST OF THE PROGRAM
11873 043732 005237 042434                 INC      @#TEMP2
11874 043736 006367 176474                 ASL      TEMP3
11875 043742 021527 000020                 CMP      (R5),#20                          ;SHIFT TEMP3 LEFT
11876 043746 001405                       BEQ      NEGAT                             ;HAS THE CONTENTS OF REGISTERS BEEN SHIFTED LEFT BY 14.?
11877 043750 000402                       BR       10$                             ;IF SO GO TO NEGAT AND INITIATE RIGHT SHIFT
11878 043752 004767 000032                 8$: JSR   PC,TST37
11879 043756 000167 176626                 10$: JMP  ASTART
11880 043762 012737 040000 042432          NEGAT: MOV  #40000,@#TEMP1                   ;GO BACK TO START
11881 043770 012737 177762 042434          MOV  #177762,@#TEMP2                       ;TEMP1=40000
11882 043776 012737 000001 042436          MOV  #1,@#TEMP3                             ;TEMP2=177762
11883 044004 000167 176600                       JMP  ASTART                                ;TEMP3=1
11884 044010 021527 000037                 TST37: CMP  (R5),#37                       ;IS IT TEST 37?
11885 044014 001013                       BNE     TST40                             ;IF NOT THEN TRY TEST 40
11886 044016 005037 042432                       CLR     @#TEMP1                             ;0
11887 044022 012737 000020 042434          MOV  #16,@#TEMP2                           ;SHIFTED BY 16
11888 044030 005037 042436                       CLR     @#TEMP3                             ;IS=0
11889 044034 012737 000004 042440          MOV  #4,@#TEMP4                             ;AND PS=4
11890 044042 000207                       RTS     PC
11891 044044 021527 000040                 TST40: CMP  (R5),#40                       ;IS IT TEST 40?
11892 044050 001003                       BNE     TST41                             ;IF NOT THEN TRY TEST 41
11893 044052 005037 042434                       CLR     @#TEMP2                             ;0 SHIFTED BY 0=0 AND PS=4
11894 044056 000207                       RTS     PC
11895 044060 021527 000041                 TST41: CMP  (R5),#41                       ;IS IT TEST 41?
11896 044064 001004                       BNE     TST42                             ;IF NOT THEN TRY TEST 42
11897 044066 012737 177760 042434          MOV  #-16,@#TEMP2                          ;0 SHIFTED BY -16.=0 AND PS=4
11898 044074 000207                       RTS     PC
11899 044076 021527 000042                 TST42: CMP  (R5),#42                       ;IS IT TEST 42?
11900 044102 001013                       BNE     TST43                             ;IF NOT THEN TRY TEST 43
11901 044104 012737 100000 042432          MOV  #100000,@#TEMP1                       ;100000
11902 044112 005237 042434                       INC     @#TEMP2                             ;SHIFTED BY -15
11903 044116 005337 042436                       DEC     @#TEMP3                             ;IS=-1
11904 044122 012737 000010 042440          MOV  #10,@#TEMP4                           ;AND PS=10
11905 044130 000207                       RTS     PC
11906 044132 021527 000043                 TST43: CMP  (R5),#43                       ;IS IT TEST 43?
11907 044136 001012                       BNE     TST44                             ;IF NOT THEN IF NOT THEN TRY TEST 44
11908 044140 012737 125252 042432          MOV  #125252,@#TEMP1                       ;125252
11909 044146 012737 177777 042434          MOV  #-1,@#TEMP2                           ;SHIFTED BY -1
11910 044154 012737 152525 042436          MOV  #152525,@#TEMP3                       ;IS=152525 AND PS=10
11911 044162 000207                       RTS     PC
11912 044164 021527 000044                 TST44: CMP  (R5),#44                       ;IS IT TEST 44?
11913 044170 001012                       BNE     TST45                             ;IF NOT THEN TRY TEST 45
11914 044172 012737 000001 042434          MOV  #1,@#TEMP2                             ;125252 SHIFTED BY 1
11915 044200 012737 052524 042436          MOV  #52524,@#TEMP3                        ;IS=52524
11916 044206 012737 000003 042440          MOV  #3,@#TEMP4                             ;AND PS=3
11917 044214 000207                       RTS     PC
11918 044216 021527 000045                 TST45: CMP  (R5),#45                       ;IS IT TEST 45?
11919 044222 001012                       BNE     TST46                             ;IF NOT THEN TRY TEST 46
11920 044224 012737 177776 042434          MOV  #-2,@#TEMP2                           ;125252 SHIFTED BY -2
11921 044232 012737 165252 042436          MOV  #165252,@#TEMP3                       ;IS=165252
11922 044240 012737 000011 042440          MOV  #11,@#TEMP4                             ;AND PS=11
11923 044246 000207                       RTS     PC
11924 044250 021527 000046                 TST46: CMP  (R5),#46                       ;IS IT TEST 46?
11925 044254 001014                       BNE     TST47                             ;IF NOT THEN TRY TEST 47
11926 044256 012737 177777 042432          MOV  #-1,@#TEMP1                           ;-1

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11927 044264 012737 000020 042434      MOV      #16,@#TEMP2      ;SHIFTED BY 15.
11928 044272 005037 042436      CLR      @#TEMP3          ;IS=0
11929 044276 012737 000007 042440      MOV      #7,@#TEMP4       ;AND PS=7
11930 044304 000207                RTS      PC
11931 044306 021527 000047      TST47:  CMP      (R5),#47   ;IS IT TEST 47?
11932 044312 001011                BNE     TST50             ;IF NOT THEN TRY TEST 50
11933 044314 005337 042434      DEC      @#TEMP2          ;-1 SHIFTED BY 15
11934 044320 012737 100000 042436      MOV      #100000,@#TEMP3  ;IS=100000
11935 044326 012737 000011 042440      MOV      #11,@#TEMP4      ;AND PS=11
11936 044334 000207                RTS      PC
11937 044336 021527 000050      TST50:  CMP      (R5),#50   ;IS IT TEST 50
11938 044342 001007                BNE     ENT51            ;IF NOT THEN TRY TEST 51
11939 044344 012737 137777 042432      MOV      #137777,@#TEMP1  ;137777 SHIFTED BY 15. IS=100000
11940 044352 012737 000013 042440      MOV      #13,@#TEMP4      ;AND PS=13
11941 044360 000207                RTS      PC
11942 044362 021527 000051      ENT51:  CMP      (R5),#51   ;IS IT ENTERING TEST 51?
11943 044366 001403                BEQ     .+10
11944 044370 004767 044310      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11945                                ;TEST NUMBER GOOFED
11946 044374 000015                15          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11947                                ;BY (013746 000172 000207)
11948
11949
11950 044376 005726                TST      (SP)+          ;RESTORE STACK POINTER
11951 044400 012704 177771      MOV      #-7,%4
11952 044404 012702 042452      MOV      #S1,%2
11953 044410 012703 042454      MOV      #S2,%3
11954
11955 :*****
11956 :TEST:51      ASH      125252 SHIFTED BY #5 = 52500 PS = 3
11957 :*****
11958 044414 010767 133552      TST51:  MOV      PC,LPADR   ;STORE ERROR LOOP ADDRESS
11959 044420 012701 125252      MOV      #125252,%1      ;LOAD R1 WITH 125252
11960 044424 072127 000005      ASH      #5,%1          ;SHIFT R1 BY #5
11961 044430 106737 042430      MFPS    @#PSWORD        ;SAVE PS
11962 044434 122737 000003 042430      CMPB    #3,@#PSWORD     ;IS THE PS 3?
11963 044442 001403                BEQ     .+10
11964 044444 004767 014234      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11965                                ;THE PS IS NOT EQUAL TO 3
11966 044450 000016                16          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11967                                ;BY (013746 000172 000207)
11968
11969 044452 022701 052500                CMP      #52500,%1      ;IS THE RESULT 52500?
11970 044456 001403                BEQ     .+10
11971 044460                1$:
11972 044460 004767 014220      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
11973                                ;R1 IS NOT EQUAL TO 52500 OR INCORRECT SEQUENCE
11974 044464 000017                17          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
11975                                ;BY (013746 000172 000207)
11976
11977 044466 021527 000051      CMP      (R5),#51       ;IS $TESTN = #51
11978 044472 001372                BNE     1$              ;IF NOT THEN GO TO HLT ABOVE
11979 044474 005215                INC      (R5)
11980
11981
11982

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11991
11992
11993
11994
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044476 010767 133470
044502 012700 125252
044506 072077 175742
044512 106737 042430
044516 122737 000010 042430
044524 001403
044526 004767 014152

044532 000020

044534 022700 177525
044540 001403
044542
044542 004767 014136
044546 000021

044550 021527 000052
044554 001372
044556 005215

042430

042430

:TEST:52 ASH 125252 SHIFTED BY @S2 = 177525 PS - 10

```
TST52: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #125252,%0 ;LOAD R0 WITH 125252
        ASH @S2,%0 ;SHIFT R0 BY @S2
        MFPS @#PSWORD ;SAVE PS
        CMPB #10,@#PSWORD ;IS THE PS 10?
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;THE PS IS NOT EQUAL TO 10
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        20
        CMP #177525,%0 ;IS THE RESULT 177525?
        BEQ .+10
1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        21
        CMP (R5),#52 ;IS $TESTN = #52
        BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
        INC (R5)
```

:TEST:53 ASH 125252 SHIFTED BY @S1 = 177525 PS - 10

```
TST53: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #125252,%0 ;LOAD R0 WITH 125252
        ASH @S1,%0 ;SHIFT R0 BY @S1
        MFPS @#PSWORD ;SAVE PS
        CMPB #10,@#PSWORD ;IS THE PS 10?
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;THE PS IS NOT EQUAL TO 10
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        22
        CMP #177525,%0 ;IS THE RESULT 177525?
        BEQ .+10
1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        23
        CMP (R5),#53 ;IS $TESTN = #53
        BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
        INC (R5)
```

12039
12040
12041
12042
12043
12044
12045 044642 010767 133324
12046 044646 012700 125252
12047 044652 072012
12048 044654 106737 042430
12049 044660 122737 000010 042430
12050 044666 001403
12051 044670 004767 014010
12052
12053 044674 000024
12054
12055
12056 044676 022700 177525
12057 044702 001403
12058 044704
12059 044704 004767 013774
12060
12061 044710 000025
12062
12063
12064 044712 021527 000054
12065 044716 001372
12066 044720 005215
12067
12068
12069
12070
12071
12072
12073
12074 044722 010767 133244
12075 044726 012700 125252
12076 044732 072022
12077 044734 106737 042430
12078 044740 122737 000010 042430
12079 044746 001403
12080 044750 004767 013730
12081
12082 044754 000026
12083
12084
12085 044756 022700 177525
12086 044762 001403
12087 044764
12088 044764 004767 013714
12089
12090 044770 000027
12091
12092
12093 044772 021527 000055
12094 044776 001372

```
*****  
:TEST:54      ASH      125252 SHIFTED BY (2)  177525 PS  10  
*****  
TST54:  MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS  
        MOV      #125252,%0    ;LOAD R0 WITH 125252  
        ASH      (2),%0        ;SHIFT R0 BY (2)  
        MFPS     @#PSWORD      ;SAVE PS  
        CMPB    #10,@#PSWORD   ;IS THE PS 10?  
        BEQ     .+10  
        JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
        ;THE PS IS NOT EQUAL TO 10  
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
        ;BY (013746 000172 000207)  
  
1$:     JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
        ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE  
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
        ;BY (013746 000172 000207)  
  
        CMP     (R5),#54      ;IS $TESTN - #54  
        BNE     1$           ;IF NOT THEN GO TO HLT ABOVE  
        INC     (R5)
```

```
*****  
:TEST:55      ASH      125252 SHIFTED BY (2)+ 177525 PS  10  
*****  
TST55:  MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS  
        MOV      #125252,%0    ;LOAD R0 WITH 125252  
        ASH      (2)+,%0       ;SHIFT R0 BY (2)+  
        MFPS     @#PSWORD      ;SAVE PS  
        CMPB    #10,@#PSWORD   ;IS THE PS 10?  
        BEQ     .+10  
        JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
        ;THE PS IS NOT EQUAL TO 10  
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
        ;BY (013746 000172 000207)  
  
1$:     JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
        ;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE  
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
        ;BY (013746 000172 000207)  
  
        CMP     (R5),#55      ;IS $TESTN = #55  
        BNE     1$           ;IF NOT THEN GO TO HLT ABOVE
```


12095 045000 005215
12096
12097
12098
12099
12100
12101
12102
12103 045002 010767 133164
12104 045006 012700 125252
12105 045012 072042
12106 045014 106737 042430
12107 045020 122737 000010 042430
12108 045026 001403
12109 045030 004767 013650
12110
12111 045034 000030
12112
12113
12114 045036 022700 177525
12115 045042 001403
12116 045044
12117 045044 004767 013634
12118
12119 045050 000031
12120
12121
12122 045052 021527 000056
12123 045056 001372
12124 045060 005215
12125
12126
12127
12128
12129
12130
12131
12132 045062 010767 133104
12133 045066 012700 125252
12134 045072 072063 000002
12135 045076 106737 042430
12136 045102 122737 000011 042430
12137 045110 001403
12138 045112 004767 013566
12139
12140 045116 000032
12141
12142
12143 045120 022700 177252
12144 045124 001403
12145 045126
12146 045126 004767 013552
12147
12148 045132 000033
12149
12150

```
INC (R5)

:*****
:TEST:56 ASH 125252 SHIFTED BY -(2) = 177525 PS = 10
:*****

TST56: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
ASH -(2),%0 ;SHIFT R0 BY -(2)
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10
30 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
31 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP (R5),#56 ;IS $TESTN #56
BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
INC (R5)

:*****
:TEST:57 ASH 125252 SHIFTED BY 2(3) = 177252 PS 11
:*****

TST57: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
ASH 2(3),%0 ;SHIFT R0 BY 2(3)
MFPS @#PSWORD ;SAVE PS
CMPB #11,@#PSWORD ;IS THE PS 11?
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 11
32 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #177252,%0 ;IS THE RESULT 177252?
BEQ .+10
1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0 IS NOT EQUAL TO 177252 OR INCORRECT SEQUENCE
33 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
```

12151 045134 021527 000057
12152 045140 001372
12153 045142 005215

CMP (R5),#57 ;IS \$TESTN = #57
BNE 1\$;IF NOT THEN GO TO HLT ABOVE
INC (R5)

:TEST:60 ASH 125252 SHIFTED BY @ (3) = 177525 PS - 10

12154
12155
12156
12157
12158
12159
12160
12161 045144 010767 133022
12162 045150 012700 125252
12163 045154 072073 000000
12164 045160 106737 042430
12165 045164 122737 000010 042430
12166 045172 001403
12167 045174 004767 013504
12168

TST60: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
ASH @ (3),%0 ;SHIFT R0 BY @ (3)
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10
34 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

12169 045200 000034
12170
12171
12172 045202 022700 177525
12173 045206 001403
12174 045210
12175 045210 004767 013470
12176
12177 045214 000035
12178
12179

1\$: CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
35 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

12180 045216 021527 000060
12181 045222 001372
12182 045224 005215
12183
12184
12185
12186

CMP (R5),#60 ;IS \$TESTN - #60
BNE 1\$;IF NOT THEN GO TO HLT ABOVE
INC (R5)

:TEST:61 ASH 125252 SHIFTED BY @ (3)+ 177525 PS 10

12187
12188
12189
12190 045226 010767 132740
12191 045232 012700 125252
12192 045236 072033
12193 045240 106737 042430
12194 045244 122737 000010 042430
12195 045252 001403
12196 045254 004767 013424
12197

TST61: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
ASH @ (3)+,%0 ;SHIFT R0 BY @ (3)+
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10
36 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

12198 045260 000036
12199
12200
12201 045262 022700 177525
12202 045266 001403
12203 045270
12204 045270 004767 013410
12205
12206 045274 000037

1\$: CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0 IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
37 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)

```

12207
12208
12209 045276 021527 000061
12210 045302 001372
12211 045304 005215
12212
12213
12214
12215
12216
12217
12218
12219 045306 010767 132660
12220 045312 012700 125252
12221 045316 072053
12222 045320 106737 042430
12223 045324 122737 000010 042430
12224 045332 001403
12225 045334 004767 013344
12226
12227 045340 000040
12228
12229
12230 045342 022700 177525
12231 045346 001403
12232 045350
12233 045350 004767 013330
12234
12235 045354 000041
12236
12237
12238 045356 021527 000062
12239 045362 001372
12240 045364 005215
12241
12242
12243

```

:BY (013746 000172 000207)

```

CMP (R5),#61 ;IS $TESTN - #61
BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
INC (R5)

```

```

:*****
:TEST:62 ASH 125252 SHIFTED BY @-(3) = 177525 PS 10
:*****

```

```

TST62: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
ASH @-(3),%0 ;SHIFT R0 BY @-(3)
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10
40 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

1$: CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;RO IS NOT EQUAL TO 177525 OR INCORRECT SEQUENCE
41 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP (R5),#62 ;IS $TESTN #62
BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
INC (R5)

```

```
12244
12245
12246
12247
12248
12249
12250
12251
12252
12253
12254
12255
12256 045366 010767 132600          MOV    PC,LPADR          ;STORE ERROR LOOP ADDRESS
12257 045372 012737 000062 042426    MOV    #62,@#COUNT
12258 045400 005037 042432          CLR    @#TEMP1          ;TEMP1=0
12259 045404 012737 000001 042434    MOV    #1,@#TEMP2       ;TEMP2=1
12260 045412 005037 042436          CLR    @#TEMP3          ;TEMP3=0
12261 045416 005037 042440          CLR    @#TEMP4          ;TEMP4=0
12262 045422 012737 000001 042442    MOV    #1,@#TEMP5       ;TEMP5=1
12263 045430 005037 042444          CLR    @#TEMP6          ;0 1 SHIFTED BY 0=0 1, PS=0
12264
12265 045434 010502          REG01: MOV    R5,R2           ;SAVE R5
12266 045436 013700 042432          MOV    @#TEMP1,%0       ;PLACE THE CONTENTS OF TEMP1 IN REGISTER 0
12267 045442 013701 042434          MOV    @#TEMP2,%0.1     ;PLACE THE CONTENTS OF TEMP2 IN REGISTER 1
12268 045446 000241          CLC
12269 045450 032737 000001 000306    BIT    #1,@#SPASS       ;IS IT AN EVEN PASS ?
12270 045456 001004          BNE    2$               ;IF NOT THEN GO TO 2$
12271 045460 013705 042436          MOV    @#TEMP3,R5       ;OTHERWISE EXECUTE ASHC INSTRUCTION IN MODE 0
12272 045464 073005          ASHC   R5,R0            ;USING R0
12273 045466 000402          BR     4$
12274 045470 073067 174742          2$: ASHC  TEMP3,%0        ;ASHC REGISTER 0 BY THE CONTENTS OF TEMP3
12275 045474 106737 042430          4$: MFPS @#PSWORD        ;SAVE PS
12276 045500 123737 042444 042430    CMPS  @#TEMP6,@#PSWORD ;COMPARE PS WITH THE CONTENTS OF TEMP6
12277 045506 001403          BEQ   .+10
12278 045510 004767 013170          JSR   PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12279
12280 045514 000042          42   ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12281
12282
12283 045516 005237 042426          INC   @#COUNT
12284 045522 023700 042440          CMP   @#TEMP4,%0       ;IS THE RESULT IN R0 SAME AS TEMP4?
12285 045526 001403          BEQ   .+10
12286 045530 004767 013150          JSR   PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12287
12288 045534 000043          43   ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12289
12290
12291 045536 023701 042442          CMP   @#TEMP5,%1       ;IS THE RESULT IN R1 SAME AS TEMP5?
12292 045542 001403          BEQ   .+10             ;TEMP1 TEMP2 SHIFTED BY TEMP3=TEMP4 TEMP5
12293
12294 045544 004767 013134          JSR   PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12295
12296 045550 000044          44   ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12297
12298
12299 045552 010205          MOV   R2,R5            ;RESTORE R5
```

12300	045554	021537	042426	CMP	(R5),@#COUNT	;IS TEST NUMBER=COUNTER?
12301	045560	001403		BEQ	.+10	
12302	045562	004767	013116	JSR	PC,\$HLT	;SEEN AN ERROR, GO TO THE HALT ROUTINE
12303						:NO
12304	045566	000045		45		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12305						:BY (013746 000172 000207)
12306						
12307	045570	005215		INC	(R5)	
12308	045572	021527	000160	CMP	(R5),#160	;HAVE THE FIRST 159 TEST BEEN EXECUTED?
12309	045576	002014		BGE	6\$	:YES
12310	045600	005237	042436	INC	@#TEMP3	
12311	045604	000241		CLC		
12312	045606	006137	042442	ROL	@#TEMP5	;ROTATE TEMP5 LEFT BY 1 PLACE
12313	045612	006137	042440	ROL	@#TEMP4	;INTRODUCE CARRY FROM TEMP4 IN TEMP5
12314	045616	021527	000121	CMP	(R5),#121	;IS IT TEST 121?
12315	045622	001004		BNE	REGR23	
12316	045624	004467	000414	JSR	R4,RITSH	;IF SO THEN GO AND INITIATE RIGHT SHIFT
12317	045630	004767	000444	JSR	%7,TST160	
12318	045634	010767	132332	MOV	PC,LPADR	;STORE ERROR LOOP ADDRESS
12319	045640	013702	042432	MOV	@#TEMP1,%2	;PLACE THE CONTENTS OF TEMP1 IN REGISTER 2
12320	045644	013703	042434	MOV	@#TEMP2,%2!1	;PLACE THE CONTENTS OF TEMP2 IN REGISTER 3
12321	045650	000241		CLC		
12322	045652	032737	000001 000306	BIT	#1,@#\$PASS	;IS IT AN EVEN PASS ?
12323	045660	001004		BNE	2\$	;IF NOT THEN GO TO 2\$
12324	045662	013704	042436	MOV	@#TEMP3,R4	;OTHERWISE EXECUTE ASHC INSTRUCTION IN MODE 0
12325	045666	073204		ASHC	R4,R2	;USING R2
12326	045670	000402		BR	4\$	
12327	045672	073267	174540	ASHC	TEMP3,%2	;ASHC REGISTER 2 BY THE CONTENTS OF TEMP3
12328	045676	106737	042430	MFPS	@#PSWORD	;SAVE PS
12329	045702	123737	042444 042430	CMPB	@#TEMP6,@#PSWORD	;COMPARE PS WITH THE CONTENTS OF TEMP6
12330	045710	001403		BEQ	.+10	
12331	045712	004767	012766	JSR	PC,\$HLT	;SEEN AN ERROR, GO TO THE HALT ROUTINE
12332						:WRONG PS
12333	045716	000046		46		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12334						:BY (013746 000172 000207)
12335						
12336	045720	005237	042426	INC	@#COUNT	
12337	045724	023702	042440	CMP	@#TEMP4,%2	;IS THE RESULT IN R2 SAME AS TEMP4?
12338	045730	001403		BEQ	.+10	
12339	045732	004767	012746	JSR	PC,\$HLT	;SEEN AN ERROR, GO TO THE HALT ROUTINE
12340						:WRONG RESULT IN R2
12341	045736	000047		47		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12342						:BY (013746 000172 000207)
12343						
12344	045740	023703	042442	CMP	@#TEMP5,%3	;IS THE RESULT IN R3 SAME AS TEMP5?
12345	045744	001403		BEQ	.+10	;TEMP1 TEMP2 SHIFTED BY TEMP3 TEMP4 TEMP5
12346						:AND PS=TEMP6
12347	045746	004767	012732	JSR	PC,\$HLT	;SEEN AN ERROR, GO TO THE HALT ROUTINE
12348						:WRONG RESULT IN R1
12349	045752	000050		50		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12350						:BY (013746 000172 000207)
12351						
12352	045754	021537	042426	CMP	(R5),@#COUNT	;IS TEST NUMBER=COUNTER?
12353	045760	001403		BEQ	.+10	
12354	045762	004767	012716	JSR	PC,\$HLT	;SEEN AN ERROR, GO TO THE HALT ROUTINE
12355						:NO

12412	046172	010105			MOV R1,R5	:RESTORE R5
12413	046174	005215			INC (R5)	
12414	046176	021527	000160		CMP (R5),#160	:HAVE THE FIRST 159 TEST BEEN EXECUTED?
12415	046202	002014			BGE 6\$	:YES
12416	046204	005237	042436		INC @#TEMP3	
12417	046210	000241			CLC	
12418	046212	006137	042442		ROL @#TEMP5	:ROTATE TEMP5 LEFT BY 1 PLACE
12419	046216	006137	042440		ROL @#TEMP4	:INTRODUCE CARRY FROM TEMP5 IN TEMP4
12420	046222	021527	000121		CMP (R5),#121	:IS IT TEST 121?
12421	046226	001004			BNE 8\$	
12422	046230	004467	000010		JSR R4,RITSH	:IF SO THEN GO AND INITIATE RIGHT SHIFT
12423	046234	004767	000040		6\$: JSR %7,TST160	
12424	046240	000167	177170		8\$: JMP REG01	
12425	046244	022424			RITSH: CMP (R4)+,(R4)+	:MAKE R4 POINT TO THE NEXT REG TAG
12426	046246	012737	040000	042432	MOV #40000,@#TEMP1	:TEMP1=4000
12427	046254	005037	042434		CLR @#TEMP2	:TEMP2=0
12428	046260	012737	177742	042436	MOV #-30,@#TEMP3	:TEMP3=-30
12429	046266	005037	042440		CLR @#TEMP4	:TEMP4=0
12430	046272	005237	042442		INC @#TEMP5	:TEMP5=1
12431	046276	000204			RTS R4	
12432	046300	021527	000160		TST160: CMP (R5),#160	:IS IT TEST 160
12433	046304	001010			BNE TST161	:IF NOT THEN TRY TEST 161
12434	046306	005037	042432		CLR @#TEMP1	:0 0 SHIFTED BY 0
12435	046312	005037	042440		CLR @#TEMP4	:IS EQUAL TO 0 0
12436	046316	012737	000004	042444	MOV #4,@#TEMP6	:AND PS=4
12437	046324	000207			RTS %7	
12438	046326	021527	000161		TST161: CMP (R5),#161	:IS IT TEST 161
12439	046332	001004			BNE TST162	
12440	046334	012737	177746	042436	MOV #-32,@#TEMP3	:0 0 SHIFTED BY -32=0 0, PS=4
12441	046342	000207			RTS %7	
12442	046344	021527	000162		TST162: CMP (R5),#162	:IS IT TEST 162
12443	046350	001004			BNE TST163	:IF NOT THEN TRY TEST 163
12444	046352	012737	000032	042436	MOV #32,@#TEMP3	:0 0 SHIFTED BY 32=0 0, PS=4
12445	046360	000207			RTS %7	
12446	046362	021527	000163		TST163: CMP (R5),#163	:IS IT TEST 163?
12447	046366	001016			BNE TST164	:IF NOT THEN TRY TEST 164
12448	046370	012737	052525	042432	MOV #52525,@#TEMP1	:52525 0
12449	046376	012737	177760	042436	MOV #-16,@#TEMP3	:SHIFTED BY -16.
12450	046404	005037	042440		CLR @#TEMP4	
12451	046410	012737	052525	042442	MOV #52525,@#TEMP5	:IS EQUAL TO 0 52525
12452	046416	005037	042444		CLR @#TEMP6	:AND PS = 0
12453	046422	000207			RTS %7	
12454	046424	021527	000164		TST164: CMP (R5),#164	:IS IT TEST 164?
12455	046430	001014			BNE TST165	:IF NOT THEN TRY TEST 165
12456	046432	012737	125252	042432	MOV #125252,@#TEMP1	:125252 0 SHIFTED BY -16.
12457	046440	005337	042440		DEC @#TEMP4	
12458	046444	012737	125252	042442	MOV #125252,@#TEMP5	:IS EQUAL TO -1 125252
12459	046452	012737	000010	042444	MOV #10,@#TEMP6	:AND PS=10
12460	046460	000207			RTS %7	
12461	046462	021527	000165		TST165: CMP (R5),#165	:IS IT TEST 165?
12462	046466	001007			BNE TST166	:IF NOT THEN TRY TEST 166
12463	046470	012737	177777	042432	MOV #-1,@#TEMP1	:-1 0 SHIFTED BY -16
12464	046476	012737	177777	042442	MOV #-1,@#TEMP5	:IS EQUAL TO -1 -1, AND PS=10
12465	046504	000207			RTS %7	
12466	046506	021527	000166		TST166: CMP (R5),#166	:IS IT TEST 166?
12467	046512	001011			BNE TST167	:IF NOT THEN TRY TEST 167

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12468 046514 012737 100000 042432 MOV #100000,@#TEMP1 ;100000 0
12469 046522 012737 177740 042436 MOV #-32,@#TEMP3 ;SHIFTED BY -32 IS EQUAL TO -1 -1
12470 046530 005237 042444 INC @#TEMP6 ;AND PS=11
12471 046534 000207 RTS %7
12472 046536 021527 000167 TST167: CMP (R5),#167 ;IS IT TEST 167?
12473 046542 001014 BNE TST170 ;IF NOT THEN TRY TEST 170
12474 046544 005037 042432 CLR @#TEMP1
12475 046550 005337 042434 DEC @#TEMP2 ;0 -1
12476 046554 012737 000020 042436 MOV #16,@#TEMP3 ;SHIFTED BY 16.
12477 046562 005037 042442 CLR @#TEMP5 ;IS EQUAL TO -1 0
12478 046566 005237 042444 INC @#TEMP6 ;AND PS=12
12479 046572 000207 RTS %7
12480 046574 021527 000170 TST170: CMP (R5),#170 ;IS IT TEST 170?
12481 046600 001007 BNE TST171 ;IF NOT THEN TRY TEST 171
12482 046602 012737 125252 042434 MOV #125252,@#TEMP2 ;0 125252 SHIFTED BY 16
12483 046610 012737 125252 042440 MOV #125252,@#TEMP4 ;IS EQUAL TO 125252 0, AND PS=12
12484 046616 000207 RTS %7
12485 046620 021527 000171 TST171: CMP (R5),#171 ;IS IT TEST 171?
12486 046624 001010 BNE TST172 ;IF NOT THEN TRY TEST 172
12487 046626 005337 042436 DEC @#TEMP3 ;0 125252 SHIFTED BY 15
12488 046632 012737 052525 042440 MOV #52525,@#TEMP4 ;IS EQUAL TO 52525 0
12489 046640 005037 042444 CLR @#TEMP6 ;AND PS=0
12490 046644 000207 RTS %7
12491 046646 021527 000172 TST172: CMP (R5),#172 ;IS IT TEST 172?
12492 046652 001006 BNE TST173 ;IF NOT THEN TRY TEST 173
12493 046654 012737 052525 042434 MOV #52525,@#TEMP2 ;0 52525
12494 046662 005237 042436 INC @#TEMP3 ;SHIFTED BY 16. IS EQUAL TO 52525 0, AND PS C
12495 046666 000207 RTS %7
12496 046670 021527 000173 TST173: CMP (R5),#173 ;IS IT TEST 173?
12497 046674 001014 BNE TST174 ;IF NOT THEN TRY TEST 174
12498 046676 012737 177777 042434 MOV #-1,@#TEMP2 ;0 -1
12499 046704 005337 042436 DEC @#TEMP3 ;SHIFTED BY 15.
12500 046710 012737 077777 042440 MOV #77777,@#TEMP4
12501 046716 012737 100000 042442 MOV #100000,@#TEMP5 ;IS EQUAL TO 77777 100000. AND PS=0
12502 046724 000207 RTS %7
12503 046726 021527 000174 TST174: CMP (R5),#174 ;IS IT TEST 174?
12504 046732 001013 BNE TST175 ;IF NOT THEN TRY TEST 175
12505 046734 012737 100000 042432 MOV #100000,@#TEMP1
12506 046742 005337 042434 DEC @#TEMP2 ;100000 -2 SHIFTED BY 15.
12507 046746 005037 042442 CLR @#TEMP5 ;IS EQUAL TO 77777 0
12508 046752 012737 000002 042444 MOV #2,@#TEMP6 ;AND PS=2
12509 046760 000207 RTS %7
12510 046762 021527 000175 TST175: CMP (R5),#175 ;IS IT TEST 175?
12511 046766 001015 BNE ENT176 ;IF NOT THEN TRY TEST 176
12512 046770 012737 177777 042432 MOV #-1,@#TEMP1
12513 046776 005037 042434 CLR @#TEMP2 ;-1 0
12514 047002 005237 042436 INC @#TEMP3 ;SHIFTED BY 16.
12515 047006 005037 042440 CLR @#TEMP4 ;IS EQUAL TO 0 0
12516 047012 012737 000007 042444 MOV #7,@#TEMP6 ;AND PS=7
12517 047020 000207 RTS %7
12518 047022 021527 000176 ENT176: CMP (R5),#176 ;IS THE PROGRAM ENTERING TEST 176?
12519 047026 001403 BEQ .+10
12520 047030 004767 011650 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12521 ;TEST NUMBER GOOFED
12522 047034 000056 56 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12523 ;BY (013746 000172 000207)

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12524
12525
12526 047036 005726          TST      (SP)+          ;RESTORE STACK POINTER
12527
12528 :*****
12529 :TEST:176          1 SHIFTED BY 8. = 400 PS = 0
12530 :*****
12531
12532 047040 010767 131126      TST176: MOV      PC,LPADR          ;STORE ERROR LOOP ADDRFS
12533 047044 012701 069000      MOV      #DUMMY,%1          ;LOAD R1 WITH DUMMY
12534 047050 012701 000001      MOV      #1,%1:1          ;LOAD R1:1 WITH 1
12535 047054 000241          CLC
12536 047056 073127 000010      ASHC     #8,%1          ;SHIFT R1,R1:1 BY 8.
12537 047062 106737 042430      MFPS     @#PSWORD          ;SAVE PS
12538 047066 122737 000000      CMPB    #0,@#PSWORD        ;IS THE PS 0?
12539 047074 001403          BEQ     .+10
12540 047076 004767 011602      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12541                                     ;THE PS IS NOT EQUAL TO 0
12542 047102 000057          57          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12543                                     ;BY (013746 000172 000207)
12544
12545 047104 022701 000400      CMP      #400,%1          ;IS THE RESULT 400?
12546 047110 001403          BEQ     .+10
12547 047112 004767 011566      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12548                                     ;R1 IS NOT EQUAL TO 400
12549 047116 000060          60          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12550                                     ;BY (013746 000172 000207)
12551
12552 047120 021527 000176      CMP      (R5),#176          ;IS $TESTN = #176?
12553 047124 001403          BEQ     .+10          ;IF NOT THEN GO TO HLT
12554 047126 004767 011552      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12555                                     ;TEST IS IN WRONG SEQUENCE
12556 047132 000061          61          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12557                                     ;BY (013746 000172 000207)
12558
12559 047134 005215          INC      (R5)
12560
12561
12562 :*****
12563 :TEST:177          -1 SHIFTED BY 15. = 100000 PS = 11
12564 :*****
12565
12566 047136 010767 131030      TST177: MOV      PC,LPADR          ;STORE ERROR LOOP ADDRESS
12567 047142 012703 000000      MOV      #DUMMY,%3          ;LOAD R3 WITH DUMMY
12568 047146 012703 177777      MOV      #-1,%3:1          ;LOAD R3:1 WITH -1
12569 047152 000241          CLC
12570 047154 073327 000017      ASHC     #15,%3          ;SHIFT R3,R3:1 BY 15.
12571 047160 106737 042430      MFPS     @#PSWORD          ;SAVE PS
12572 047164 122737 000011      CMPB    #11,@#PSWORD        ;IS THE PS 11?
12573 047172 001403          BEQ     .+10
12574 047174 004767 011504      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12575                                     ;THE PS IS NOT EQUAL TO 11
12576 047200 000062          62          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12577                                     ;BY (013746 000172 000207)
12578
12579 047202 022703 100000      CMP      #100000,%3          ;IS THE RESULT 100000?
```

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12580 047206 001403          BEQ      .+10
12581 047210 004767 C11470    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12582                                     ;R3 IS NOT EQUAL TO 100000
12583 047214 000063          63      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12584                                     ;BY (013746 000172 000207)
12585
12586 047216 021527 000177    CMP      (R5),#177          ;IS $TESTN = #177?
12587 047222 001403          BEQ      .+10              ;IF NOT THEN GO TO HLT
12588 047224 004767 011454    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12589                                     ;TEST IS IN WRONG SEQUENCE
12590 047230 000064          64      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12591                                     ;BY (013746 000172 000207)
12592
12593 047232 005215          INC      (R5)
12594
12595
12596                                     :*****
12597 :TEST:200          52525 SHIFTED BY 0 = 52525 PS = 0
12598 :*****
12599
12600 047234 010767 130732    TST200: MOV     PC,LPADR      ;STORE ERROR LOOP ADDRESS
12601 047240 010501          MOV     R5,R1              ;SAVE R5
12602 047242 012705 000C00    MOV     #DUMMY,%5         ;LOAD R5 WITH DUMMY
12603 047246 012705 052525    MOV     #52525,%5.1       ;LOAD R5!1 WITH 52525
12604 047252 000241          CLC
12605 047254 073527 000000    ASHC   #0,%5              ;SHIFT R5,R5!1 BY 0
12606 047260 106737 042430    MFPS   @#PSWORD          ;SAVE PS
12607 047264 122737 000000 042430  CMPB   #0,@#PSWORD        ;IS THE PS 0?
12608 047272 001403          BEQ      .+10
12609 047274 004767 011404    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12610                                     ;THE PS IS NOT EQUAL TO 0
12611 047300 000065          65      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12612                                     ;BY (013746 000172 000207)
12613
12614 047302 022705 052525    CMP     #52525,%5         ;IS THE RESULT 52525?
12615 047306 001403          BEQ      .+10
12616 047310 004767 011370    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12617                                     ;R5 IS NOT EQUAL TO 52525
12618 047314 000066          66      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12619                                     ;BY (013746 000172 000207)
12620
12621 047316 010105          MOV     R1,R5              ;RESTORE R5
12622 047320 021527 000200    CMP     (R5),#200         ;IS $TESTN = #200?
12623 047324 001403          BEQ      .+10              ;IF NOT THEN GO TO HLT
12624 047326 004767 011352    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12625                                     ;TEST IS IN WRONG SEQUENCE
12626 047332 000067          67      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12627                                     ;BY (013746 000172 000207)
12628
12629 047334 005215          INC      (R5)
12630
12631
12632                                     :*****
12633 :TEST:201          20010 SHIFTED BY -13. - 101 PS - 0
12634 :*****
12635

```

```
12636 047336 010767 130630      TST201: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
12637 047342 012701 000000      MOV    #DUMMY,%1          ;LOAD R1 WITH DUMMY
12638 047346 012701 020010      MOV    #20010,%1.1        ;LOAD R1:1 WITH 20010
12639 047352 000241                CLC
12640 047354 073127 177763      ASHC   #-13,%1            ;SHIFT R1,R1:1 BY -13.
12641 047360 106737 042430      MFPS   @#PSWORD           ;SAVE PS
12642 047364 122737 000000      CMPB   #0,@#PSWORD        ;IS THE PS 0?
12643 047372 001403                BEQ    .+10
12644 047374 004767 011304      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12645                                ;THE PS IS NOT EQUAL TO 0
12646 047400 000070                70      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12647                                ;BY (013746 000172 000207)
12648
12649 047402 022701 000101      CMP    #101,%1            ;IS THE RESULT 101?
12650 047406 001403                BEQ    .+10
12651 047410 004767 011270      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12652                                ;R1 IS NOT EQUAL TO 101
12653 047414 000071                71      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12654                                ;BY (013746 000172 000207)
12655
12656 047416 021527 000201      CMP    (R5),#201           ;IS $TESTN = #201?
12657 047422 001403                BEQ    .+10                ;IF NOT THEN GO TO HLT
12658 047424 004767 011254      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12659                                ;TEST IS IN WRONG SEQUENCE
12660 047430 000072                72      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12661                                ;BY (013746 000172 000207)
12662
12663 047432 005215                INC    (R5)
12664
12665
12666 ;*****
12667 ;TEST:202      -1 SHIFTED BY 16. = 0 PS = 11
12668 ;*****
12669
12670 047434 010767 130532      TST202: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
12671 047440 012703 000000      MOV    #DUMMY,%3          ;LOAD R3 WITH DUMMY
12672 047444 012703 177777      MOV    #-1,%3!1           ;LOAD R3:1 WITH -1
12673 047450 000241                CLC
12674 047452 073327 000020      ASHC   #16,%3             ;SHIFT R3,R3:1 BY 16.
12675 047456 106737 042430      MFPS   @#PSWORD           ;SAVE PS
12676 047462 122737 000011      CMPB   #11,@#PSWORD        ;IS THE PS 11?
12677 047470 001403                BEQ    .+10
12678 047472 004767 011206      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12679                                ;THE PS IS NOT EQUAL TO 11
12680 047476 000073                73      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12681                                ;BY (013746 000172 000207)
12682
12683 047500 022703 000000      CMP    #0,%3              ;IS THE RESULT 0?
12684 047504 001403                BEQ    .+10
12685 047506 004767 011172      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12686                                ;R3 IS NOT EQUAL TO 0
12687 047512 000074                74      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12688                                ;BY (013746 000172 000207)
12689
12690 047514 021527 000202      CMP    (R5),#202           ;IS $TESTN = #202?
12691 047520 001403                BEQ    .+10                ;IF NOT THEN GO TO HLT
```

```
12692 047522 004767 011156 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12693 :TEST IS IN WRONG SEQUENCE
12694 047526 000075 75 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12695 :BY (013746 000172 000207)
12696
12697 047530 005215 INC (R5)
12698
12699
12700
12701 :*****
12702 :TEST:203 1 SHIFTED BY -1 100000 PS - 1
12703 :*****
12704 047532 010767 130434 TST203: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
12705 047536 010501 MOV R5,R1 ;SAVE R5
12706 047540 012705 000000 MOV #DUMMY,%5 ;LOAD R5 WITH DUMMY
12707 047544 012705 000001 MOV #1,%5.1 ;LOAD R5.1 WITH 1
12708 047550 000241 CLC
12709 047552 073527 177777 ASHC #-1,%5 ;SHIFT R5,R5.1 BY -1
12710 047556 106737 042430 MFPS @#PSWORD ;SAVE PS
12711 047562 122737 0C0001 042430 CMPB #1,@#PSWORD ;IS THE PS 1?
12712 047570 001403 BEQ .+10
12713 047572 004767 011106 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12714 :THE PS IS NOT EQUAL TO 1
12715 047576 000076 76 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12716 :BY (013746 000172 000207)
12717
12718 047600 022705 100000 CMP #100000,%5 ;IS THE RESULT 100000?
12719 047604 001403 BEQ .+10
12720 047606 004767 011072 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12721 :R5 IS NOT EQUAL TO 100000
12722 047612 000077 77 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12723 :BY (013746 000172 000207)
12724
12725 047614 010105 MOV R1,R5 ;RESTORE R5
12726 047616 021527 000203 CMP (R5),#203 ;IS $TESTN - #203?
12727 047622 001403 BEQ .+10 ;IF NOT THEN GO TO HLT
12728 047624 004767 011054 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12729 :TEST IS IN WRONG SEQUENCE
12730 047630 000100 100 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12731 :BY (013746 000172 000207)
12732
12733 047632 005215 INC (R5)
12734
12735
12736 :*****
12737 :TEST:204 125252 SHIFTED BY -16. = 125252 PS - 11
12738 :*****
12739
12740 047634 010767 130332 TST204: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
12741 047640 012701 000000 MOV #DUMMY,%1 ;LOAD R1 WITH DUMMY
12742 047644 012701 125252 MOV #125252,%1:1 ;LOAD R1:1 WITH 125252
12743 047650 000241 CLC
12744 047652 073127 177760 ASHC #-16,%1 ;SHIFT R1,R1:1 BY -16.
12745 047656 106737 042430 MFPS @#PSWORD ;SAVE PS
12746 047662 122737 000011 042430 CMPB #1,@#PSWORD ;IS THE PS 11?
12747 047670 001403 BEQ .+10
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12748 047672 004767 011006 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12749 :THE PS IS NOT EQUAL TO 11
12750 047676 000101 101 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12751 :BY (013746 000172 000207)
12752
12753 047700 022701 125252 CMP #125252,%1 ;IS THE RESULT 125252?
12754 047704 001403 BEQ .+10
12755 047706 004767 010772 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12756 :R1 IS NOT EQUAL TO 125252
12757 047712 000102 102 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12758 :BY (013746 000172 000207)
12759
12760 047714 021527 000204 CMP (R5),#204 ;IS $TESTN = #204?
12761 047720 001403 BEQ .+10 ;IF NOT THEN GO TO HLT
12762 047722 004767 010756 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12763 :TEST IS IN WRONG SEQUENCE
12764 047726 000103 103 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12765 :BY (013746 000172 000207)
12766
12767 047730 005215 INC (R5)
12768
12769
12770 :*****
12771 :TEST:205 125252 125252 SHIFTED BY 21. = 52500 000000 PS 3
12772 :*****
12773
12774 047732 010767 130234 TST205: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
12775 047736 012702 125252 MOV #125252,%2 ;LOAD R2 WITH 125252
12776 047742 012703 125252 MOV #125252,%2!1 ;LOAD R2!1 WITH 125252
12777 047746 000241 CLC
12778 047750 073227 000025 ASHC #21,%2 ;SHIFT R2,R2!1 BY 21.
12779 047754 106737 042430 MFPS @#PSWORD ;SAVE PS
12780 047760 122737 000003 042430 CMPB #3,@#PSWORD ;IS THE PS 3?
12781 047766 001403 BEQ .+10
12782 047770 004767 010710 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12783 :THE PS IS NOT EQUAL TO 3
12784 047774 000104 104 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12785 :BY (013746 000172 000207)
12786
12787 047776 022702 052500 CMP #52500,%2 ;IS THE RESULT 52500?
12788 050002 001403 BEQ .+10
12789 050004 004767 010674 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12790 :R2 IS NOT EQUAL TO 52500
12791 050010 000105 105 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12792 :BY (013746 000172 000207)
12793
12794 050012 022703 000000 CMP #000000,%2!1 ;IS THE RESULT 000000?
12795 050016 001403 BEQ .+10
12796 050020 004767 010660 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
12797 :R2!1 IS NOT EQUAL TO 000000
12798 050024 000106 106 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12799 :BY (013746 000172 000207)
12800
12801 050026 021527 000205 CMP (R5),#205 ;IS $TESTN = #205?
12802 050032 001403 BEQ .+10 ;IF NOT THEN GO TO HLT
12803 050034 004767 010644 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE

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12804
12805 050040 000107
12806
12807
12808 050042 005215
12809
12810
12811
12812 050044 012702 177771
12813 050050 012703 042452
12814 050054 012704 042454
12815
12816
12817
12818
12819
12820 050060 010767 130106
12821 050064 012700 125252
12822 050070 012701 125252
12823 050074 000241
12824 050076 073067 172350
12825 050102 106737 042430
12826 050106 122737 000010 042430
12827 050114 001403
12828 050116 004767 010562
12829
12830 050122 000110
12831
12832
12833 050124 022700 177525
12834 050130 001403
12835 050132 004767 010546
12836
12837 050136 000111
12838
12839
12840 050140 022701 052525
12841 050144 001403
12842 050146
12843 050146 004767 010532
12844
12845 050152 000112
12846
12847
12848 050154 021527 000206
12849 050160 001372
12850 050162 005215
12851
12852
12853
12854
12855
12856
12857 050164 010767 130002
12858 050170 012700 125252
12859 050174 012701 125252

TEST IS IN WRONG SEQUENCE
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
INC (R5)
MOV #-7,%2
MOV #5,%3
MOV #52,%4
:*****
:TEST:206 125252 125252 SHIFTED BY S1 - 177525 52525 PS - 10
:*****
TST206: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
MOV #125252,%0:1 ;LOAD R0:1 WITH 125252
CLC
ASHC S1,%0 ;SHIFT R0,R0:1 BY S1
MFPS @MPSWORD ;SAVE PS
CMPB #10,@MPSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0 IS NOT EQUAL TO 177525
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP #52525,%0:1 ;IS THE RESULT 52525?
BEQ .+10
1\$: JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;R0:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP (R5),#206 ;IS THE \$TESTN - #206?
BNE 1\$;IF NOT THEN GO TO HLT ABOVE
INC (R5)
:*****
:TEST:207 125252 125252 SHIFTED BY @S2 = 177525 52525 PS - 10
:*****
TST207: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
MOV #125252,%0:1 ;LOAD R0:1 WITH 125252

12860	050200	000241		CLC		
12861	050202	073077	172246	ASHC	@S2,%0	:SHIFT R0,R0:1 BY @S2
12862	050206	106737	042430	MFPS	@#PSWORD	:SAVE PS
12863	050212	122737	000010	042430 CMPB	#10,@#PSWORD	:IS THE PS 10?
12864	050220	001403		BEQ	+.10	
12865	050222	004767	010456	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12866						:THE PS IS NOT EQUAL TO 10
12867	050226	000113		113		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12868						:BY (013746 000172 000207)
12869						
12870	050230	022700	177525	CMP	#177525,%0	:IS THE RESULT 177525?
12871	050234	001403		BEQ	+.10	
12872	050236	004767	010442	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12873						:R0 IS NOT EQUAL TO 177525
12874	050242	000114		114		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12875						:BY (013746 000172 000207)
12876						
12877	050244	022701	052525	CMP	#52525,%0.1	:IS THE RESULT 52525?
12878	050250	001403		BEQ	+.10	
12879	050252			1\$:		
12880	050252	004767	010426	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12881						:R0:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
12882	050256	000115		115		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12883						:BY (013746 000172 000207)
12884						
12885	050260	021527	000207	CMP	(R5),#207	:IS THE \$TESTN = #207?
12886	050264	001372		BNE	1\$	:IF NOT THEN GO TO HLT ABOVE
12887	050266	005215		INC	(R5)	
12888						
12889						
12890						:*****
12891						:TEST:210 125252 125252 SHIFTED BY @#S1 = 177525 52525 PS 10
12892						:*****
12893						
12894	050270	010767	127676	TST210: MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
12895	050274	012700	125252	MOV	#125252,%0	:LOAD R0 WITH 125252
12896	050300	012701	125252	MOV	#125252,%0:1	:LOAD R0:1 WITH 125252
12897	050304	000241		CLC		
12898	050306	073037	042452	ASHC	@#S1,%0	:SHIFT R0,R0:1 BY @#S1
12899	050312	106737	042430	MFPS	@#PSWORD	:SAVE PS
12900	050316	122737	000010	042430 CMPB	#10,@#PSWORD	:IS THE PS 10?
12901	050324	001403		BEQ	+.10	
12902	050326	004767	010352	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12903						:THE PS IS NOT EQUAL TO 10
12904	050332	000116		116		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12905						:BY (013746 000172 000207)
12906						
12907	050334	022700	177525	CMP	#177525,%0	:IS THE RESULT 177525?
12908	050340	001403		BEQ	+.10	
12909	050342	004767	010336	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12910						:R0 IS NOT EQUAL TO 177525
12911	050346	000117		117		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12912						:BY (013746 000172 000207)
12913						
12914	050350	022701	052525	CMP	#52525,%0.1	:IS THE RESULT 52525?
12915	050354	001403		BEQ	+.10	

12916 050356
12917 050356 004767 010322
12918
12919 050362 000120
12920
12921
12922 050364 021527 000210
12923 050370 001372
12924 050372 005215
12925
12926
12927
12928
12929
12930

1\$: JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;RO:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
120 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP (R5),#210 ;IS THE \$TESTN - #210?
BNE 1\$;IF NOT THEN GO TO HLT ABOVE
INC (R5)

:TEST:211 125252 125252 SHIFTED BY (3) = 177525 52525 PS = 10

12931 050374 010767 127572
12932 050400 012700 125252
12933 050404 012701 125252
12934 050410 000241
12935 050412 073013
12936 050414 106737 042430
12937 050420 122737 000010 042430
12938 050426 001403
12939 050430 004767 010250
12940

TST211: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
MOV #125252,%0:1 ;LOAD R0:1 WITH 125252
CLC
ASHC (3),%0 ;SHIFT R0,R0:1 BY (3)
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS THE PS 10?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;THE PS IS NOT EQUAL TO 10

12941 050434 000121
12942
12943
12944 050436 022700 177525
12945 050442 001403
12946 050444 004767 010234
12947
12948 050450 000122
12949
12950

121 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP #177525,%0 ;IS THE RESULT 177525?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;RO IS NOT EQUAL TO 177525
122 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

12951 050452 022701 052525
12952 050456 001403
12953 050460
12954 050460 004767 010220
12955
12956 050464 000123
12957
12958
12959 050466 021527 000211
12960 050472 001372
12961 050474 005215
12962
12963

1\$: CMP #52525,%0:1 ;IS THE RESULT 52525?
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;RO:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
123 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP (R5),#211 ;IS THE \$TESTN #211?
BNE 1\$;IF NOT THEN GO TO HLT ABOVE
INC (R5)

:TEST:212 125252 125252 SHIFTED BY (3)+ - 177525 52525 PS 10

12968 050476 010767 127470
12969 050502 012700 125252
12970 050506 012701 125252
12971 050512 000241

TST212: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%0 ;LOAD R0 WITH 125252
MOV #125252,%0:1 ;LOAD R0:1 WITH 125252
CLC

12972	050514	073023		ASHC	(3),%0	:SHIFT R0,R0 1 BY (3)+
12973	050516	106737	042430	MFPS	@#PSWORD	:SAVE PS
12974	050522	122737	000010	CMPB	#10,@#PSWORD	:IS THE PS 10?
12975	050530	001403		BEQ	.+10	
12976	050532	004767	010146	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12977						:THE PS IS NOT EQUAL TO 10
12978	050536	000124		124		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12979						:BY (013746 000172 000207)
12980						
12981	050540	022700	177525	CMP	#177525,%0	:IS THE RESULT 177525?
12982	050544	001403		BEQ	.+10	
12983	050546	004767	010132	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12984						:R0 IS NOT EQUAL TO 177525
12985	050552	000125		125		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12986						:BY (013746 000172 000207)
12987						
12988	050554	022701	052525	CMP	#52525,%0!1	:IS THE RESULT 52525?
12989	050560	001403		BEQ	.+10	
12990	050562			1\$:		
12991	050562	004767	010116	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
12992						:R0!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
12993	050566	000126		126		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
12994						:BY (013746 000172 000207)
12995						
12996	050570	021527	000212	CMP	(R5),#212	:IS THE \$TESTN - #212?
12997	050574	001372		1\$		:IF NOT THEN GO TO HLT ABOVE
12998	050576	005215		INC	(R5)	
12999						

:TEST:213 125252 125252 SHIFTED BY -(3) = 177525 52525 PS 10

13000						
13001						
13002						
13003						
13004						
13005	050600	010767	127366	TST213: MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
13006	050604	012700	125252	MOV	#125252,%0	:LOAD R0 WITH 125252
13007	050610	012701	125252	MOV	#125252,%0!1	:LOAD R0!1 WITH 125252
13008	050614	000241		CLL		
13009	050616	073043		ASHC	-(3),%0	:SHIFT R0,R0!1 BY -(3)
13010	050620	106737	042430	MFPS	@#PSWORD	:SAVE PS
13011	050624	122737	000010	CMPB	#10,@#PSWORD	:IS THE PS 10?
13012	050632	001403		BEQ	.+10	
13013	050634	004767	010044	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
13014						:THE PS IS NOT EQUAL TO 10
13015	050640	000127		127		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13016						:BY (013746 000172 000207)
13017						
13018	050642	022700	177525	CMP	#177525,%0	:IS THE RESULT 177525?
13019	050646	001403		BEQ	.+10	
13020	050650	004767	010030	JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
13021						:R0 IS NOT EQUAL TO 177525
13022	050654	000130		130		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13023						:BY (013746 000172 000207)
13024						
13025	050656	022701	052525	CMP	#52525,%0.1	:IS THE RESULT 52525?
13026	050662	001403		BEQ	.+10	
13027	050664			1\$:		

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13028 050664 004767 010014 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13029 :RO!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
13030 050670 000131 131 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13031 ;BY (013746 000172 000207)
13032
13033 050672 021527 000213 CMP (R5),#213 ;IS THE $TESTN #213?
13034 050676 001372 BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
13035 050700 005215 INC (R5)
13036
13037
13038
13039 :*****
13040 :TEST:214 125252 125252 SHIFTED BY 2(4) - 177252 125252 PS 11
13041 :*****
13042 050702 010767 127264 TST214: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13043 050706 012700 125252 MOV #125252,%0 ;LOAD R0 WITH 125252
13044 050712 012701 125252 MOV #125252,%0!1 ;LOAD R0!1 WITH 125252
13045 050716 000241 CLC
13046 050720 073064 000002 ASHC 2(4),%0 ;SHIFT R0,R0!1 BY 2(4)
13047 050724 106737 042430 MFPS @#PSWORD ;SAVE PS
13048 050730 122737 000011 042430 CMPB #11,@#PSWORD ;IS THE PS 11?
13049 050736 001403 BEQ .+10
13050 050740 004767 007740 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13051 :THE PS IS NOT EQUAL TO 11
13052 050744 000132 132 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13053 ;BY (013746 000172 000207)
13054
13055 050746 022700 177252 CMP #177252,%0 ;IS THE RESULT 177252?
13056 050752 001403 BEQ .+10
13057 050754 004767 007724 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13058 :RO IS NOT EQUAL TO 177252
13059 050760 000133 133 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13060 ;BY (013746 000172 000207)
13061
13062 050762 022701 125252 CMP #125252,%0!1 ;IS THE RESULT 125252?
13063 050766 001403 BEQ .+10
13064 050770 1$ :
13065 050770 004767 007710 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13066 :RO!1 IS NOT EQUAL TO 125252 OR INCORRECT SEQUENCE
13067 050774 000134 134 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13068 ;BY (013746 000172 000207)
13069
13070 050776 021527 000214 CMP (R5),#214 ;IS THE $TESTN - #214?
13071 051002 001372 BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
13072 051004 005215 INC (R5)
13073
13074
13075 :*****
13076 :TEST:215 125252 125252 SHIFTED BY @ (4) = 177525 52525 PS 10
13077 :*****
13078
13079 051006 010767 127160 TST215: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13080 051012 012700 125252 MOV #125252,%0 ;LOAD R0 WITH 125252
13081 051016 012701 125252 MOV #125252,%0!1 ;LOAD R0!1 WITH 125252
13082 051022 000241 CLC
13083 051024 073074 000000 ASHC @ (4),%0 ;SHIFT R0,R0!1 BY @ (4)
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13084 051030 106737 042430 MFPS @#PSWORD ;SAVE PS
13085 051034 122737 000010 042430 CMPB #10,@#PSWORD ;IS THE PS 10?
13086 051042 001403 BEQ .+10
13087 051044 004767 007634 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13088 ;THE PS IS NOT EQUAL TO 10
13089 051050 000135 135 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13090 ;BY (013746 000172 000207)
13091
13092 051052 022700 177525 CMP #177525,%0 ;IS THE RESULT 177525?
13093 051056 001403 BEQ .+10
13094 051060 004767 007620 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13095 ;RO IS NOT EQUAL TO 177525
13096 051064 000136 136 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13097 ;BY (013746 000172 000207)
13098
13099 051066 022701 052525 CMP #52525,%0.1 ;IS THE RESULT 52525?
13100 051072 001403 BEQ .+10
13101 051074 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13102 051074 004767 007604 1$: ;RO!1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
13103 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13104 051100 000137 137 ;BY (013746 000172 000207)
13105
13106
13107 051102 021527 000215 CMP (R5),#215 ;IS THE $TESTN - #215?
13108 051106 001372 BNE 1$ ;IF NOT THEN GO TO HLT ABOVE
13109 051110 005215 INC (R5)
13110
13111
13112 :*****
13113 :TEST:216 125252 125252 SHIFTED BY @ (4)+ = 177525 52525 PS - 10
13114 :*****
13115
13116 051112 010767 127054 TST216: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13117 051116 012700 125252 MOV #125252,%0 ;LOAD R0 WITH 125252
13118 051122 012701 125252 MOV #125252,%0!1 ;LOAD R0!1 WITH 125252
13119 051126 000241 CLC
13120 051130 073034 ASHC @ (4)+,%0 ;SHIFT R0,R0!1 BY @ (4)+
13121 051132 106737 042430 MFPS @#PSWORD ;SAVE PS
13122 051136 122737 000010 042430 CMPB #10,@#PSWORD ;IS THE PS 10?
13123 051144 001403 BEQ .+10
13124 051146 004767 007532 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13125 ;THE PS IS NOT EQUAL TO 10
13126 051152 000140 140 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13127 ;BY (013746 000172 000207)
13128
13129 051154 022700 177525 CMP #177525,%0 ;IS THE RESULT 177525?
13130 051160 001403 BEQ .+10
13131 051162 004767 007516 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13132 ;RO IS NOT EQUAL TO 177525
13133 051166 000141 141 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13134 ;BY (013746 000172 000207)
13135
13136 051170 022701 052525 CMP #52525,%0!1 ;IS THE RESULT 52525?
13137 051174 001403 BEQ .+10
13138 051176 1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13139 051176 004767 007502
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13140                                     ;R0:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
13141 051202 000142                       142 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13142                                     ;BY (013746 000172 000207)
13143
13144 051204 021527 000216                CMP      (R5),#216                ;IS THE $TESTN = #216?
13145 051210 001372                        BNE     1$                       ;IF NOT THEN GO TO HLT ABOVE
13146 051212 005215                        INC     (R5)
13147
13148
13149
13150                                     :*****
13151 :TEST:217      125252 125252 SHIFTED BY @-(4) = 177525 52525 PS = 10
13152 :*****
13153 051214 010767 126752                TST217: MOV    PC,LPADR           ;STORE ERROR LOOP ADDRESS
13154 051220 012700 125252                MOV     #125252,%0              ;LOAD R0 WITH 125252
13155 051224 012701 125252                MOV     #125252,%0.1          ;LOAD R0:1 WITH 125252
13156 051230 000241                        CLC
13157 051232 073054                        ASHC   @-(4),%0                ;SHIFT R0,R0:1 BY @-(4)
13158 051234 106737 042430                MFPS   @#PSWORD               ;SAVE PS
13159 051240 122737 0C0010 042430        CMPB   #10,@#PSWORD           ;IS THE PS 10?
13160 051246 001403                        BEQ    .+10
13161 051250 004767 007430                JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13162                                     ;THE PS IS NOT EQUAL TO 10
13163 051254 000143                       143 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13164                                     ;BY (013746 000172 000207)
13165
13166 051256 022700 177525                CMP     #177525,%0            ;IS THE RESULT 177525?
13167 051262 001403                        BEQ    .+10
13168 051264 004767 007414                JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13169                                     ;R0 IS NOT EQUAL TO 177525
13170 051270 000144                       144 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13171                                     ;BY (013746 000172 000207)
13172
13173 051272 022701 052525                CMP     #52525,%0:1          ;IS THE RESULT 52525?
13174 051276 001403                        BEQ    .+10
13175 051300
13176 051300 004767 007400                JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13177                                     ;R0:1 IS NOT EQUAL TO 52525 OR INCORRECT SEQUENCE
13178 051304 000145                       145 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13179                                     ;BY (013746 000172 000207)
13180
13181 051306 021527 000217                CMP     (R5),#217            ;IS THE $TESTN = #217?
13182 051312 001372                        BNE     1$                       ;IF NOT THEN GO TO HLT ABOVE
13183 051314 005215                        INC     (R5)
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: MUL INSTRUCTION TESTS

:TEST:220 MUL 1 * #0 = 0 0 PS = 4

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TST220: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #1,%0 ;LOAD MULTIPLICAND WITH 1
        MUL #0,%0 ;MULTIPLY 1 * #0
        MFPS @#PSWORD ;SAVE PS
        CMPB #4,@#PSWORD ;IS PS = 4
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;PS IS WRONG
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        LMP #0,%0 ;IS HIGH ORDER = 0
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;HIGH ORDER IS WRONG
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        CMP #0,%0!1 ;IS LOW ORDER = 0
        BEQ .+10
1$: JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)
        CMP (R5),#220
        BNE 1$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
        INC (R5)

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042430

1\$:

042430

:TEST:221 MUL -1 * #1 = -1 -1 PS 10

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TST221: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #-1,%0 ;LOAD MULTIPLICAND WITH -1
        MUL #1,%0 ;MULTIPLY -1 * #1
        MFPS @#PSWORD ;SAVE PS
        CMPB #10,@#PSWORD ;IS PS = 10
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
                ;PS IS WRONG
                ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
                ;BY (013746 000172 000207)

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13249
13250 051452 022700 177777      CMP    #-1,%0          ;IS HIGH ORDER = -1
13251 051456 001403              BEQ    .+10
13252 051460 004767 007220      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13253                                ;HIGH ORDER IS WRONG
13254 051464 000152              152    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13255                                ;BY (013746 000172 000207)
13256
13257 051466 022701 177777      CMP    #-1,%0!1        ;IS LOW ORDER = -1
13258 051472 001403              BEQ    .+10
13259 051474                                15$:
13260 051474 004767 007204      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13261                                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13262 051500 000153              153    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13263                                ;BY (013746 000172 000207)
13264
13265 051502 021527 000221      CMP    (R5),#221
13266 051506 001372              BNE    1$
13267 051510 005215              INC    (R5)          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13268
13269
13270 :*****
13271 :TEST:222      MUL    2 * #2 = 0 4      PS 0
13272 :*****
13273
13274 051512 010767 126454      TST222: MOV    PC,LPADR          ;STORE ERROR LOOP ADDRESS
13275 051516 012702 000002      MOV    #2,%2          ;LOAD MULTIPLICAND WITH 2
13276 051522 070227 000002      MUL    #2,%2          ;MULTIPLY 2 * #2
13277 051526 106737 042430      MFPS   @#PSWORD       ;SAVE PS
13278 051532 122737 000000 042430  CMPB   #0,@#PSWORD     ;IS PS = 0
13279 051540 001403              BEQ    .+10
13280 051542 004767 007136      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13281                                ;PS IS WRONG
13282 051546 000154              154    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13283                                ;BY (013746 000172 000207)
13284
13285 051550 022702 000000      CMP    #0,%2          ;IS HIGH ORDER = 0
13286 051554 001403              BEQ    .+10
13287 051556 004767 007122      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13288                                ;HIGH ORDER IS WRONG
13289 051562 000155              155    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13290                                ;BY (013746 000172 000207)
13291
13292 051564 022703 000004      CMP    #4,%2!1        ;IS LOW ORDER = 4
13293 051570 001403              BEQ    .+10
13294 051572                                15$:
13295 051572 004767 007106      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13296                                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13297 051576 000156              156    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13298                                ;BY (013746 000172 000207)
13299
13300 051600 021527 000222      CMP    (R5),#222
13301 051604 001372              BNE    1$
13302 051606 005215              INC    (R5)          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
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13304
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13309 051610 010767 126356
13310 051614 010501
13311 051616 012704 001000
13312 051622 070427 000200
13313 051626 106737 042430
13314 051632 122737 000001 042430
13315 051640 001403
13316 051642 004767 007036
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13318 051646 000157
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13321 051650 022704 000001
13322 051654 001403
13323 051656 004767 007022
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13325 051662 000160
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13327
13328 051664 022705 000000
13329 051670 001403
13330 051672
13331 051672 004767 007006
13332
13333 051676 000161
13334
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13336 051700 021127 000223
13337 051704 001372
13338 051706 010105
13339 051710 005215
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13346 051712 010767 126254
13347 051716 012700 000002
13348 051722 070027 077777
13349 051726 106737 042430
13350 051732 122737 000001 042430
13351 051740 001403
13352 051742 004767 006736
13353
13354 051746 000162
13355
13356
13357 051750 022700 000000
13358 051754 001403
13359 051756 004767 006722
13360

:*****
:TEST:223 MUL 1000 * #200 - 1 0 PS 1
:*****

TST223: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV R5,R1 ;SAVE R5
MOV #1000,%4 ;LOAD MULTIPLICAND WITH 1000
MUL #200,%4 ;MULTIPLY 1000 * #200
MFPS @#PSWORD ;SAVE PS
CMPB #1,@#PSWORD ;IS PS = 1
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #1,%4 ;IS HIGH ORDER - 1
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;HIGH ORDER IS WRONG
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #0,%4:1 ;IS LOW ORDER = 0
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;LOW ORDER IS WRONG OR WRONG SEQUENCE
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

1$: CMP (R1),#223 ;CHECK THE TEST NUMBER
BNE 1$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
MOV R1,R5 ;RESTORE R5
INC (R5)

:*****
:TEST:224 MUL 2 * #77777 - 0 177776 PS = 1
:*****

TST224: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #2,%0 ;LOAD MULTIPLICAND WITH 2
MUL #77777,%0 ;MULTIPLY 2 * #77777
MFPS @#PSWORD ;SAVE PS
CMPB #1,@#PSWORD ;IS PS = 1
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #0,%0 ;IS HIGH ORDER = 0
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;HIGH ORDER IS WRONG
  
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```
13361 051762 000163          163          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13362                               ;BY (013746 000172 000207)
13363
13364 051764 022701 177776      CMP      #177776,%0!1      ;IS LOW ORDER = 177776
13365 051770 001403          BEQ      .+10
13366 051772
13367 051772 004767 006706      1$:      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13368                               ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13369 051776 000164          164          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13370                               ;BY (013746 000172 000207)
13371
13372 052000 021527 000224      CMP      (R5),#224
13373 052004 001372          BNE     1$                ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13374 052006 005215          INC     (R5)
13375
13376
13377
13378          :*****
13379          :TEST:225      MUL      7777 * #10 = 0 77770      PS  0
13380          :*****
13381 052010 010767 126156      TST225: MOV     PC,LPADR      ;STORE ERROR LOOP ADDRESS
13382 052014 012702 007777      MOV     #7777,%2          ;LOAD MULTIPLICAND WITH 7777
13383 052020 070227 000010      MUL     #10,%2            ;MULTIPLY 7777 * #10
13384 052024 106737 042430      MFPS   @#PSWORD          ;SAVE PS
13385 052030 122737 000000 042430  CMPB   #0,@#PSWORD        ;IS PS = 0
13386 052036 001403          BEQ     .+10
13387 052040 004767 006640      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13388                               ;PS IS WRONG
13389 052044 000165          165          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13390                               ;BY (013746 000172 000207)
13391
13392 052046 022702 000000      CMP     #0,%2            ;IS HIGH ORDER = 0
13393 052052 001403          BEQ     .+10
13394 052054 004767 006624      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13395                               ;HIGH ORDER IS WRONG
13396 052060 000166          166          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13397                               ;BY (013746 000172 000207)
13398
13399 052062 022703 077770      CMP     #77770,%2!1      ;IS LOW ORDER = 77770
13400 052066 001403          BEQ     .+10
13401 052070
13402 052070 004767 006610      1$:      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13403                               ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13404 052074 000167          167          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13405                               ;BY (013746 000172 000207)
13406
13407 052076 021527 000225      CMP     (R5),#225
13408 052102 001372          BNE     1$                ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13409 052104 005215          INC     (R5)
13410
13411
13412          :*****
13413          :TEST:226      MUL      77777 * #77777 = 37777 1      PS = 1
13414          :*****
13415
13416 052106 010767 126060      TST226: MOV     PC,LPADR      ;STORE ERROR LOOP ADDRESS
```



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13417 052112 010501          MOV     R5,R1          ;SAVE R5
13418 052114 012704 077777    MOV     #77777,%4      ;LOAD MULTIPLICAND WITH 77777
13419 052120 070427 077777    MUL     #77777,%4      ;MULTIPLY 77777 * #77777
13420 052124 106737 042430    MFPS   @#PSWORD       ;SAVE PS
13421 052130 122737 000001    CMPB   #1,@#PSWORD    ;IS PS = 1
13422 052136 001403          BEQ     .+10           ;
13423 052140 004767 006540    JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13424                                ;PS IS WRONG
13425 052144 000170          170                    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13426                                ;BY (013746 000172 000207)
13427
13428 052146 022704 037777    CMP     #37777,%4      ;IS HIGH ORDER = 37777
13429 052152 001403          BEQ     .+10           ;
13430 052154 004767 006524    JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13431                                ;HIGH ORDER IS WRONG
13432 052160 000171          171                    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13433                                ;BY (013746 000172 000207)
13434
13435 052162 022705 000001    CMP     #1,%4.1        ;IS LOW ORDER = 1
13436 052166 001403          BEQ     .+10           ;
13437 052170          1$:
13438 052170 004767 006510    JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13439                                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13440 052174 000172          172                    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13441                                ;BY (013746 000172 000207)
13442
13443 052176 021127 000226    CMP     (R1),#226      ;CHECK THE TEST NUMBER
13444 052202 001372          BNE    1$             ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13445 052204 010105          MOV     R1,R5          ;RESTORE R5
13446 052206 005215          INC     (R5)
13447
13448
13449
13450 :*****
13451 :TEST:227      MUL      -1 * #77777 - -1 10001      PS 10
13452 :*****
13453 052210 010767 125756    TST227: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
13454 052214 012702 177777    MOV     #-1,%2         ;LOAD MULTIPLICAND WITH -1
13455 052220 070227 077777    MUL     #77777,%2      ;MULTIPLY -1 * #77777
13456 052224 106737 042430    MFPS   @#PSWORD       ;SAVE PS
13457 052230 122737 000010    CMPB   #10,@#PSWORD   ;IS PS = 10
13458 052236 001403          BEQ     .+10           ;
13459 052240 004767 006440    JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13460                                ;PS IS WRONG
13461 052244 000173          173                    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13462                                ;BY (013746 000172 000207)
13463
13464 052246 022702 177777    CMP     #-1,%2         ;IS HIGH ORDER = -1
13465 052252 001403          BEQ     .+10           ;
13466 052254 004767 006424    JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13467                                ;HIGH ORDER IS WRONG
13468 052260 000174          174                    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13469                                ;BY (013746 000172 000207)
13470
13471 052262 022703 100001    CMP     #100001,%2.1   ;IS LOW ORDER = 10000
13472 052266 001403          BEQ     .+10           ;

```

13473 052270
13474 052270 004767 006410
13475
13476 052274 000175
13477
13478
13479 052276 021527 000227
13480 052302 001372
13481 052304 005215
13482
13483
13484
13485
13486
13487

1\$: JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;LOW ORDER IS WRONG OR WRONG SEQUENCE
175 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP (R5),#227
BNE 1\$;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
INC (R5)

:TEST:230 MUL -2 * #77777 = -1 2 PS - 11

13488 052306 010767 125660
13489 052312 012700 177776
13490 052316 070027 077777
13491 052322 106737 042430
13492 052326 122737 000011 042430
13493 052334 001403
13494 052336 004767 006342
13495
13496 052342 000176
13497
13498
13499 052344 022700 177777
13500 052350 001403
13501 052352 004767 006326
13502
13503 052356 000177
13504
13505
13506 052360 022701 000002
13507 052364 001403
13508 052366
13509 052366 004767 006312
13510
13511 052372 000200
13512
13513
13514 052374 021527 000230
13515 052400 001372
13516 052402 005215
13517
13518
13519

TST230: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #-2,%0 ;LOAD MULTIPLICAND WITH -2
MUL #77777,%0 ;MULTIPLY -2 * #77777
MFPS @#PSWORD ;SAVE PS
CMPB #11,@#PSWORD ;IS PS = 11
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG
176 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP #-1,%0 ;IS HIGH ORDER - -1
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;HIGH ORDER IS WRONG
177 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP #2,%0:1 ;IS LOW ORDER = 2
BEQ .+10

1\$: JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;LOW ORDER IS WRONG OR WRONG SEQUENCE
200 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
CMP (R5),#230
BNE 1\$;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
INC (R5)

:TEST:231 MUL 125252 * #2 = -1 52524 PS = 11

13522
13523 052404 010767 125562
13524 052410 012702 125252
13525 052414 070227 000002
13526 052420 106737 042430
13527 052424 122737 000011 042430
13528 052432 001403

TST231: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #125252,%2 ;LOAD MULTIPLICAND WITH 125252
MUL #2,%2 ;MULTIPLY 125252 * #2
MFPS @#PSWORD ;SAVE PS
CMPB #11,@#PSWORD ;IS PS = 11
BEQ .+10

```
13529 052434 004767 006244 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13530 ;PS IS WRONG
13531 052440 000201 201 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13532 ;BY (013746 000172 000207)
13533
13534 052442 022702 177777 CMP #-1,%2 ;IS HIGH ORDER = -1
13535 052446 001403 BEQ .+10
13536 052450 004767 006230 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13537 ;HIGH ORDER IS WRONG
13538 052454 000202 202 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13539 ;BY (013746 000172 000207)
13540
13541 052456 022703 052524 CMP #52524,%2.1 ;IS LOW ORDFR = 52524
13542 052462 001403 BEQ .+10
13543 052464 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13544 052464 004767 006214 ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13545 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13546 052470 000203 203 ;BY (013746 000172 000207)
13547
13548
13549 052472 021527 000231 CMP (R5),#231
13550 052476 001372 BNE '$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13551 052500 005215 INC (R5)
13552
13553
13554
13555 :*****
13556 :TEST:232 MUL 125252 * #40000 165252 100000 PS 1'
13557 :*****
13558 052502 010767 125464 TST:232: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13559 052506 010501 MOV R5,R1 ;SAVE R5
13560 052510 012704 125252 MOV #125252,%4 ;LOAD MULTIPLICAND WITH 125252
13561 052514 070427 040000 MUL #40000,%4 ;MULTIPLY 125252 * #40000
13562 052520 106737 042430 MFPS @#PSWORD ;SAVE PS
13563 052524 122737 000011 042430 CMPB #11,@#PSWORD ;IS PS = 11
13564 052532 001403 BEQ .+10
13565 052534 004767 006144 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13566 ;PS IS WRONG
13567 052540 000204 204 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13568 ;BY (013746 000172 000207)
13569
13570 052542 022704 165252 CMP #165252,%4 ;IS HIGH ORDER = 165252
13571 052546 001403 BEQ .+10
13572 052550 004767 006130 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13573 ;HIGH ORDER IS WRONG
13574 052554 000205 205 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13575 ;BY (013746 000172 000207)
13576
13577 052556 022705 100000 CMP #100000,%4.1 ;IS LOW ORDER = 100000
13578 052562 001403 BEQ .+10
13579 052564 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13580 052564 004767 006114 ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13581 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13582 052570 000206 206 ;BY (013746 000172 000207)
13583
13584
```

13585 052572 021127 000237
13586 052576 001372
13587 052600 010105
13588 052602 005215
13589
13590
13591
13592
13593
13594

CMP (R1),#232 ;CHECK THE TEST NUMBER
BNE 1\$;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
MOV R1,R5 ;RESTORE R5
INC (R5)

:TEST:233 MUL 107070 * #107070 = 31222 26100 PS 1

13595 052604 010767 125362
13596 052610 012700 107070
13597 052614 070027 107070
13598 052620 106737 042430
13599 052624 122737 000001 042430
13600 052632 001403
13601 052634 004767 006044
13602

TST233: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #107070,% ;LOAD MULTIPLICAND WITH 107070
MUL #107070,% ;MULTIPLY 107070 * #107070
MFPS @#PSWORD ;SAVE PS
CMPB #1,@#PSWORD ;IS PS = 1
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG

13603 052640 000207
13604
13605
13606 052642 022700 031222
13607 052646 001403
13608 052650 004767 006030
13609

207 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #31222,% ;IS HIGH ORDER = 31222
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;HIGH ORDER IS WRONG

13610 052654 000210
13611
13612
13613 052656 022701 026100
13614 052662 001403
13615 052664
13616 052664 004767 006014
13617

210 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP #26100,% .1 ;IS LOW ORDER = 26100
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;LOW ORDER IS WRONG OR WRONG SEQUENCE

13618 052670 000211
13619
13620
13621 052672 021527 000233
13622 052676 001372
13623 052700 005215
13624
13625

211 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

CMP (R5),#233
BNE 1\$;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
INC (R5)

:TEST:234 MUL -1 * #1 = -1 -1 PS = 10

13626
13627
13628
13629

13630 052702 010767 125264
13631 052706 012701 177777
13632 052712 070127 000001
13633 052716 106737 042430
13634 052722 122737 000010 042430
13635 052730 001403
13636 052732 004767 005746
13637

TST234: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #-1,%1 ;LOAD MULTIPLICAND WITH -1
MUL #1,%1 ;MULTIPLY -1 * #1
MFPS @#PSWORD ;SAVE PS
CMPB #10,@#PSWORD ;IS PS = 10
BEQ .+10
JSR PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG

13638 052736 000212
13639
13640

212 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)

```

13641 052740 022701 177777      CMP      #-1,%1          ;IS HIGH ORDER = -1
13642 052744 001403      BEQ      .+10
13643 052746 004767 005732      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13644                                ;HIGH ORDER IS WRONG
13645 052752 000213      213      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13646                                ;BY (013746 000172 000207)
13647
13648 052754 022701 177777      CMP      #-1,%1:1       ;IS LOW ORDER - -1
13649 052760 001403      BEQ      .+10
13650 052762
13651 052762 004767 005716      1$:      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13652                                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13653 052766 000214      214      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13654                                ;BY (013746 000172 000207)
13655
13656 052770 021527 000234      CMP      (R5),#234
13657 052774 001372      BNE      1$
13658 052776 005215      INC      (R5)          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13659
13660
13661
13662 :*****
13663 :TEST:235      MUL      -1 * #0 = 0 0      PS - 4
13664 :*****
13665 053000 010767 125166      TST235: MOV      PC,LPADR          ;STORE ERROR LOOP ADDRESS
13666 053004 012703 177777      MOV      #-1,%3          ;LOAD MULTIPLICAND WITH -1
13667 053010 070327 000000      MUL      #0,%3          ;MULTIPLY -1 * #0
13668 053014 106737 042430      MFPS     @#PSWORD        ;SAVE PS
13669 053020 122737 000004      CMPB    #4,@#PSWORD      ;IS PS = 4
13670 053026 001403      BEQ      .+10
13671 053030 004767 005650      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13672                                ;PS IS WRONG
13673 053034 000215      215      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13674                                ;BY (013746 000172 000207)
13675
13676 053036 022703 000000      CMP      #0,%3          ;IS HIGH ORDER = 0
13677 053042 001403      BEQ      .+10
13678 053044 004767 005634      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13679                                ;HIGH ORDER IS WRONG
13680 053050 000216      216      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13681                                ;BY (013746 000172 000207)
13682
13683 053052 022703 000000      CMP      #0,%3:1       ;IS LOW ORDER - 0
13684 053056 001403      BEQ      .+10
13685 053060
13686 053060 004767 005620      1$:      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13687                                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13688 053064 000217      217      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13689                                ;BY (013746 000172 000207)
13690
13691 053066 021527 000235      CMP      (R5),#235
13692 053072 001372      BNE      1$
13693 053074 005215      INC      (R5)          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13694
13695
13696 :*****

```

```

13697 ;TEST:236      MUL      77777 * #100000 - 100000 100000      PS = 11
13698 ;*****
13699
13700 TST236: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
13701      MOV      R5,R1          ;SAVE R5
13702      MOV      #77777,%5      ;LOAD MULTIPLICAND WITH 77777
13703      MUL      #100000,%5      ;MULTIPLY 77777 * #100000
13704      MFPS     @#PSWORD      ;SAVE PS
13705      CMPB    #11,@#PSWORD    ;IS PS = 11
13706      BEQ     .+10           ;
13707      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13708      ;PS IS WRONG
13709      220      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13710      ;BY (013746 000172 000207)
13711
13712      CMP     #100000,%5      ;IS HIGH ORDER = 100000
13713      BEQ     .+10           ;
13714      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13715      ;HIGH ORDER IS WRONG
13716      221      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13717      ;BY (013746 000172 000207)
13718
13719      CMP     #100000,%5.1    ;IS LOW ORDER - 100000
13720      BEQ     .+10           ;
13721      1$:      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13722      ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13723      222      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13724      ;BY (013746 000172 000207)
13725
13726      CMP     (R1),#236        ;CHECK THE TEST NUMBER
13727      BNE     1$            ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13728      MOV     R1,R5          ;RESTORE R5
13729      INC     (R5)
13730
13731
13732
13733 ;*****
13734 ;TEST:237      MUL      -1 * #77777 = 100001 100001      PS  10
13735 ;*****
13736
13737 TST237: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
13738      MOV      #-1,%1          ;LOAD MULTIPLICAND WITH -1
13739      MUL      #77777,%1      ;MULTIPLY -1 * #77777
13740      MFPS     @#PSWORD      ;SAVE PS
13741      CMPB    #10,@#PSWORD    ;IS PS = 10
13742      BEQ     .+10           ;
13743      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13744      ;PS IS WRONG
13745      223      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13746      ;BY (013746 000172 000207)
13747
13748      CMP     #100001,%1      ;IS HIGH ORDER = 100001
13749      BEQ     .+10           ;
13750      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13751      ;HIGH ORDER IS WRONG
13752      224      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)

```

```

13753                                     ;BY (013746 000172 000207)
13754
13755 053252 022701 100001          CMP      #100001,%1.1      ;IS LOW ORDER - 100001
13756 053256 001403                BEQ      .+10
13757 053260                          1$:      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13758 053260 004767 005420                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13759                                225      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13760 053264 000225                ;BY (013746 000172 000207)
13761
13762
13763 053266 021527 000237          CMP      (R5),#237
13764 053272 001372                BNE     1$                ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13765 053274 005215                INC     (R5)
13766
13767
13768
13769
13770
13771

```

```

:*****
:TEST:240      MUL      77777 * #77777 = 1 1      PS = 1
:*****

```

```

13772 053276 010767 124670          TST240: MOV     PC,LPADR      ;STORE ERROR LOOP ADDRESS
13773 053302 012703 077777          MOV     #77777,%3        ;LOAD MULTIPLICAND WITH 77777
13774 053306 070327 077777          MUL     #77777,%3        ;MULTIPLY 77777 * #77777
13775 053312 106737 042430          MFPS   @#PSWORD         ;SAVE PS
13776 053316 122737 000001 042430  CMPB   #1,@#PSWORD      ;IS PS = 1
13777 053324 001403                BEQ     .+10
13778 053326 004767 005352          JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13779                                ;PS IS WRONG
13780 053332 000226                226    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13781                                ;BY (013746 000172 000207)
13782

```

```

13783 053334 022703 000001          CMP     #1,%3            ;IS HIGH ORDER = 1
13784 053340 001403                BEQ     .+10
13785 053342 004767 005336          JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13786                                ;HIGH ORDER IS WRONG
13787 053346 000227                227    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13788                                ;BY (013746 000172 000207)
13789

```

```

13790 053350 022703 000001          CMP     #1,%3!1         ;IS LOW ORDER = 1
13791 053354 001403                BEQ     .+10
13792 053356                          1$:      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13793 053356 004767 005322                ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13794                                230    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13795 053362 000230                ;BY (013746 000172 000207)
13796
13797

```

```

13798 053364 021527 000240          CMP     (R5),#240
13799 053370 001372                BNE     1$                ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13800 053372 005215                INC     (R5)
13801
13802

```

```

:*****
:TEST:241      MUL      2 * #2 = 4 4      PS = 0
:*****

```

```

13803
13804
13805
13806
13807 053374 010767 124572          TST241: MOV     PC,LPADR      ;STORE ERROR LOOP ADDRESS
13808 053400 010501                MOV     R5,R1            ;SAVE R5

```



```

13865
13866 053564 022701 100000      CMP      #100000,%0!1      ;IS LOW ORDER = 100000
13867 053570 001403      BEQ      .+10
13868 053572
13869 053572 004767 005106      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13870                                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13871 053576 000236      236      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13872                                     ;BY (013746 000172 000207)
13873
13874 053600 021527 000242      CMP      (R5),#242
13875 053604 001372      BNE      1$      ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13876 053606 005215      INC      (R5)
13877
13878
13879

```

```

:*****
:TEST:243      MUL      125252 * @s6 - 165252 100000      PS = 11
:*****

```

```

13882
13883 053610 010767 124356      TST243: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
13884 053614 012700 125252      MOV      #125252,%0      ;LOAD MULTIPLICAND WITH 125252
13885 053620 070077 166640      MUL      @s6,%0      ;MULTIPLY 125252 * @s6
13886 053624 106737 042430      MFPS      @#PSWORD      ;SAVE PS
13887 053630 122737 000011 042430      CMPB     #11,@#PSWORD      ;IS PS = 11
13888 053636 001403      BEQ      .+10
13889 053640 004767 005040      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13890                                     ;PS IS WRONG
13891 053644 000237      237      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13892                                     ;BY (013746 000172 000207)
13893

```

```

13894 053646 022700 165252      CMP      #165252,%0      ;IS HIGH ORDER = 165252
13895 053652 001403      BEQ      .+10
13896 053654 004767 005024      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13897                                     ;HIGH ORDER IS WRONG
13898 053660 000240      240      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13899                                     ;BY (013746 000172 000207)
13900

```

```

13901 053662 022701 100000      CMP      #100000,%0!1      ;IS LOW ORDER - 100000
13902 053666 001403      BEQ      .+10
13903 053670
13904 053670 004767 005010      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13905                                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13906 053674 000241      241      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13907                                     ;BY (013746 000172 000207)
13908
13909 053676 021527 000243      CMP      (R5),#243
13910 053702 001372      BNE      1$      ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13911 053704 005215      INC      (R5)
13912
13913

```

```

:*****
:TEST:244      MUL      125252 * @#s5 = 165252 100000      PS 11
:*****

```

```

13914
13915
13916
13917
13918 053706 010767 124260      TST244: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
13919 053712 012700 125252      MOV      #125252,%0      ;LOAD MULTIPLICAND WITH 125252
13920 053716 070037 042462      MUL      @#s5,%0      ;MULTIPLY 125252 * @#s5

```

```

13921 053722 106737 042430 MFPS @#PSWORD ;SAVE PS
13922 053726 122737 000011 042430 CMPB #11,@#PSWORD ;IS PS = 11
13923 053734 001403 BEQ .+10
13924 053736 004767 004742 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13925 ;PS IS WRONG
13926 053742 000242 242 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13927 ;BY (013746 000172 000207)
13928
13929 053744 022700 165252 CMP #165252,%0 ;IS HIGH ORDER = 165252
13930 053750 001403 BEQ .+0
13931 053752 004767 004726 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13932 ;HIGH ORDER IS WRONG
13933 053756 000243 243 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13934 ;BY (013746 000172 000207)
13935
13936 053760 022701 100000 CMP #100000,%0!1 ;IS LOW ORDER = 100000
13937 053764 001403 BEQ .+10
13938 053766 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13939 053766 004767 004712 1$: ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13940 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13941 053772 000244 244 ;BY (013746 000172 000207)
13942
13943
13944 053774 021527 000244 CMP (R5),#244
13945 054000 001372 BNE 1$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13946 054002 005215 INC (R5)
13947
13948
13949
13950 :*****
13951 :TEST:245 MUL 125252 * %2 = 165252 100000 PS 11
13952 :*****
13953 054004 010767 124162 1$T245: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13954 054010 012700 125252 MOV #125252,%0 ;LOAD MULTIPLICAND WITH 125252
13955 054014 070002 MUL %2,%0 ;MULTIPLY 125252 * %2
13956 054016 106737 042430 MFPS @#PSWORD ;SAVE PS
13957 054022 122737 000011 042430 CMPB #11,@#PSWORD ;IS PS = 11
13958 054030 001403 BEQ .+10
13959 054032 004767 004646 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13960 ;PS IS WRONG
13961 054036 000245 245 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13962 ;BY (013746 000172 000207)
13963
13964 054040 022700 165252 CMP #165252,%0 ;IS HIGH ORDER = 165252
13965 054044 001403 BEQ .+10
13966 054046 004767 004632 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13967 ;HIGH ORDER IS WRONG
13968 054052 000246 246 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13969 ;BY (013746 000172 000207)
13970
13971 054054 022701 100000 CMP #100000,%0.1 ;IS LOW ORDER = 100000
13972 054060 001403 BEQ .+10
13973 054062 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13974 054062 004767 004616 1$: ;LOW ORDER IS WRONG OR WRONG SEQUENCE
13975 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13976 054066 000247 247

```

```

13977 ;BY (013746 000172 000207)
13978
13979 054070 021527 000245 CMP (R5),#245
13980 054074 001372 BNE 1$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
13981 054076 005215 INC (R5)
13982
13983
13984 :*****
13985 :TEST:246 MUL 125252 * (3)+ = 165252 100000 PS - 11
13986 :*****
13987
13988 054100 010767 124066 TST246: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
13989 054104 012700 125252 MOV #125252,%0 ;LOAD MULTIPLICAND WITH 125252
13990 054110 070023 MUL (3)+,%0 ;MULTIPLY 125252 * (3)+
13991 054112 106737 042430 MFPS @#PSWORD ;SAVE PS
13992 054116 122737 000011 042430 CMPB #11,@#PSWORD ;IS PS = 11
13993 054124 001403 BEQ .+10
13994 054126 004767 004552 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
13995 ;PS IS WRONG
13996 054132 000250 250 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
13997 ;BY (013746 000172 000207)
13998
13999 054134 022700 165252 CMP #165252,%0 ;IS HIGH ORDER = 165252
14000 054140 001403 BEQ .+10
14001 054142 004767 004536 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14002 ;HIGH ORDER IS WRONG
14003 054146 000251 251 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14004 ;BY (013746 000172 000207)
14005
14006 054150 022701 100000 CMP #100000,%0!1 ;IS LOW ORDER - 100000
14007 054154 001403 BEQ .+10
14008 054156 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14009 054156 004767 004522 1$: ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14010 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14011 054162 000252 252 ;BY (013746 000172 000207)
14012
14013
14014 054164 021527 000246 CMP (R5),#246
14015 054170 001372 BNE 1$ ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14016 054172 005215 INC (R5)
14017
14018
14019 :*****
14020 :TEST:247 MUL 125252 * -(3) = 165252 100000 PS - 11
14021 :*****
14022
14023 054174 010767 123772 TST247: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
14024 054200 012700 125252 MOV #125252,%0 ;LOAD MULTIPLICAND WITH 125252
14025 054204 070043 MUL -(3),%0 ;MULTIPLY 125252 * -(3)
14026 054206 106737 042430 MFPS @#PSWORD ;SAVE PS
14027 054212 122737 000011 042430 CMPB #11,@#PSWORD ;IS PS = 11
14028 054220 001403 BEQ .+10
14029 054222 004767 004456 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14030 ;PS IS WRONG
14031 054226 000253 253 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14032 ;BY (013746 000172 000207)

```

```
14033
14034 054230 022700 165252      CMP    #165252,%0      ;IS HIGH ORDER = 165252
14035 054234 001403      BEQ    .+10
14036 054236 004767 004442      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14037                                     ;HIGH ORDER IS WRONG
14038 054242 000254      254    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14039                                     ;BY (013746 000172 000207)
14040
14041 054244 022701 100000      CMP    #100000,%0.1    ;IS LOW ORDER = 100000
14042 054250 001403      BEQ    .+10
14043 054252                                     1$:
14044 054252 004767 004426      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14045                                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14046 054256 000255      255    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14047                                     ;BY (013746 000172 000207)
14048
14049 054260 021527 000247      CMP    (R5),#247
14050 054264 001372      BNE    1$              ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14051 054266 005215      INC    (R5)
14052
14053
14054 :*****
14055 :TEST:250      MUL    125252 * 2(4) = 165252 100000      PS = 11
14056 :*****
14057
14058 054270 010767 123676      TST250: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
14059 054274 012700 125252      MOV    #125252,%0      ;LOAD MULTIPLICAND WITH 125252
14060 054300 070064 000002      MUL    2(4),%0          ;MULTIPLY 125252 * 2(4)
14061 054304 106737 042430      MFPS   @#PSWORD        ;SAVE PS
14062 054310 122737 000011 042430  CMPB   #11,@#PSWORD     ;IS PS = 11
14063 054316 001403      BEQ    .+10
14064 054320 004767 004360      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14065                                     ;PS IS WRONG
14066 054324 000256      256    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14067                                     ;BY (013746 000172 000207)
14068
14069 054326 022700 165252      CMP    #165252,%0      ;IS HIGH ORDER = 165252
14070 054332 001403      BEQ    .+10
14071 054334 004767 004344      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14072                                     ;HIGH ORDER IS WRONG
14073 054340 000257      257    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14074                                     ;BY (013746 000172 000207)
14075
14076 054342 022701 100000      CMP    #100000,%0!1    ;IS LOW ORDER 100000
14077 054346 001403      BEQ    .+10
14078 054350                                     1$:
14079 054350 004767 004330      JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14080                                     ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14081 054354 000260      260    ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14082                                     ;BY (013746 000172 000207)
14083
14084 054356 021527 000250      CMP    (R5),# 50
14085 054362 001372      BNE    1$              ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14086 054364 005215      INC    (R5)
14087
14088
```

```
14089
14090 :*****
14091 :TEST:251      MUL      125252 * @ (4) = 165252 100000      PS 11
14092 :*****
14093 054366 010767 123600 TST251: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14094 054372 012700 125252      MOV      #125252,%0      ;LOAD MULTIPLICAND WITH 125252
14095 054376 070074 000000      MUL      @ (4),%0      ;MULTIPLY 125252 * @ (4)
14096 054402 106737 042430      MFPS    @#PSWORD      ;SAVE PS
14097 054406 122737 000011 042430      CMPB   #11,@#PSWORD    ;IS PS = 11
14098 054414 001403      BEQ     .+10
14099 054416 004767 004262      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14100      ;PS IS WRONG
14101 054422 000261      261      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14102      ;BY (013746 000172 000207)
14103
14104 054424 022700 165252      CMP     #165252,%0      ;IS HIGH ORDER = 165252
14105 054430 001403      BEQ     .+10
14106 054432 004767 004246      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14107      ;HIGH ORDER IS WRONG
14108 054436 000262      262      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14109      ;BY (013746 000172 000207)
14110
14111 054440 022701 100000      CMP     #100000,%0:1    ;IS LOW ORDER 100000
14112 054444 001403      BEQ     .+10
14113 054446      1$:
14114 054446 004767 004232      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14115      ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14116 054452 000263      263      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14117      ;BY (013746 000172 000207)
14118
14119 054454 021527 000251      CMP     (R5),#251
14120 054460 001372      BNE     1$
14121 054462 005215      INC     (R5)
14122      ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14123
14124 :*****
14125 :TEST:252      MUL      125252 * @ (4)+ = 165252 100000      PS 11
14126 :*****
14127
14128 054464 010767 123502 TST252: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14129 054470 012700 125252      MOV      #125252,%0      ;LOAD MULTIPLICAND WITH 125252
14130 054474 070034 042430      MUL      @ (4)+,%0      ;MULTIPLY 125252 * @ (4)+
14131 054476 106737 042430      MFPS    @#PSWORD      ;SAVE PS
14132 054502 122737 000011 042430      CMPB   #11,@#PSWORD    ;IS PS = 11
14133 054510 001403      BEQ     .+10
14134 054512 004767 004166      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14135      ;PS IS WRONG
14136 054516 000264      264      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14137      ;BY (013746 000172 000207)
14138
14139 054520 022700 165252      CMP     #165252,%0      ;IS HIGH ORDER - 165252
14140 054524 001403      BEQ     .+10
14141 054526 004767 004152      JSR     PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14142      ;HIGH ORDER IS WRONG
14143 054532 000265      265      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14144      ;BY (013746 000172 000207)
```

```
14145
14146 054534 022701 100000          CMP    #100000,%0.1    ;IS LOW ORDER = 100000
14147 054540 001403          BEQ    .+10
14148 054542          1$:
14149 054542 004767 004136          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14150          ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14151 054546 000266          266          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14152          ;BY (013746 000172 000207)
14153
14154 054550 021527 000252          CMP    (R5),#252
14155 054554 001372          BNE    1$          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14156 054556 005215          INC    (R5)
14157
14158
14159
14160          :*****
14161          :TEST:253          MUL    125252 * @-(4) - 165252 100000          PS 11
14162          :*****
14163 054560 010767 123406          TST253: MOV    PC,LPADR          ;STORE ERROR LOOP ADDRESS
14164 054564 012700 125252          MOV    #125252,%0          ;LOAD MULTIPLICAND WITH 125252
14165 054570 070054          MUL    @-(4),%0          ;MULTIPLY 125252 * @-(4)
14166 054572 106737 042430          MFPS   @#PSWORD          ;SAVE PS
14167 054576 122737 000011          CMPB   #11,@#PSWORD          ;IS PS = 11
14168 054604 001403          BEQ    .+10
14169 054606 004767 004072          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14170          ;PS IS WRONG
14171 054612 000267          267          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14172          ;BY (013746 000172 000207)
14173
14174 054614 022700 165252          CMP    #165252,%0          ;IS HIGH ORDER = 165252
14175 054620 001403          BEQ    .+10
14176 054622 004767 004056          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14177          ;HIGH ORDER IS WRONG
14178 054626 000270          270          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14179          ;BY (013746 000172 000207)
14180
14181 054630 022701 100000          CMP    #100000,%0.1    ;IS LOW ORDER = 100000
14182 054634 001403          BEQ    .+10
14183 054636          1$:
14184 054636 004767 004042          JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14185          ;LOW ORDER IS WRONG OR WRONG SEQUENCE
14186 054642 000271          271          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14187          ;BY (013746 000172 000207)
14188
14189 054644 021527 000253          CMP    (R5),#253
14190 054650 001372          BNE    1$          ;IF IN WRONG SEQUENCE GO TO THE HLT ABOVE
14191 054652 005215          INC    (R5)
14192
14193
```

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: DIV INSTRUCTION TESTS

: TEST:254 DIV 0 4 / #2 = 2 REM = 0 PS = 0

```
TST254: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #0,%0 ;LOAD HIGH ORDER WITH 0
        MOV #4,%0+1 ;LOAD LOW ORDER WITH 4
        DIV #2,%0 ;DIVIDE BY #2
        MFPS @#PSWORD ;SAVE PS

        CMPB #0,@#PSWORD ;IS PS = 0
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
        ;PS IS WRONG
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
        ;BY (013746 000172 000207)

        CMP #2,%0 ;IS QUOTIENT - 2
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
        ;QUOTIENT IS WRONG
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
        ;BY (013746 000172 000207)

        CMP #0,%0+1 ;IS REMAINDER - 0
        BEQ .+10
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
        ;WRONG REMAINDER
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
        ;BY (013746 000172 000207)

        CMP (R5),#254
        BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
        JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
        ;TEST IS IN WRONG SEQUENCE
        ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
        ;BY (013746 000172 000207)

        INC (R5)
```

: TEST:255 DIV -1 -9. / #3 = -3 REM = 0 PS = 10

```
TST255: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
        MOV #-1,%2 ;LOAD HIGH ORDER WITH -1
        MOV #-9,%2+1 ;LOAD LOW ORDER WITH -9.
        DIV #3,%2 ;DIVIDE BY #3
```

14250	055004	106737	042430		MFPS	@#PSWORD	;SAVE PS
14251							
14252	055010	122737	000010	042430	CMPS	#10,@#PSWORD	;IS PS = 10
14253	055016	001403			BEQ	.+10	
14254	055020	004767	003660		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
14255							:PS IS WRONG
14256	055024	000276			276		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14257							:BY (013746 000172 000207)
14258							
14259							
14260	055026	022702	177775		CMPS	#-3,%2	;IS QUOTIENT - -3
14261	055032	001403			BEQ	.+10	
14262	055034	004767	003644		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
14263							:QUOTIENT IS WRONG
14264	055040	000277			277		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14265							:BY (013746 000172 000207)
14266							
14267							
14268	055042	022703	000000		CMPS	#0,%2+1	;IS REMAINDER = 0
14269	055046	001403			BEQ	.+10	
14270	055050	004767	003630		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
14271							:WRONG REMAINDER
14272	055054	000300			300		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14273							:BY (013746 000172 000207)
14274							
14275	055056	021527	000255		CMPS	(R5),#255	
14276	055062	001403			BEQ	.+10	:IF IN WRONG SEQUENCE GO TO THE HLT
14277	055064	004767	003614		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
14278							:TEST IS IN WRONG SEQUENCE
14279	055070	000301			301		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14280							:BY (013746 000172 000207)
14281							
14282	055072	005215			INC	(R5)	
14283							
14284							
14285							
14286							
14287							
14288	055074	010767	123072		TST256: MOV	PC,LPADR	:STORE ERROR LOOP ADDRESS
14289	055100	010501			MOV	R5,R1	:SAVE R5
14290	055102	012704	000000		MOV	#0,%4	:LOAD HIGH ORDER WITH 0
14291	055106	012705	000011		MOV	#9,%4+1	:LOAD LOW ORDER WITH 9.
14292	055112	071427	000002		MOV	#2,%4	:DIVIDE BY #2
14293	055116	106737	042430		MFPS	@#PSWORD	:SAVE PS
14294							
14295	055122	122737	000000	042430	CMPS	#0,@#PSWORD	:IS PS = 0
14296	055130	001403			BEQ	.+10	
14297	055132	004767	003546		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	
14298							:PS IS WRONG
14299	055136	000302			302		:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14300							:BY (013746 000172 000207)
14301							
14302							
14303	055140	022704	000004		CMPS	#4,%4	:IS QUOTIENT = 4
14304	055144	001403			BEQ	.+10	
14305	055146	004767	003532		JSR	PC,\$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE	

:TEST:256 DIV 0 9. / #2 = 4 REM 1 PS - 0

```
14306                                     ;QUOTIENT IS WRONG
14307 055152 000303 303                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14308                                     ;BY (013746 000172 000207)
14309
14310
14311 055154 022705 000001 CMP #1,%4+1 ;IS REMAINDER = 1
14312 055160 001403 BEQ .+10
14313 055162 004767 003516 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14314                                     ;WRONG REMAINDER
14315 055166 000304 304                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14316                                     ;BY (013746 000172 000207)
14317
14318 055170 010105 MOV R1,R5 ;RESTORE R5
14319 055172 021527 000256 CMP (R5),#256
14320 055176 001403 BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
14321 055200 004767 003500 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14322                                     ;TEST IS IN WRONG SEQUENCE
14323 055204 000305 305                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14324                                     ;BY (013746 000172 000207)
14325
14326 055206 005215 INC (R5)
14327
14328
14329 :*****
14330 :TEST:257 DIV -1 -9. / #2 = -4 REM = -1 PS = 10
14331 :*****
14332 055210 010767 122756 TST257: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
14333 055214 01_700 177777 MOV #-1,%0 ;LOAD HIGH ORDER WITH -1
14334 055220 012701 177767 MOV #-9,%0+1 ;LOAD LOW ORDER WITH -9.
14335 055224 071027 000002 DIV #2,%0 ;DIVIDE BY #2
14336 055230 106737 042430 MFPS @#PSWORD ;SAVE PS
14337
14338 055234 122737 000010 042430 CMPB #10,@#PSWORD ;IS PS = 10
14339 055242 001403 BEQ .+10
14340 055244 004767 003434 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14341                                     ;PS IS WRONG
14342 055250 000306 306                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14343                                     ;BY (013746 000172 000207)
14344
14345
14346 055252 022700 177774 CMP #-4,%0 ;IS QUOTIENT = -4
14347 055256 001403 BEQ .+10
14348 055260 004767 003420 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14349                                     ;QUOTIENT IS WRONG
14350 055264 000307 307                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14351                                     ;BY (013746 000172 000207)
14352
14353
14354 055266 022701 177777 CMP #-1,%0+1 ;IS REMAINDER = -1
14355 055272 001403 BEQ .+10
14356 055274 004767 003404 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14357                                     ;WRONG REMAINDER
14358 055300 000310 310                 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14359                                     ;BY (013746 000172 000207)
14360
14361 055302 021527 000257 CMP (R5),#257
```

```

14362 055306 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14363 055310 004767 003370  JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14364                                ;TEST IS IN WRONG SEQUENCE
14365 055314 000311          311      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14366                                ;BY (013746 000172 000207)
14367
14368 055316 005215          INC      (R5)
14369

```

```

:*****
:TEST:260      DIV      0 2 / #-3 - 0      REM = 2      PS  4
:*****

```

```

14374 055320 010767 122646  TST260: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14375 055324 012702 000000      MOV      #0,%2          ;LOAD HIGH ORDER WITH 0
14376 055330 012703 000002      MOV      #2,%2+1      ;LOAD LOW ORDER WITH 2
14377 055334 071227 177775      DIV      #-3,%2       ;DIVIDE BY #-3
14378 055340 106737 042430      MFPS     @#PSWORD     ;SAVE PS
14379
14380 055344 122737 000004 042430  (MPB    #4,@#PSWORD   ;IS PS = 4
14381 055352 001403          BEQ      .+10
14382 055354 004767 003324  JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14383                                ;PS IS WRONG
14384 055360 000312          312      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14385                                ;BY (013746 000172 000207)
14386

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```

14387
14388 055362 022702 000000      CMP      #0,%2          ;IS QUOTIENT = 0
14389 055366 001403          BEQ      .+10
14390 055370 004767 003310  JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14391                                ;QUOTIENT IS WRONG
14392 055374 000313          313      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14393                                ;BY (013746 000172 000207)
14394

```

```

14395
14396 055376 022703 000002      CMP      #2,%2+1      ;IS REMAINDER = 2
14397 055402 001403          BEQ      .+10
14398 055404 004767 003274  JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14399                                ;WRONG REMAINDER
14400 055410 000314          314      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14401                                ;BY (013746 000172 000207)
14402

```

```

14403 055412 021527 000260      CMP      (R5),#260
14404 055416 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14405 055420 004767 003260  JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14406                                ;TEST IS IN WRONG SEQUENCE
14407 055424 000315          315      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14408                                ;BY (013746 000172 000207)
14409

```

```

14410 055426 005215          INC      (R5)
14411

```

```

:*****
:TEST:261      DIV      -1 -2 / #3 = 0      REM = -2      PS - 4
:*****

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```

14416 055430 010767 122536  TST261: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14417 055434 010501          MOV      R5,R1        ;SAVE R5

```

```

14418 055436 012704 177777      MOV      #-1,%4      ;LOAD HIGH ORDER WITH -1
14419 055442 012705 177776      MOV      #-2,%4+1    ;LOAD LOW ORDER WITH -2
14420 055446 071427 000003      DIV      #3,%4      ;DIVIDE BY #3
14421 055452 106737 042430      MFPS     @#PSWORD    ;SAVE PS
14422
14423 055456 122737 000004 042430  CMPB     #4,@#PSWORD ;IS PS = 4
14424 055464 001403                BEQ      .+10
14425 055466 004767 003212      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14426                                ;PS IS WRONG
14427 055472 000316                316      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14428                                ;BY (013746 000172 000207)
14429
14430
14431 055474 022704 000000      CMP      #0,%4      ;IS QUOTIENT = 0
14432 055500 001403                BEQ      .+10
14433 055502 004767 003176      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14434                                ;QUOTIENT IS WRONG
14435 055506 000317                317      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14436                                ;BY (013746 000172 000207)
14437
14438
14439 055510 022705 177776      CMP      #-2,%4+1    ;IS REMAINDER = -2
14440 055514 001403                BEQ      .+10
14441 055516 004767 003162      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14442                                ;WRONG REMAINDER
14443 055522 000320                320      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14444                                ;BY (013746 000172 000207)
14445
14446 055524 010105                MOV      R1,R5      ;RESTORE R5
14447 055526 021527 000261      CMP      (R5),#261
14448 055532 001403                BEQ      .+10
14449 055534 004767 003144      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14450                                ;TEST IS IN WRONG SEQUENCE
14451 055540 000321                321      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14452                                ;BY (013746 000172 000207)
14453
14454 055542 005215                INCL     (R5)
14455
14456
14457 ;*****
14458 ;TEST:262      DIV      -1 -1 / #1 = -1      REM = 0      PS 10
14459 ;*****
14460 055544 010767 122422      TST262: MOV     PC,LPADR ;STORE ERROR LOOP ADDRESS
14461 055550 012700 177777      MOV      #-1,%0      ;LOAD HIGH ORDER WITH -1
14462 055554 012701 177777      MOV      #-1,%0+1    ;LOAD LOW ORDER WITH -1
14463 055560 071027 000001      DIV      #1,%0      ;DIVIDE BY #1
14464 055564 106737 042430      MFPS     @#PSWORD    ;SAVE PS
14465
14466 055570 122737 000010 042430  CMPB     #10,@#PSWORD ;IS PS = 10
14467 055576 001403                BEQ      .+10
14468 055600 004767 003100      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14469                                ;PS IS WRONG
14470 055604 000322                322      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14471                                ;BY (013746 000172 000207)
14472
14473

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14530
14531 055746 021527 000263      CMP      (R5),#263
14532 055752 001403              BEQ      .+10      ;IF IN WRONG SEQUENCE GO TO THE HLT
14533 055754 004767 002724      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14534                                ;TEST IS IN WRONG SEQUENCE
14535 055760 000331              331      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14536                                ;BY (013746 000172 000207)
14537
14538 055762 005215              INC      (R5)
14539
14540                                ;*****
14541                                ;TEST:264      DIV      -1 125252 / #2 = 152525      REM - 0      PS 10
14542                                ;*****
14543
14544 055764 010767 122202      TST264: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14545 055770 012702 177777      MOV      #-1,%2      ;LOAD HIGH ORDER WITH -1
14546 055774 012703 125252      MOV      #125252,%2+1  ;LOAD LOW ORDER WITH 125252
14547 056000 071227 000002      DIV      #2,%2      ;DIVIDE BY #2
14548 056004 106737 042430      MFPS     @#PSWORD      ;SAVE PS
14549
14550 056010 122737 000010 042430  CMPB     #10,@#PSWORD  ;IS PS = 10
14551 056016 001403              BEQ      .+10
14552 056020 004767 002660      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14553                                ;PS IS WRONG
14554 056024 000332              332      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14555                                ;BY (013746 000172 000207)
14556
14557
14558 056026 022702 152525      CMP      #152525,%2      ;IS QUOTIENT = 152525
14559 056032 001403              BEQ      .+10
14560 056034 004767 002644      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14561                                ;QUOTIENT IS WRONG
14562 056040 000333              333      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14563                                ;BY (013746 000172 000207)
14564
14565
14566 056042 022703 000000      CMP      #0,%2+1      ;IS REMAINDER = 0
14567 056046 001403              BEQ      .+10
14568 056050 004767 002630      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14569                                ;WRONG REMAINDER
14570 056054 000334              334      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14571                                ;BY (013746 000172 000207)
14572
14573 056056 021527 000264      CMP      (R5),#264
14574 056062 001403              BEQ      .+10      ;IF IN WRONG SEQUENCE GO TO THE HLT
14575 056064 004767 002614      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14576                                ;TEST IS IN WRONG SEQUENCE
14577 056070 000335              335      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14578                                ;BY (013746 000172 000207)
14579
14580 056072 005215              INC      (R5)
14581
14582                                ;*****
14583                                ;TEST:265      DIV      -1 -1 / #-1 = 1      REM - 0      PS 0
14584                                ;*****
14585

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14586 056074 010767 122072 TST265: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
14587 056100 010501 MOV R5,R1 ;SAVE R5
14588 056102 012704 177777 MOV #-1,%4 ;LOAD HIGH ORDER WITH -1
14589 056106 012705 177777 MOV #-1,%4+1 ;LOAD LOW ORDER WITH -1
14590 056112 071427 177777 DIV #-1,%4 ;DIVIDE BY #-1
14591 056116 106737 042430 MFPS @#PSWORD ;SAVE PS
14592
14593 056122 122737 000000 042430 (MPB #0,@#PSWORD ;IS PS = 0
14594 056130 001403 BEQ .+10
14595 056132 004767 002546 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14596 ;PS IS WRONG
14597 056136 000336 336 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14598 ;BY (013746 000172 000207)
14599
14600
14601 056140 022704 000001 CMP #1,%4 ;IS QUOTIENT = 1
14602 056144 001403 BEQ .+10
14603 056146 004767 002532 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14604 ;QUOTIENT IS WRONG
14605 056152 000337 337 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14606 ;BY (013746 000172 000207)
14607
14608
14609 056154 022705 000000 CMP #0,%4+1 ;IS REMAINDER = 0
14610 056160 001403 BEQ .+10
14611 056162 004767 002516 JSR PC,$HLT,SEEN AN ERROR, GO TO THE HALT ROUTINE
14612 ;WRONG REMAINDER
14613 056166 000340 340 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14614 ;BY (013746 000172 000207)
14615
14616 056170 010105 MOV R1,R5 ;RESTORE R5
14617 056172 021527 00026 CMP (R5),#265
14618 056176 001403 BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
14619 056200 004767 002500 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14620 ;TEST IS IN WRONG SEQUENCE
14621 056204 000341 341 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14622 ;BY (013746 000172 000207)
14623
14624 056206 005215 INC (R5)
14625
14626 :*****
14627 :TEST:266 DIV 25253 1 / #125252 = 100000 REM = 1 PS = 10
14628 :*****
14629
14630 056210 010767 121756 TST266: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
14631 056214 012700 025253 MOV #25253,%0 ;LOAD HIGH ORDER WITH 25253
14632 056220 012701 000001 MOV #1,%0+1 ;LOAD LOW ORDER WITH 1
14633 056224 071027 125252 DIV #125252,%0 ;DIVIDE BY #125252
14634 056230 106737 042430 MFPS @#PSWORD ;SAVE PS
14635
14636 056234 122737 000010 042430 (MPB #10,@#PSWORD ;IS PS = 10
14637 056242 001403 BEQ .+10
14638 056244 004767 002434 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14639 ;PS IS WRONG
14640 056250 000342 342 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14641 ;BY (013746 000172 000207)

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14642
14643
14644 056252 022700 100000      CMP      #100000,%0      ;IS QUOTIENT = 100000
14645 056256 001403              BEQ      .+10
14646 056260 004767 002420      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14647                                ;QUOTIENT IS WRONG
14648 056264 000343              343      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14649                                ;BY (013746 000172 000207)
14650
14651
14652 056266 022701 000001      CMP      #1,%0+1      ;IS REMAINDER = 1
14653 056272 001403              BEQ      .+10
14654 056274 004767 002404      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14655                                ;WRONG REMAINDER
14656 056300 000344              344      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14657                                ;BY (013746 000172 000207)
14658
14659 056302 021527 000266      CMP      (R5),#266
14660 056306 001403              BEQ      .+10      ;IF IN WRONG SEQUENCE GO TO THE HLT
14661 056310 004767 002370      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14662                                ;TEST IS IN WRONG SEQUENCE
14663 056314 000345              345      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14664                                ;BY (013746 000172 000207)
14665
14666 056316 005215              INC      (R5)
14667
14668
14669 :*****
14670 :TEST:267      DIV      37777 77777 / #77777 = 77777      REM - 77776      PS = 0
14671 :*****
14672 056320 010767 121646      TST267: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14673 056324 012702 037777      MOV      #37777,%2      ;LOAD HIGH ORDER WITH 37777
14674 056330 012703 077777      MOV      #77777,%2+1      ;LOAD LOW ORDER WITH 77777
14675 056334 071227 077777      DIV      #77777,%2      ;DIVIDE BY #77777
14676 056340 106737 042430      MFPS      @#PSWORD      ;SAVE PS
14677
14678 056344 122737 000000 042430      CMPB     #0,@#PSWORD      ;IS PS = 0
14679 056352 001403              BEQ      .+10
14680 056354 004767 002324      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14681                                ;PS IS WRONG
14682 056360 000346              346      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14683                                ;BY (013746 000172 000207)
14684
14685
14686 056362 022702 077777      CMP      #77777,%2      ;IS QUOTIENT = 77777
14687 056366 001403              BEQ      .+10
14688 056370 004767 002310      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14689                                ;QUOTIENT IS WRONG
14690 056374 000347              347      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14691                                ;BY (013746 000172 000207)
14692
14693
14694 056376 022703 077776      CMP      #77776,%2+1      ;IS REMAINDER = 77776
14695 056402 001403              BEQ      .+10
14696 056404 004767 002274      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14697                                ;WRONG REMAINDER

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```
14698 056410 000350          350          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14699                          ;BY (013746 000172 000207)
14700
14701 056412 021527 000267      CMP      (R5),#267
14702 056416 001403              BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14703 056420 004767 002260      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14704                          ;TEST IS IN WRONG SEQUENCE
14705 056424 000351          351          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14706                          ;BY (013746 000172 000207)
14707
14708 056426 005215          INC      (R5)
14709
14710
14711                          :*****
14712                          :TEST:270      DIV      0 100000 / #2 = 40000      REM      0      PS      0
14713                          :*****
14714 056430 010767 121536      TST270: MOV      PC,LPADR          ;STORE ERROR LOOP ADDRESS
14715 056434 010501              MOV      R5,R1          ;SAVE R5
14716 056436 012704 000000      MOV      #0,%4          ;LOAD HIGH ORDER WITH 0
14717 056442 012705 100000      MOV      #100000,%4+1    ;LOAD LOW ORDER WITH 100000
14718 056446 071427 000002      DIV      #2,%4          ;DIVIDE BY #2
14719 056452 106737 042430      MFPS     @#PSWORD        ;SAVE PS
14720
14721 056456 122737 000000 042430  CMPB     #0,@#PSWORD      ;IS PS = 0
14722 056464 001403              BEQ      .+10
14723 056466 004767 002212      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14724                          ;PS IS WRONG
14725 056472 000352          352          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14726                          ;BY (013746 000172 000207)
14727
14728
14729 056474 022704 040000      CMP      #40000,%4        ;IS QUOTIENT = 40000
14730 056500 001403              BEQ      .+10
14731 056502 004767 002176      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14732                          ;QUOTIENT IS WRONG
14733 056506 000353          353          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14734                          ;BY (013746 000172 000207)
14735
14736
14737 056510 022705 000000      CMP      #0,%4+1          ;IS REMAINDER = 0
14738 056514 001403              BEQ      .+10
14739 056516 004767 002162      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14740                          ;WRONG REMAINDER
14741 056522 000354          354          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14742                          ;BY (013746 000172 000207)
14743
14744 056524 010105              MOV      R1,R5          ;RESTORE R5
14745 056526 021527 000270      CMP      (R5),#270
14746 056532 001403              BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14747 056534 004767 002144      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14748                          ;TEST IS IN WRONG SEQUENCE
14749 056540 000355          355          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14750                          ;BY (013746 000172 000207)
14751
14752 056542 005215          INC      (R5)
14753
```



```
14754 :*****  
14755 :TEST:271 DIV 177777 77777 / #177776 = 40000 REM - 177777 PS  
14756 :*****  
14757  
14758 056544 010767 121422 TST271: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS  
14759 056550 012700 177777 MOV #177777,%0 ;LOAD HIGH ORDER WITH 177777  
14760 056554 012701 077777 MOV #77777,%0+1 ;LOAD LOW ORDER WITH 77777  
14761 056560 071027 177776 DIV #177776,%0 ;DIVIDE BY #177776  
14762 056564 106737 042430 MFPS @#PSWORD ;SAVE PS  
14763  
14764 056570 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS = 0  
14765 056576 001403 BEQ .+10  
14766 056600 004767 002100 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
14767 ;PS IS WRONG  
14768 056604 000356 356 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
14769 ;BY (013746 000172 000207)  
14770  
14771  
14772 056606 022700 040000 CMP #40000,%0 ;IS QUOTIENT - 40000  
14773 056612 001403 BEQ .+10  
14774 056614 004767 002064 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
14775 ;QUOTIENT IS WRONG  
14776 056620 000357 357 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
14777 ;BY (013746 000172 000207)  
14778  
14779  
14780 056622 022701 177777 CMP #177777,%0+1 ;IS REMAINDER = 177777  
14781 056626 001403 BEQ .+10  
14782 056630 004767 002050 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
14783 ;WRONG REMAINDER  
14784 056634 000360 360 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
14785 ;BY (013746 000172 000207)  
14786  
14787 056636 021527 000271 CMP (R5),#271  
14788 056642 001403 BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT  
14789 056644 004767 002034 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
14790 ;TEST IS IN WRONG SEQUENCE  
14791 056650 000361 361 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)  
14792 ;BY (013746 000172 000207)  
14793  
14794 056652 005215 INC (R5)  
14795  
14796 :*****  
14797 :TEST:272 DIV 0 52525 / #52525 - 1 REM 0 PS 0  
14798 :*****  
14799  
14800 056654 010767 121312 TST272: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS  
14801 056660 012702 000000 MOV #0,%2 ;LOAD HIGH ORDER WITH 0  
14802 056664 012703 052525 MOV #52525,%2+1 ;LOAD LOW ORDER WITH 52525  
14803 056670 071227 052525 DIV #52525,%2 ;DIVIDE BY #52525  
14804 056674 106737 042430 MFPS @#PSWORD ;SAVE PS  
14805  
14806 056700 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS - 0  
14807 056706 001403 BEQ .+10  
14808 056710 004767 001770 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE  
14809 ;PS IS WRONG
```

```

14810 056714 000362          362          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14811                                     ;BY (013746 000172 000207)
14812
14813
14814 056716 022702 000001      CMP      #1,%2          ;IS QUOTIENT = 1
14815 056722 001403          BEQ      .+10
14816 056724 004767 001754      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14817                                     ;QUOTIENT IS WRONG
14818 056730 000363          363          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14819                                     ;BY (013746 000172 000207)
14820
14821
14822 056732 022703 000000      CMP      #0,%2+1      ;IS REMAINDER = 0
14823 056736 001403          BEQ      .+10
14824 056740 004767 001740      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14825                                     ;WRONG REMAINDER
14826 056744 000364          364          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14827                                     ;BY (013746 000172 000207)
14828
14829 056746 021527 000272      CMP      (R5),#272
14830 056752 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14831 056754 004767 001724      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14832                                     ;TEST IS IN WRONG SEQUENCE
14833 056760 000365          365          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14834                                     ;BY (013746 000172 000207)
14835
14836 056762 005215          INC      (R5)
14837
14838
14839
14840
14841
14842 056764 010767 121202      TST273: MOV      PC,LPADR      ;STORE ERROR LOOP ADDRESS
14843 056770 010501          MOV      R5,R1          ;SAVE R5
14844 056772 012704 000000      MOV      #0,%4          ;LOAD HIGH ORDER WITH 0
14845 056776 012705 077777      MOV      #77777,%4+1    ;LOAD LOW ORDER WITH 77777
14846 057002 071427 000000      DIV      #0,%4          ;DIVIDE BY #0
14847 057006 106737 042430      MFPS     @#PSWORD       ;SAVE PS
14848 057012 042737 000014 042430 BIC      #14,@#PSWORD
14849
14850 057020 122737 000003 042430 CMPB     #3,@#PSWORD     ;IS PS = 3
14851 057026 001403          BEQ      .+10
14852 057030 004767 001650      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14853                                     ;PS IS WRONG
14854 057034 000366          366          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14855                                     ;BY (013746 000172 000207)
14856
14857
14858 057036 010105          MOV      R1,R5          ;RESTORE R5
14859 057040 021527 000273      CMP      (R5),#273
14860 057044 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14861 057046 004767 001632      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14862                                     ;TEST IS IN WRONG SEQUENCE
14863 057052 000367          367          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14864                                     ;BY (013746 000172 000207)
14865

```

```

:*****
:TEST:273      DIV      0 77777 / #0 = DUMMY      REM      DUMMY      PS      3
:*****

```

14866 057054 005215
14867
14868
14869
14870
14871
14872 057056 010767 121110
14873 057062 012700 077777
14874 057066 012701 177777
14875 057072 071027 000002
14876 057076 106737 042430
14877 057102 042737 000014 042430
14878
14879 057110 122737 000002 042430
14880 057116 001403
14881 057120 004767 001530
14882
14883 057124 000370
14884
14885
14886
14887 057126 021527 000274
14888 057132 001403
14889 057134 004767 001544
14890
14891 057140 000371
14892
14893
14894 057142 005215
14895
14896 057144 012702 000002
14897 057150 012703 042472
14898 057154 012704 042474
14899
14900
14901
14902
14903
14904 057160 010767 121006
14905 057164 012700 000000
14906 057170 012701 052525
14907 057174 071067 163272
14908 057200 106737 042430
14909
14910 057204 122737 000000 042430
14911 057212 001403
14912 057214 004767 001464
14913
14914 057220 000372
14915
14916
14917
14918 057222 022700 025252
14919 057226 001403
14920 057230 004767 001450
14921

```
INC (R5)
:*****
:TEST:274 DIV 77777 177777 / #2 DUMMY REM DUMMY PS - 2
:*****
TST274: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #77777,%0 ;LOAD HIGH ORDER WITH 77777
MOV #177777,%0+1 ;LOAD LOW ORDER WITH 177777
DIV #2,%0 ;DIVIDE BY #2
MFPS @#PSWORD ;SAVE PS
BIC #14,@#PSWORD
(CMPB #2,@#PSWORD ;IS PS = 2
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
(CMP (R5),#274
BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;TEST IS IN WRONG SEQUENCE
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
INC (R5)
MOV #2,%2
MOV #S9,%3
MOV #S10,%4
:*****
:TEST:275 DIV 0 52525 / S9 = 25252 REM 1 PS 0
:*****
TST275: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
MOV #0,%0 ;LOAD HIGH ORDER WITH 0
MOV #52525,%0+1 ;LOAD LOW ORDER WITH 52525
DIV S9,%0 ;DIVIDE BY S9
MFPS @#PSWORD ;SAVE PS
(CMPB #0,@#PSWORD ;IS PS = 0
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;PS IS WRONG
;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
;BY (013746 000172 000207)
(CMP #25252,%0 ;IS QUOTIENT = 25252
BEQ .+10
JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
;QUOTIENT IS WRONG
```

```
14922 057234 000373          373          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14923                          ;BY (013746 000172 000207)
14924
14925
14926 057236 022701 000001      CMP      #1,%0+1          ;IS REMAINDER = 1
14927 057242 001403          BEQ      .+10
14928 057244 004767 001434      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14929                          ;WRONG REMAINDER
14930 057250 000374          374          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14931                          ;BY (013746 000172 000207)
14932
14933 057252 021527 000275      CMP      (R5),#275
14934 057256 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14935 057260 004767 001420      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14936                          ;TEST IS IN WRONG SEQUENCE
14937 057264 000375          375          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14938                          ;BY (013746 000172 000207)
14939
14940 057266 005215          INC      (R5)
14941
14942
14943
14944
14945
14946 057270 010767 120676      TST276: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
14947 057274 012700 000000      MOV    #0,%0          ;LOAD HIGH ORDER WITH 0
14948 057300 012701 052525      MOV    #52525,%0+1    ;LOAD LOW ORDER WITH 52525
14949 057304 071077 163164      DIV    @S10,%0        ;DIVIDE BY @S10
14950 057310 106737 042430      MFPS   @#PSWORD       ;SAVE PS
14951
14952 057314 122737 000000 042430  CMPB   #0,@#PSWORD     ;IS PS = 0
14953 057322 001403          BEQ      .+10
14954 057324 004767 001354      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14955                          ;PS IS WRONG
14956 057330 000376          376          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14957                          ;BY (013746 000172 000207)
14958
14959
14960 057332 022700 025252      CMP    #25252,%0      ;IS QUOTIENT - 25252
14961 057336 001403          BEQ      .+10
14962 057340 004767 001340      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14963                          ;QUOTIENT IS WRONG
14964 057344 000377          377          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14965                          ;BY (013746 000172 000207)
14966
14967
14968 057346 022701 000001      CMP    #1,%0+1        ;IS REMAINDER - 1
14969 057352 001403          BEQ      .+10
14970 057354 004767 001324      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14971                          ;WRONG REMAINDER
14972 057360 000400          400          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14973                          ;BY (013746 000172 000207)
14974
14975 057362 021527 000276      CMP    (R5),#276
14976 057366 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
14977 057370 004767 001310      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
```

```
14978                                     ;TEST IS IN WRONG SEQUENCE
14979 057374 000401                       401      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14980                                     ;BY (013746 000172 000207)
14981
14982 057376 005215                       INC      (R5)
14983
14984 :*****
14985 :TEST:277      DIV      0 52525 / @#S9 = 25252      REM 1      PS 0
14986 :*****
14987
14988 057400 010767 120566                   TST277: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
14989 057404 012700 000000                   MOV    #0,%0              ;LOAD HIGH ORDER WITH 0
14990 057410 012701 052525                   MOV    #52525,%0+1        ;LOAD LOW ORDER WITH 52525
14991 057414 071037 042472                   DIV    @#S9,%0            ;DIVIDE BY @#S9
14992 057420 106737 042430                   MFPS   @#PSWORD           ;SAVE PS
14993
14994 057424 122737 000000 042430           CMPB   #0,@#PSWORD        ;IS PS = 0
14995 057432 001403                       BEQ    .+10
14996 057434 004767 001244                   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
14997                                     ;PS IS WRONG
14998 057440 070402                       402      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
14999                                     ;BY (013746 000172 000207)
15000
15001
15002 057442 022700 025252                   CMP    #25252,%0          ;IS QUOTIENT = 25252
15003 057446 001403                       BEQ    .+10
15004 057450 004767 001230                   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15005                                     ;QUOTIENT IS WRONG
15006 057454 000403                       403      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15007                                     ;BY (013746 000172 000207)
15008
15009
15010 057456 022701 000001                   CMP    #1,%0+1           ;IS REMAINDER = 1
15011 057462 001403                       BEQ    .+10
15012 057464 004767 001214                   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15013                                     ;WRONG REMAINDER
15014 057470 000404                       404      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15015                                     ;BY (013746 000172 000207)
15016
15017 057472 021527 000277                   CMP    (R5),#277
15018 057476 001403                       BEQ    .+10              ;IF IN WRONG SEQUENCE GO TO THE HLT
15019 057500 004767 001200                   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15020                                     ;TEST IS IN WRONG SEQUENCE
15021 057504 000405                       405      ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15022                                     ;BY (013746 000172 000207)
15023
15024 057506 005215                       INC      (R5)
15025
15026 :*****
15027 :TEST:300      DIV      0 52525 / %2 = 25252      REM = 1      PS 0
15028 :*****
15029
15030 057510 010767 120456                   TST300: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
15031 057514 012700 000000                   MOV    #0,%0              ;LOAD HIGH ORDER WITH 0
15032 057520 012701 052525                   MOV    #52525,%0+1        ;LOAD LOW ORDER WITH 52525
15033 057524 071002                       DIV    %2,%0              ;DIVIDE BY %2
```

```

15034 057526 106737 042430 MFPS @#PSWORD ;SAVE PS
15035
15036 057532 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS = 0
15037 057540 001403 BEQ .+10
15038 057542 004767 001136 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15039 ;PS IS WRONG
15040 057546 000406 406 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15041 ;BY (013746 000172 000207)
15042
15043
15044 057550 022700 025252 CMP #25252,%0 ;IS QUOTIENT - 25252
15045 057554 001403 BEQ .+10
15046 057556 004767 001122 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15047 ;QUOTIENT IS WRONG
15048 057562 000407 407 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15049 ;BY (013746 000172 000207)
15050
15051
15052 057564 022701 000001 CMP #1,%0+1 ;IS REMAINDER = 1
15053 057570 001403 BEQ .+10
15054 057572 004767 001106 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15055 ;WRONG REMAINDER
15056 057576 000410 410 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001.03)
15057 ;BY (013746 000172 000207)
15058
15059 057600 021527 000300 CMP (R5),#300
15060 057604 001403 BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
15061 057606 004767 001072 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15062 ;TEST IS IN WRONG SEQUENCE
15063 057612 000411 411 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15064 ;BY (013746 000172 000207)
15065
15066 057614 005215 INC (R5)
15067
15068 :*****
15069 :TEST:301 DIV 0 52525 / (3)+ = 25252 REM - 1 PS 0
15070 :*****
15071
15072 057616 010767 120350 TST301: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
15073 057622 012700 000000 MOV #0,%0 ;LOAD HIGH ORDER WITH 0
15074 057626 012701 052525 MOV #52525,%0+1 ;LOAD LOW ORDER WITH 52525
15075 057632 071023 DIV (3)+,%0 ;DIVIDE BY (3)+
15076 057634 106737 042430 MFPS @#PSWORD ;SAVE PS
15077
15078 057640 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS = 0
15079 057646 001403 BEQ .+10
15080 057650 004767 001030 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15081 ;PS IS WRONG
15082 057654 000412 412 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15083 ;BY (013746 000172 000207)
15084
15085
15086 057656 022700 025252 CMP #25252,%0 ;IS QUOTIENT = 25252
15087 057662 001403 BEQ .+10
15088 057664 004767 001014 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15089 ;QUOTIENT IS WRONG

```

```
15090 057670 000413          413          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15091                                     :BY (013746 000172 000207)
15092
15093
15094 057672 022701 000001    CMP      #1,%0+1          :IS REMAINDER = 1
15095 057676 001403          BEQ      .+10
15096 057700 004767 001000    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15097                                     :WRONG REMAINDER
15098 057704 000414          414          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15099                                     :BY (013746 000172 000207)
15100
15101 057706 021527 000301    CMP      (R5),#301
15102 057712 001403          BEQ      .+10          :IF IN WRONG SEQUENCE GO TO THE HLT
15103 057714 004767 000764    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15104                                     :TEST IS IN WRONG SEQUENCE
15105 057720 000415          415          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15106                                     :BY (013746 000172 000207)
15107
15108 057722 005215          INC      (R5)
15109
15110 :*****
15111 :TEST:302 DIV 0 52525 / -(3) = 25252 REM = 1 PS = 0
15112 :*****
15113
15114 057724 010767 120242    TST302: MOV    PC,LPADR          :STORE ERROR LOOP ADDRESS
15115 057730 012700 000000    MOV      #0,%0          :LOAD HIGH ORDER WITH 0
15116 057734 012701 052525    MOV      #52525,%0+1    :LOAD LOW ORDER WITH 52525
15117 057740 071043          DIV      -(3),%0        :DIVIDE BY -(3)
15118 057742 106737 042430    MFPS     @#PSWORD       :SAVE PS
15119
15120 057746 122737 000000 042430 CMPB     #0,@#PSWORD     :IS PS = 0
15121 057754 001403          BEQ      .+10
15122 057756 004767 000722    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15123                                     :PS IS WRONG
15124 057762 000416          416          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15125                                     :BY (013746 000172 000207)
15126
15127
15128 057764 022700 025252    CMP      #25252,%0      :IS QUOTIENT = 25252
15129 057770 001403          BEQ      .+10
15130 057772 004767 000706    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15131                                     :QUOTIENT IS WRONG
15132 057776 000417          417          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15133                                     :BY (013746 000172 000207)
15134
15135
15136 060000 022701 000001    CMP      #1,%0+1          :IS REMAINDER = 1
15137 060004 001403          BEQ      .+10
15138 060006 004767 000672    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15139                                     :WRONG REMAINDER
15140 060012 000420          420          :TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15141                                     :BY (013746 000172 000207)
15142
15143 060014 021527 000302    CMP      (R5),#302
15144 060020 001403          BEQ      .+10          :IF IN WRONG SEQUENCE GO TO THE HLT
15145 060022 004767 000656    JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
```

```
15146                                     :TEST IS IN WRONG SEQUENCE
15147 060026 000421                       421       ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15148                                     ;BY (013746 000172 000207)
15149
15150 060030 005215                       INC      (R5)
15151
15152 ;*****
15153 ;TEST:303   DIV      0 52525 / 2(4) = 25252   REM - 1   PS  0
15154 ;*****
15155
15156 060032 010767 120134   TST303: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
15157 060036 012700 000000   MOV    #0,%0              ;LOAD HIGH ORDER WITH 0
15158 060042 012701 052525   MOV    #52525,%0+1        ;LOAD LOW ORDER WITH 52525
15159 060046 071064 000002   DIV    2(4),%0            ;DIVIDE BY 2(4)
15160 060052 106737 042430   MFPS   @#PSWORD          ;SAVE PS
15161
15162 060056 122737 000000 042430   CMPB   #0,@#PSWORD        ;IS PS = 0
15163 060064 001403          BEQ    .+10
15164 060066 004767 000612   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15165                                     ;PS IS WRONG
15166 060072 000422                       422       ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15167                                     ;BY (013746 000172 000207)
15168
15169
15170 060074 022700 025252   CMP    #25252,%0          ;IS QUOTIENT = 25252
15171 060100 001403          BEQ    .+10
15172 060102 004767 000576   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15173                                     ;QUOTIENT IS WRONG
15174 060106 000423                       423       ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15175                                     ;BY (013746 000172 000207)
15176
15177
15178 060110 022701 000001   CMP    #1,%0+1           ;IS REMAINDER = 1
15179 060114 001403          BEQ    .+10
15180 060116 004767 000562   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15181                                     ;WRONG REMAINDER
15182 060122 000424                       424       ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15183                                     ;BY (013746 000172 000207)
15184
15185 060124 021527 000303   CMP    (R5),#303
15186 060130 001403          BEQ    .+10               ;IF IN WRONG SEQUENCE GO TO THE HLT
15187 060132 004767 000546   JSR    PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15188                                     ;TEST IS IN WRONG SEQUENCE
15189 060136 000425                       425       ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15190                                     ;BY (013746 000172 000207)
15191
15192 060140 005215                       INC      (R5)
15193
15194 ;*****
15195 ;TEST:304   DIV      0 52525 / @ (4) = 25252   REM = 1   PS  C
15196 ;*****
15197
15198 060142 010767 120024   TST304: MOV    PC,LPADR      ;STORE ERROR LOOP ADDRESS
15199 060146 012700 000000   MOV    #0,%0              ;LOAD HIGH ORDER WITH 0
15200 060152 012701 052525   MOV    #52525,%0+1        ;LOAD LOW ORDER WITH 52525
15201 060156 071074 000900   DIV    @ (4),%0           ;DIVIDE BY @ (4)
```



```
15202 060162 106737 042430 MFPS @#PSWORD ;SAVE PS
15203
15204 060166 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS = 0
15205 060174 001403 BEQ .+10
15206 060176 004767 000502 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15207 ;PS IS WRONG
15208 060202 000426 426 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15209 ;BY (013746 000172 000207)
15210
15211
15212 060204 022700 025252 CMP #25252,%0 ;IS QUOTIENT = 25252
15213 060210 001403 BEQ .+10
15214 060212 004767 000466 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15215 ;QUOTIENT IS WRONG
15216 060216 000427 427 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15217 ;BY (013746 000172 000207)
15218
15219
15220 060220 022701 000001 CMP #1,%0+1 ;IS REMAINDER = 1
15221 060224 001403 BEQ .+10
15222 060226 004767 000452 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15223 ;WRONG REMAINDER
15224 060232 000430 430 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15225 ;BY (013746 000172 000207)
15226
15227 060234 021527 000304 CMP (R5),#304
15228 060240 001403 BEQ .+10 ;IF IN WRONG SEQUENCE GO TO THE HLT
15229 060242 004767 000436 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15230 ;TEST IS IN WRONG SEQUENCE
15231 060246 000431 431 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15232 ;BY (013746 000172 000207)
15233
15234 060250 005215 INC (R5)
15235
15236 ;*****
15237 ;TEST:305 DIV 0 52525 / @ (4)+ = 25252 REM 1 PS - 0
15238 ;*****
15239
15240 060252 010767 117714 TST305: MOV PC,LPADR ;STORE ERROR LOOP ADDRESS
15241 060256 012700 000000 MOV #0,%0 ;LOAD HIGH ORDER WITH 0
15242 060262 012701 052525 MOV #52525,%0+1 ;LOAD LOW ORDER WITH 52525
15243 060266 071034 DIV @ (4)+,%0 ;DIVIDE BY @ (4)+
15244 060270 106737 042430 MFPS @#PSWORD ;SAVE PS
15245
15246 060274 122737 000000 042430 CMPB #0,@#PSWORD ;IS PS = 0
15247 060302 001403 BEQ .+10
15248 060304 004767 000374 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15249 ;PS IS WRONG
15250 060310 000432 432 ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15251 ;BY (013746 000172 000207)
15252
15253
15254 060312 022700 025252 CMP #25252,%0 ;IS QUOTIENT = 25252
15255 060316 001403 BEQ .+10
15256 060320 004767 000360 JSR PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15257 ;QUOTIENT IS WRONG
```

```
15258 060324 000433          433          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15259                               ;BY (013746 000172 000207)
15260
15261
15262 060326 022701 000001      CMP      #1,%0+1          ;IS REMAINDER = 1
15263 060332 001403          BEQ      .+10
15264 060334 004767 000344      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15265                               ;WRONG REMAINDER
15266 060340 000434          434          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15267                               ;BY (013746 000172 000207)
15268
15269 060342 021527 000305      CMP      (R5),#305
15270 060346 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
15271 060350 004767 000330      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15272                               ;TEST IS IN WRONG SEQUENCE
15273 060354 000435          435          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15274                               ;BY (013746 000172 000207)
15275
15276 060356 005215          INC      (R5)
15277
15278
15279 :*****
15280 :TEST:306      DIV      0 52525 / @-(4) = 25252      REM - 1      PS 0
15281 :*****
15282 060360 010767 117606      TST306: MOV      PC,LPADR          ;STORE ERROR LOOP ADDRESS
15283 060364 012700 000000      MOV      #0,%0          ;LOAD HIGH ORDER WITH 0
15284 060370 012701 052525      MOV      #52525,%0+1    ;LOAD LOW ORDER WITH 52525
15285 060374 071054          DIV      @-(4),%0        ;DIVIDE BY @-(4)
15286 060376 106737 042430      MFPS     @#PSWORD        ;SAVE PS
15287
15288 060402 122737 000000 042430  CMPB     #0,@#PSWORD      ;IS PS = 0
15289 060410 001403          BEQ      .+10
15290 060412 004767 000266      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15291                               ;PS IS WRONG
15292 060416 000436          436          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15293                               ;BY (013746 000172 000207)
15294
15295
15296 060420 022700 025252      CMP      #25252,%0        ;IS QUOTIENT = 25252
15297 060424 001403          BEQ      .+10
15298 060426 004767 000252      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15299                               ;QUOTIENT IS WRONG
15300 060432 000437          437          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15301                               ;BY (013746 000172 000207)
15302
15303
15304 060434 022701 000001      CMP      #1,%0+1          ;IS REMAINDER = 1
15305 060440 001403          BEQ      .+10
15306 060442 004767 000236      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
15307                               ;WRONG REMAINDER
15308 060446 000440          440          ;TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
15309                               ;BY (013746 000172 000207)
15310
15311 060450 021527 000306      CMP      (R5),#306
15312 060454 001403          BEQ      .+10          ;IF IN WRONG SEQUENCE GO TO THE HLT
15313 060456 004767 000222      JSR      PC,$HLT;SEEN AN ERROR, GO TO THE HALT ROUTINE
```

15314
15315 060462 000441
15316
15317
15318 060464 005215
15319

441

INC (R5)

:TEST IS IN WRONG SEQUENCE
:TO SCOPE, REPLACE LAST: BEQ .+10 (001403)
:BY (013746 000172 000207)

```

15320
15321
15322
15323
15324
15325
15326
15327
15328 060466 005227 177777
15329 060472 001002
15330 060474 104401 060642
15331 060500 005267 117602
15332 060504 042767 100000 117574
15333 060512 005327
15334 060514 000001
15335 060516 003037
15336 060520 012737
15337 060522 000016
15338 060524 060514
15339 060526 104401 060625
15340 060532 016746 117550
15341 060536 104405
15342 060540 104401 060622
15343 060544 013700 000042
15344 060550 001405
15345 060552 000005
15346 060554 004710
15347 060556 000240
15348 060560 000240
15349 060562 000240
15350 060564 013746 000004
15351 060570 012737 060606 000004
15352 060576 012737 000001 164000
15353 060604 000402
15354 060606 062706 000004
15355 060612 012637 000004
15356 060616 000137
15357 060620 001024
15358 060622 377 000
15359 060625 015 042412 042116
15360 060632 050040 051501 020123
15361 060640 000043
15362 060642 005015 045103 042113
15363 060650 042102 020060 041504
15364 060656 030506 026461 040501
15365 060664 041440 052520 042040
15366 060672 040511 047107 051517
15367 060700 044524 000103
15368

```

```

.SBTTL END OF PASS ROUTINE
:*****
:*INCREMENT THE PASS NUMBER ($PASS) IN APT MAILBOX
:*TYPE 'END PASS #XXXXX' (WHERE XXXXX IS A DECIMAL NUMBER)
:*IF THERE IS A MONITOR GO TO IT
:*IF THERE ISN'T JUMP TO RESTART
:*****
$EOP: INC #-1 ;TYPE ID ONLY ON FIRST PASS
      BNE SKPMSG ;BRANCH AROUND AFTER FIRST PASS
      TYPE ,MSG1 ;TYPE TITLE
SKPMSG: INC $PASS ;INCREMENT THE PASS NUMBER
      BIC #10000,$PASS ;DON'T LET COUNT GO NEGATIVE
      DEC (PC)+ ;LOOP?
$EOPCT: .WORD 1
      BGT $DDAGN ;YES
      MOV (PC)+,@(PC)+ ;RESTORE LOOP COUNTER
$ENDCT: .WORD 16
      $EOPCT
      TYPE ,SENDMG ;TYPE 'END PASS #'
      MOV $PASS,-(SP) ;SAVE PASS COUNT FOR TYPEOUT
      TYPDS ;GO TYPE PASS COUNT IN DECIMAL
      TYPE ,SENUL ;TYPE A FEW NULL CHARACTERS
$GET42: MOV @#42,R0 ;GET MONITOR ADDRESS
      BEQ DOAGIN ;BRANCH IF NO MONITOR
      RESET ;CLEAR THE WORLD
$ENDAD: JSR PC,(R0) ;GO TO MONITOR
      NOP ;SAVE ROOM
      NOP ;FOR
      NOP ;ACT11
DOAGIN: MOV @#4,-(SP) ;SAVE CONTENTS OF LOCATION 4
      MOV #1,@#4 ;SET UP IN CASE OF TRAP
      MOV #1,@#164000 ;NOTIFY MULTI-TESTER WE'RE DONE
      BR 2$ ;NO TRAP SO DON'T RESET STACK
1$: ADD #4,SP ;RESET STACK AFTER TRAP
2$: MOV (SP)+,@#4 ;RESTORE LOCATION 4 FOR TESTING
$DOAGN: JMP @(PC)+ ;RETURN TO TEST
$RTNAD: .WORD RESTR
$ENUL: .BYTE -1,-1,0 ;NULL CHARACTER STRING
$ENDMG: .ASCIZ <15><12>/END PASS #/
MSG1: .ASCIZ <15><12>/CJKDBD0 DCF11-AA CPU DIAGNOSTIC/
.EVEN

```

```

15369 .SBTTL HALT ROUTINE
15370
15371 :* HALT ROUTINE
15372 :* -----
15373 :*
15374 :*
15375 :* PROGRAM COMES HERE ON ENCOUNTERING ANY ERROR
15376 :*
15377
15378 060704 017637 000000 000302 $HLT: MOV @($P),@($FATAL) ;PLACE THE ERROR NUMBER AT LOCATION $FATAL
15379 060712 011637 061072 MOV ($P),@($CONTIN) ;SAVE ERROR NUMBER ADDRESS
15380 060716 032777 020000 146530 BIT #20000,@$SWR ;HAS THE OPERATOR ASKED TO SUPRESS ERROR TYPE OUTS
15381 060724 001021 BNE 6$
15382 060726 104401 042506 TYPE , $CRLF ;GO AND TYPE A CR, LF, FOLLOWED BY 3 SPACES
15383 060732 104401 061032 TYPE ,MSGERR ;INFORM ERROR
15384 060736 104401 042506 TYPE , $CRLF ;GO AND TYPE A CR, LF, FOLLOWED BY 3 SPACES
15385 060742 013746 061072 MOV @($CONTIN,-($P)) ;RETRIVE ERROR NUMBER ADDR
15386 060746 162716 000004 SUB #4,($P) ;CALCULATE ERROR PC
15387 060752 104402 -YPOC ;TYPE PC
15388 060754 104401 042506 TYPE , $CRLF ;GO AND TYPE A CR, LF, FOLLOWED BY 3 SPACES
15389 060760 013746 000302 MOV @($FATAL,-($P)) ;RETRIVE ERROR NUMBER
15390 060764 104403 ;TYPE ERROR NUMBER
15391 060766 003 .BYTE 3
15392 060767 000 .BYTE 0
15393 060770 105767 117324 6$: TSTB $ENV ;IF WE ARE NOT UNDER APT. THEN GO TO
15394 060774 001403 BEQ 8$ ;8$
15395 060776 005237 000300 INC @($MSGTY) ;OTHERWISE INFORM APT. ABOUT SEEING THE ERROR
15396 061002 000777 BR . ;AND LOOP
15397 061004 104401 042506 8$: TYPE , $CRLF ;GO AND TYPE A CR, LF, FOLLOWED BY 3 SPACES
15398 061010 005777 146440 TST @($SWR) ;IS IT REQUIRED TO HALT ON ERROR ?
15399 061014 100001 BPL 10$ ;IF NOT THEN GO TO 10$
15400 061016 000000 HALT
15401 061020 013746 061072 10$: MOV @($CONTIN,-($P)) ;
15402 061024 062716 000002 ADD #2,($P) ;CALCULATE RETURN ADDRESS
15403 061030 000207 RTS PC ;RETURN
15404 061032 042440 051122 051117 MSGERR: .ASCIZ / ERROR! PC, AND ERROR # ARE: /
15405 061040 020041 020040 041520
15406 061046 020054 047101 020104
15407 061054 051105 047522 020122
15408 061062 020043 051101 035105
15409 061070 000040
15410
15411 061072 000000 .EVEN
CONTIN: .WORD 0
15412
15413 .SBTTL POWER FAIL ROUTINE
15414 061074 012767 061104 116722 PWRDN: MOV #PWRUP,24
15415 061102 000000 HALT
15416
15417 061104 012767 061074 116712 PWRUP: MOV #PWRDN,24
15418 061112 012706 001000 MOV #BUFF,$P
15419 061116 132767 000040 117175 BITB #40,$ENVM ;WILL APT ALLOW PRINTING?
15420 061124 001013 BNE PFRES ;NO
15421 061126 012700 061160 MOV #MSGPWF,$R0 ;GET MSG ADDR.
15422 061132 105737 177564 PWAIT: TSTB @($TPS) ;TTY READY
15423 061136 100375 BPL PWAIT ;NO WAIT
15424 061140 112037 177566 MOVB ($R0)+,@($TPB) ;PRINT CHARACTER

```

15425 061144 001372
 15426 061146 105737 177564
 15427 061152 100375
 15428 061154 000167 117644
 15429 061160 005015 047520
 15430 061166 020122 040506
 15431 061174 042105 000041

042527
046111

BNE PWAIT ;NEXT IF NOT DONE.
 PWAIT1: TSTB @WTPS
 BPL PWAIT1
 PFRES: JMP RESTR
 MSGPWF: .ASCIZ <15><12>.POWER FAILED..

.EVEN
.SBTTL TYPE ROUTINE

 *ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
 *THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
 *NOTE1: \$NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
 *NOTE2: \$FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
 *NOTE3: \$FILLC CONTAINS THE CHARACTER TO FILL AFTER.
 *

*CALL:
 *1) USING A TRAP INSTRUCTION
 * TYPE ,MESADR ;:MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
 *OR
 * TYPE
 * MESADR
 *

15450 061200 105767 000337
 15451 061204 100002
 15452 061206 000000
 15453 061210 000430
 15454 061212 010046
 15455 061214 017600 000002
 15456 061220 122767 000001 117072
 15457 061226 001011
 15458 061230 132767 000100 117063
 15459 061236 001405
 15460 061240 010067 000004
 15461 061244 004767 000306
 15462 061250 000000
 15463 061252 132767 000040 117041
 15464 061260 001003
 15465 061262 112046
 15466 061264 001005
 15467 061266 005726
 15468 061270 012600
 15469 061272 062716 000002
 15470 061276 000002
 15471 061300 122716 000011
 15472 061304 001430
 15473 061306 122716 000200
 15474 061312 001006
 15475 061314 005726
 15476 061316 104401
 15477 061320 042506
 15478 061322 105067 000202
 15479 061326 000755
 15480 061330 004767 000056

\$TYPE: TSTB \$TPFLG ;:IS THERE A TERMINAL?
 BPL 1\$;:BR IF YES
 HALT ;:HALT HERE IF NO TERMINAL
 BR 3\$;:LEAVE
 1\$: MOV RO,-(SP) ;:SAVE RO
 MOV @2(SP),RO ;:GET ADDRESS OF ASCIZ STRING
 CMPB #APTENV,\$ENV ;:RUNNING IN APT MODE
 BNE 62\$;:NO,GO CHECK FOR APT CONSOLE
 BITB #APTSPOOL,\$ENVM ;:SPOOL MESSAGE TO APT
 BEQ 62\$;:NO,GO CHECK FOR CONSOLE
 MOV RO,61\$;:SETUP MESSAGE ADDRESS FOR APT
 JSR PC,\$ATY3 ;:SPOOL MESSAGE TO APT
 61\$: .WORD 0 ;:MESSAGE ADDRESS
 62\$: BITB #APTCSUP,\$ENVM ;:APT CONSOLE SUPPRESSED
 BNE 60\$;:YES,SKIP TYPE OUT
 2\$: MOVB (RO)+,-(SP) ;:PUSH CHARACTER TO BE TYPED ONTO STACK
 BNE 4\$;:BR IF IT ISN'T THE TERMINATOR
 TST (SP)+ ;:IF TERMINATOR POP IT OFF THE STACK
 60\$: MOV (SP)+,RO ;:RESTORE RO
 3\$: ADD #2,(SP) ;:ADJUST RETURN PC
 RTI ;:RETURN
 4\$: CMPB #HT,(SP) ;:BRANCH IF <HT>
 BEQ 8\$
 CMPB #CRLF,(SP) ;:BRANCH IF NOT <CRLF>
 BNE 5\$
 TST (SP)+ ;:POP <CR><LF> EQUIV
 TYPE ;:TYPE A CR AND LF
 \$CRLF
 CLRB \$CHARCNT ;:CLEAR CHARACTER COUNT
 BR 2\$;:GET NEXT CHARACTER
 5\$: JSR PC,\$TYPEC ;:GO TYPE THIS CHARACTER

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15481 061334 126726 000207      6$:  CMPB  $FILLC,(SP)+  ;; IS IT TIME FOR FILLER CHARS.?
15482 061340 001350              BNE  2$                ;; IF NO GO GET NEXT CHAR.
15483 061342 016746 000172      MOV  $NULL,-(SP)      ;; GET # OF FILLER CHARS. NEEDED.
15484                                ;; AND THE NULL CHAR.
15485 061346 105366 000001      7$:  DECB  1(SP)        ;; DOES A NULL NEED TO BE TYPED?
15486 061352 002770              BLT  6$                ;; BR IF NO--GO POP THE NULL OFF OF STACK
15487 061354 004767 000032      JSR  PC,$TYPEC        ;; GO TYPE A NULL
15488 061360 105367 000144      DECB  $CHARCNT        ;; DO NOT COUNT AS A COUNT
15489 061364 000770              BR   7$                ;; LOOP
15490
15491                                ;HORIZONTAL TAB PROCESSOR
15492
15493 061366 112716 000040      8$:  MOVB  #' ,(SP)    ;; REPLACE TAB WITH SPACE
15494 061372 004767 000014      9$:  JSR  PC,$TYPEC    ;; TYPE A SPACE
15495 061376 132767 000007 000124 BITB  #7,$CHARCNT    ;; BRANCH IF NOT AT
15496 061404 001372              BNE  9$                ;; TAB STOP
15497 061406 005726              TST  (SP)+            ;; POP SPACE OFF STACK
15498 061410 000724              BR   2$                ;; GET NEXT CHARACTER
15499 061412
15500 061412 105777 000116      $TYPEC: TSTB  @$TKS          ;; CHAR IN KYBD BUFFER?
15501 061416 100022              BPL  10$              ;; BR IF NOT
15502 061420 017746 000112      MOV  @$TKB,-(SP)     ;; GET CHAR
15503 061424 042716 177600      BIC  #177600,(SP)   ;; STRIP EXTRANEIOUS BITS
15504 061430 122716 000023      CMPB  #$XOFF,(SP)   ;; WAS CHAR XOFF
15505 061434 001012              BNE  102$            ;; BR IF NOT
15506 061436
15507 061436 105777 000072      101$: TSTB  @$TKS          ;; WAIT FOR CHAR
15508 061442 100375              BPL  101$            ;; BR IF NOT
15509 061444 117716 000066      MOVB  @$TKB,(SP)    ;; GET CHAR
15510 061450 042716 177600      BIC  #177600,(SP)   ;; STRIP IT
15511 061454 122716 000021      CMPB  #$XON,(SP)    ;; WAS IT XON?
15512 061460 001366              BNE  101$            ;; BR IF NOT
15513 061462
15514 061462 005726              102$: TST  (SP)+        ;; FIX STACK
15515 061464
15516 061464 105777 161014      10$:  TSTB  @$TPS          ;; WAIT UNTIL PRINTER IS READY
15517 061470 100375              BPL  10$              ;; BR IF NOT
15518 061472 116677 000002 161002 MOVB  2(SP),@$TPB    ;; LOAD CHAR TO BE TYPED INTO DATA REG.
15519 061500 122766 000015 000002 CMPB  #CR,2(SP)     ;; IS CHARACTER A CARRIAGE RETURN?
15520 061506 001003              BNE  1$                ;; BRANCH IF NO
15521 061510 105067 000014      CLRB  $CHARCNT      ;; YES--CLEAR CHARACTER COUNT
15522 061514 000406              BR   $TYPEX           ;; EXIT
15523 061516 122766 000012 000002 1$:  CMPB  #LF,2(SP)    ;; IS CHARACTER A LINE FEED?
15524 061524 001402              BEQ  $TYPEX           ;; BRANCH IF YES
15525 061526 105227              INCB  (PC)+          ;; COUNT THE CHARACTER
15526 061530 000000      $CHARCNT: .WORD 0   ;; CHARACTER COUNT STORAGE
15527 061532 000207      $TYPEX: RTS  PC
15528
15529 061534 177560      $TKS: .WORD 177560  ;; TTY KDB STATUS
15530 061536 177562      $TKB: .WORD 177562  ;; TTY KDB BUFFER
15531 061540 000          $NULL: .BYTE 0      ;; CONTAINS NULL CHARACTER FOR FILLS
15532 061541 002          $FILLS: .BYTE 2     ;; CONTAINS # OF FILLER CHARACTERS REQUIRED
15533 061542 012          $FILLC: .BYTE 12   ;; INSERT FILL CHARS. AFTER A 'LINE FEED'
15534 061543 000          $TPFLG: .BYTE 0    ;; 'TERMINAL AVAILABLE' FLAG (BIT<07>=0=YES)
15535 061544 077          $QUES: .ASCII '?'  ;; QUESTION MARK
15536 061545 012 000      $LF: .ASCII <12>  ;; LINEFEED

```

```

15537          061550          .EVEN
15538          .SBTTL  APT COMMUNICATIONS ROUTINE
15539
15540          :*****
15541 061550 112767 000001 000236 $ATY1:  MOVB  #1,$FFLG      ;;TO REPORT FATAL ERROR
15542 061556 112767 000001 000226 $ATY3:  MOVB  #1,$MFLG      ;;TO TYPE A MESSAGE
15543 061564 000403          BR          $ATYC
15544 061566 112767 000001 000220 $ATY4:  MOVB  #1,$FFLG      ;;TO ONLY REPORT FATAL FROR
15545 061574          $ATYC:
15546 061574 010046          MOV    R0,-(SP)      ;;PUSH R0 ON STACK
15547 061576 010146          MOV    R1,-(SP)      ;;PUSH R1 ON STACK
15548 061600 105767 000206          TSTB  $MFLG      ;;SHOULD TYPE A MESSAGE?
15549 061604 001450          BEQ   5$          ;;IF NOT: BR
15550 061606 122767 000001 116504          CMPB  #APTENV,$ENV  ;;OPERATING UNDER APT?
15551 061614 001031          BNE   3$          ;;IF NOT: BR
15552 061616 132767 000100 116475          BITB  #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
15553 061624 001425          BEQ   3$          ;;IF NOT: BR
15554 061626 017600 000004          MOV    @4(SP),R0     ;;GET MESSAGE ADDR.
15555 061632 062766 000002 000004          ADD    #2,4(SP)     ;;BUMP RETURN ADDR.
15556 061640 005767 116434          1$:  TST    $MSGTYPE     ;;SEE IF DONE W/ LAST XMISSION?
15557 061644 001375          BNE   1$          ;;IF NOT: WAIT
15558 061646 010067 116442          MOV    R0,$MSGAD     ;;PUT ADDR IN MAILBOX
15559 061652 105720          2$:  TSTB  (R0)+        ;;FIND END OF MESSAGE
15560 061654 001376          BNE   2$
15561 061656 166700 116432          SUB    $MSGAD,R0     ;;SUB START OF MESSAGE
15562 061662 006200          ASR   R0             ;;GET MESSAGE LGTH IN WORDS
15563 061664 010067 116426          MOV    R0,$MSGGLGT   ;;PUT LENGTH IN MAILBOX
15564 061670 012767 000004 116402          MOV    #4,$MSGTYPE   ;;TELL APT TO TAKE MSG.
15565 061676 000413          BR    5$
15566 061700 017667 000004 000016 3$:  MOV    @4(SP),4$     ;;PUT MSG ADDR IN JSR LINKAGE
15567 061706 062766 000002 000004          ADD    #2,4(SP)     ;;BUMP RETURN ADDRESS
15568 061714 016746          MOV    177776,-(SP) ;;PUSH 177776 ON STACK
15569 061720 004767 177254          JSR   PC,$TYPE      ;;CALL TYPE MACRO
15570 061724 000000          4$:  .WORD  0
15571 061726          5$:
15572 061726 105767 000062          10$: TSTB  $FFLG      ;;SHOULD REPORT FATAL ERROR?
15573 061732 001416          BEQ   12$          ;;IF NOT: BR
15574 061734 005767 116360          TST   $ENV          ;;RUNNING UNDER APT?
15575 061740 001413          BEQ   12$          ;;IF NOT: BR
15576 061742 005767 116332          11$: TST   $MSGTYPE     ;;FINISHED LAST MESSAGE?
15577 061746 001375          BNE   11$          ;;IF NOT: WAIT
15578 061750 017667 000004 116324          MOV    @4(SP),$FATAL ;;GET ERROR #
15579 061756 062766 000002 000004          ADD    #2,4(SP)     ;;BUMP RETURN ADDR.
15580 061764 005267 116310          INC    $MSGTYPE     ;;TELL APT TO TAKE ERROR
15581 061770 105067 000020          12$: CLRB  $FFLG      ;;CLEAR FATAL FLAG
15582 061774 105067 000013          CLRB  $LFLG      ;;CLEAR LOG FLAG
15583 062000 105067 000006          CLRB  $MFLG      ;;CLEAR MESSAGE FLAG
15584 062004 012601          MOV    (SP)+,R1     ;;POP STACK INTO R1
15585 062006 012600          MOV    (SP)+,R0     ;;POP STACK INTO R0
15586 062010 000207          RTS   PC           ;;RETURN
15587 062012          000          $MFLG: .BYTE  0     ;;MESSG. FLAG
15588 062013          000          $LFLG: .BYTE  0     ;;LOG FLAG
15589 062014          000          $FFLG: .BYTE  0     ;;FATAL FLAG
15590          062016          .EVEN
15591          000200          APTSIZE=200
15592          000001          APTENV=001
  
```



```
15593 000100 APTSPool-100
15594 000040 APTCSUP=040
15595 .SBTTL CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
15596
15597 :*****
15598 :*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
15599 :*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
15600 :*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
15601 :*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
15602 :*REPLACED WITH SPACES.
15603 :*CALL:
15604 :*      MOV      NUM,-(SP)      ;;PUT THE BINARY NUMBER ON THE STACK
15605 :*      TYPDS                    ;;GO TO THE ROUTINE
15606
15607 $TYPDS:
15608 MOV      R0,-(SP)      ;;PUSH R0 ON STACK
15609 MOV      R1,-(SP)      ;;PUSH R1 ON STACK
15610 MOV      R2,-(SP)      ;;PUSH R2 ON STACK
15611 MOV      R3,-(SP)      ;;PUSH R3 ON STACK
15612 MOV      R5,-(SP)      ;;PUSH R5 ON STACK
15613 MOV      #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
15614 MOV      20(SP),R5      ;;GET THE INPUT NUMBER
15615 BPL      1$            ;;BR IF INPUT IS POS.
15616 NEG      R5            ;;MAKE THE BINARY NUMBER POS.
15617 MOVB    #'-,1(SP)      ;;MAKE THE ASCII NUMBER NEG.
15618 CLR      R0            ;;ZERO THE CONSTANTS INDEX
15619 MOV      #SDBLK,R3      ;;SETUP THE OUTPUT POINTER
15620 MOVB    #' ,(R3)+      ;;SET THE FIRST CHARACTER TO A BLANK
15621 CLR      R2            ;;CLEAR THE BCD NUMBER
15622 MOV      $DTBL(R0),R1   ;;GET THE CONSTANT
15623 SUB     R1,R5          ;;FORM THIS BCD DIGIT
15624 BLT     4$            ;;BR IF DONE
15625 INC     R2            ;;INCREASE THE BCD DIGIT BY 1
15626 BR     3$
15627 ADD     R1,R5          ;;ADD BACK THE CONSTANT
15628 TST     R2            ;;CHECK IF BCD DIGIT 0
15629 BNE     5$            ;;FALL THROUGH IF 0
15630 TSTB   (SP)          ;;STILL DOING LEADING 0'S?
15631 BMI     7$            ;;BR IF YES
15632 ASLB   (SP)          ;;MSD?
15633 BCC     6$            ;;BR IF NO
15634 MOVB   1(SP),-1(R3)    ;;YES--SET THE SIGN
15635 BIS     #'0,R2         ;;MAKE THE BCD DIGIT ASCII
15636 BIS     #' ,R2        ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
15637 MOVB   R2,(R3)+      ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
15638 TST    (R0)+         ;;JUST INCREMENTING
15639 CMP    R0,#10        ;;CHECK THE TABLE INDEX
15640 PLT    2$            ;;GO DO THE NEXT DIGIT
15641 BGT    8$            ;;GO TO EXIT
15642 MOV    R5,R2         ;;GET THE LSD
15643 BR     6$            ;;GO CHANGE TO ASCII
15644 TSTB   (SP)+         ;;WAS THE LSD THE FIRST NON-ZERO?
15645 SPL    9$            ;;BR IF NO
15646 MOVB   -1(SP),-2(R3)  ;;YES--SET THE SIGN FOR TYPING
15647 CLRB   (R3)          ;;SET THE TERMINATOR
15648 MOV    (SP)+,R5      ;;POP STACK INTO R5
```

15649 062174 012603
 15650 062176 012602
 15651 062200 012601
 15652 062202 012600
 15653 062204 104401 062232
 15654 062210 016666 000002 0G0004
 15655 062216 012616
 15656 062220 000002
 15657 062222 023420
 15658 062224 001750
 15659 062226 000144
 15660 062230 000012
 15661 062232 000004
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 15687 062242 017646 000000
 15688 062246 116667 000001 000211
 15689 062254 112667 000207
 15690 062260 062716 000002
 15691 062264 000406
 15692 062266 112767 000001 000171
 15693 062274 112767 000006 000165
 15694 062302 112767 000005 000154
 15695 062310 010346
 15696 062312 010446
 15697 062314 010546
 15698 062316 116704 000145
 15699 062322 005404
 15700 062324 062704 000006
 15701 062330 110467 000132
 15702 062334 116704 000125
 15703 062340 016605 000012
 15704 062344 005003

```

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 $DBLK        ;;NOW TYPE THE NUMBER
MOV 2(SP),4(SP)  ;;ADJUST THE STACK
MOV (SP)+,(SP)
RTI              ;;RETURN TO USER

$DTBL: 10000.
      1000.
      100.
      10.
$DBLK: .BLKW 4
.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
*$TYPOS: MOV @ (SP),-(SP) ;;PICKUP THE MODE
MOV 1(SP),%OFILL ;;LOAD ZERO FILL SWITCH
MOV 2(SP),%MODE+1 ;;NUMBER OF DIGITS TO TYPE
ADD #2,(SP) ;;ADJUST RETURN ADDRESS
BR $TYPON
*$TYPOC: MOV #1,%OFILL ;;SET THE ZERO FILL SWITCH
MOV #6,%MODE+1 ;;SET FOR SIX(6) DIGITS
*$TYPON: MOV #5,%CNT ;;SET THE ITERATION COUNT
MOV R3,-(SP) ;;SAVE R3
MOV R4,-(SP) ;;SAVE R4
MOV R5,-(SP) ;;SAVE R5
MOV #5,%MODE+1,R4 ;;GET THE NUMBER OF DIGITS TO TYPE
NEG R4
ADD #6,R4 ;;SUBTRACT IT FOR MAX. ALLOWED
MOV R4,%MODE ;;SAVE IT FOR USE
MOV %OFILL,R4 ;;GET THE ZERO FILL SWITCH
MOV 12(SP),R5 ;;PICKUP THE INPUT NUMBER
CLR R3 ;;CLEAR THE OUTPUT WORD

```

```

15705 062346 006105          1$:  ROL    R5          ;;ROTATE MSB INTO 'C''
15706 062350 000404          BR     3$          ;;GO DO MSB
15707 062352 006105          2$:  ROL    R5          ;;FORM THIS DIGIT
15708 062354 006105          ROL    R5
15709 062356 006105          ROL    R5
15710 062360 010503          MOV    R5,R3
15711 062362 006103          3$:  ROL    R3          ;;GET LSB OF THIS DIGIT
15712 062364 105367 000076  DECB   $OMODE     ;;TYPE THIS DIGIT?
15713 062370 100016          BPL    7$          ;;BR IF NO
15714 062372 042703 177770  BIC    #177770,R3 ;;GET RID OF JUNK
15715 062376 001002          BNE    4$          ;;TEST FOR 0
15716 062400 005704          TST    R4          ;;SUPPRESS THIS 0?
15717 062402 001403          BEQ    5$          ;;BR IF YES
15718 062404 005204          4$:  INC    R4          ;;DON'T SUPPRESS ANYMORE 0'S
15719 062406 052703 000060  BIS    #'0,R3     ;;MAKE THIS DIGIT ASCII
15720 062412 052703 000040  BIS    #' ,R3     ;;MAKE ASCII IF NOT ALREADY
15721 062416 110367 000040  MOVB   R3,8$      ;;SAVE FOR TYPING
15722 062422 104401 062462  TYPE   ,8$        ;;GO TYPE THIS DIGIT
15723 062426 105367 000032  7$:  DECB   $OCNT     ;;COUNT BY 1
15724 062432 003347          BGT    2$          ;;BR IF MORE TO DO
15725 062434 002402          BLT    6$          ;;BR IF DONE
15726 062436 005204          INC    R4          ;;INSURE LAST DIGIT ISN'T A BLANK
15727 062440 000744          BR     2$          ;;GO DO THE LAST DIGIT
15728 062442 012605          6$:  MOV    (SP)+,R5  ;;RESTORE R5
15729 062444 012604          MOV    (SP)+,R4  ;;RESTORE R4
15730 062446 012603          MOV    (SP)+,R3  ;;RESTORE R3
15731 062450 016666 000002 000004  MOV    2(SP),4(SP) ;;SET THE STACK FOR RETURNING
15732 062456 012616          MOV    (SP)+,(SP)
15733 062460 000002          RTI                    ;;RETURN
15734 062462 000          8$:  .BYTE  0          ;;STORAGE FOR ASCII DIGIT
15735 062463 000          .BYTE  0          ;;TERMINATOR FOR TYPE ROUTINE
15736 062464 000          $OCNT: .BYTE  0     ;;OCTAL DIGIT COUNTER
15737 062465 000          $OFILL: .BYTE  0    ;;ZERO FILL SWITCH
15738 062466 000000          $OMODE: .WORD  0    ;;NUMBER OF DIGITS TO TYPE
15739          .SBTTL TRAP DECODER
15740
15741          ;*****
15742          ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE 'TRAP' INSTRUCTION
15743          ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
15744          ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
15745          ;*GO TO THAT ROUTINE.
15746
15747 062470 010046          $TRAP: MOV    R0,-(SP)  ;;SAVE R0
15748 062472 016600 000002  MOV    2(SP),R0     ;;GET TRAP ADDRESS
15749 062476 005740          TST    -(R0)        ;;BACKUP BY 2
15750 062500 111000          MOVB   (R0),R0     ;;GET RIGHT BYTE OF TRAP
15751 062502 006300          ASL    R0           ;;POSITION FOR INDEXING
15752 062504 016000 062524  MOV    $TRPAD(R0),R0 ;;INDEX TO TABLE
15753 062510 000200          RTS    R0           ;;GO TO ROUTINE
15754
15755
15756          ;;THIS IS USE TO HANDLE THE 'GETPRI' MACRO
15757
15758 062512 011646          $TRAP2: MOV   (SP),-(SP) ;;MOVE THE PC DOWN
15759 062514 016666 000004 000002  MOV   4(SP),2(SP)  ;;MOVE THE PSW DOWN
15760 062522 000002          RTI                    ;;RESTORE THE PSW

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15761
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15769 062524 062512
15770 062526 061200
15771 062530 062266
15772 062532 062242
15773 062534 062302
15774 062536 062016
15775
15776
15777 062540 177777
15778 000001

.SBTTL TRAP TABLE

.*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
.*BY THE "TRAP" INSTRUCTION.

ROUTINE

\$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)

PASSPT: -1
.END

BRMF PD 027120
 BRN1 003230
 BRN2 003240
 BRN3 003250
 BRTAB 027214
 BRV1 003300
 BRV2 003310
 BRV3 003320
 BRZ1 003160
 BRZ2 003170
 BRZ3 003200
 BR1 027552
 BR10 027766
 BR11 030072
 BR12 030140
 BR13 030206
 BR14 030254
 BR15 030352
 BR16 030372
 BR17 030412
 BR2 027600
 BR20 030432
 BR21 030452
 BR22 030472
 BR23 030512
 BR3 027622
 BR33 030562
 BR34 030574
 BR35 030606
 BR36 030620
 BR37 030642
 BR4 027646
 BR40 030654
 BR41 030666
 BR45 032214
 BR46 032762
 BR46A 032772
 BR47 033552
 BR5 027672
 BR51 034320
 BR51A 034330
 BR6 027716
 BR7 027742
 BR70 037306
 BR71 040236
 B'CON 025624
 B.TERR 025610
 BTRAP C37644
 BUFF = 001000

8473 8477#
 1256 1262#
 1257 1267#
 1269 1275#
 7937 8503#
 1298 1304#
 1299 1309#
 1311 1317#
 1209 1215#
 1210 1220#
 1222 1228#
 8664 8673#
 8752 8761#
 8785 8794#
 8800 8809#
 8815 8824#
 8830 8839#
 8861 8870#
 8871 8880#
 8881 8890#
 8676 8685#
 8891 8899#
 8900 8909#
 8910 8919#
 8920 8929#
 8688 8697#
 8949 8957#
 8958 8966#
 8967 8975#
 8976 8984#
 8987 8995#
 8701 8710#
 8996 9004#
 9005 9013#
 9418 9424#
 9524 9622#
 9617 9626#
 9825 9831#
 8714 8723#
 9933 10031#
 10026 10035#
 8727 8735#
 8739 8748#
 10798 10813#
 10995 11007
 8047 8052#
 8042 8048#
 10906 10924#
 8626# 9029

11016#

9043 9046 9062 9065 9081 9086 9095 9100 9116 9165 9227
 9240 9243 9259 9262 9278 9283 9292 9296 9312 9361 9422 9439 9452
 9455 9471 9474 9490 9495 9504 9509 9525 9574 9634 9647 9650 9666
 9669 9685 9690 9699 9704 9720 9769 9829 9847 9860 9863 9879 9882
 9898 9903 9913 9918 9934 9983 10050 10063 10066 10082 10085 10101 10106
 10115 10120 10136 10185 10242 10255 10258 10274 10277 10294 10299 10308 10313
 10329 10378 10650 10666 10675 10691 10697 10716 10741 10771 10800 10825 10831
 10866 10888 10907 10934 10950 11003 11036 11097 11126 11141 11171 11195 11216

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEC 111

DNMB2E	011352	3892	3901#						
DNMB2F	011370	3903	3911#						
DNMB3A	011452	3937	3938	3939	3945#				
DNMB3B	011462	3940	3949#						
DNMB3C	011500	3950	3958#						
DNMB3D	011516	3961	3962	3968#					
DNMB3E	011526	3963	3972#						
DNMB4A	011716	4040	4041	4042	4048#				
DNMB4B	011726	4043	4052#						
DNMB4C	011744	4053	4061#						
DNMB4D	011754	4062	4068#						
DNMB4E	011764	4063	4072#						
DNMB4F	012000	4073	4081#						
DNM03A	010136	3366	3367	3368	3374#				
DNM03B	010146	3369	3378#						
DNM03C	010156	3379	3386#						
DNM1	010010	3300	3308#						
DNM1A	011122	3790	3791	3792	3798#				
DNM1B	011132	3793	3802#						
DNM2	C10024	3309	3317#						
DNM2A	011200	3823	3824	3830#					
DNM2B	011210	3825	3834#						
DNM2C	011216	3841#							
DNM2D	011226	3836	3845#						
DNM3	010042	3319	3327#						
DNM4	010064	3331	3339#						
DNM4A	011610	3996	3997	3998	4004#				
DNM4B	011620	3999	4008#						
DNM4C	011634	4009	4017#						
DNM5A	012060	4104	4105	4106	4112#				
DNM5B	012070	4107	4116#						
DNM5C	012106	4117	4125#						
DNM6A	012166	4147	4148	4149	4155#				
DNM6B	012176	4150	4159#						
DNM6C	012214	4160	4168#						
DNM7A	012276	4190	4191	4192	4198#				
DNM7B	012306	4193	4202#						
DNM7C	012324	4203	4211#						
DOAGIN	060564	15344	15350#						
DOPB2A	010550	3610	3618#						
DOPB2B	010626	3648	3656#						
DOP0A	007552	3184	3192#						
DOP0B	007576	3197	3205#						
DOP0C	007616	3208	3216#						
DOP0D	007646	3223	3231#						
DOP03A	007724	3261	3262	3263	3269#				
DOP03B	007734	3264	3273#						
DOP1	010362	3502	3510#						
DOP2	010474	3570	3578#						
DOP4	014000	4781	4793#						
DOP5	014064	4819	4831#						
DTRAP1	037626	10910#	10934						
DUMMY =	000000	11566#	12533	12567	12602	12637	12671	12706	12741
END1	027204	8484	8497#						
ENT176	047022	12511	12518#						
ENT51	044362	11938	11942#						

ER 025322
 ERRAM - 000442

7936	7951	7953	7965#	11671#	11696	11701#	11705	11710#	11734	11739#	11743	11748#	
1567#	11657	11662#	11666	11811	11816#	11820	11825#	11851	11856#	11860	11865#	11944	
11772	11777#	11781	11786#	11972	11977#	11993	11998#	12001	12006#	12022	12027#	12030	
11949#	11964	11969#	11972	12051	12056#	12059	12064#	12088	12093#	12109	12114#	12117	
12051	12056#	12059	12064#	12143#	12146	12151#	12167	12175	12180#	12196	12201#	12204	
12143#	12146	12151#	12167	12233	12238#	12278	12283#	12286	12291#	12294	12299#	12302	
12233	12238#	12278	12283#	12344#	12347	12352#	12354	12359#	12384	12389#	12392	12397#	
12344#	12347	12352#	12354	12520	12525#	12540	12545#	12547	12552#	12554	12559#	12574	
12520	12525#	12540	12545#	12593#	12609	12614#	12616	12621#	12624	12629#	12644	12649#	
12593#	12609	12614#	12616	2678	12683#	12685	12690#	12692	12697#	12713	12718#	12720	
2678	12683#	12685	12690#	12753#	12755	12760#	12762	12767#	12782	12787#	12789	12794#	
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13139	13144#	13161	13166#	13230#	13245	13250#	13252	13257#	13260	13265#	13280	13285#	
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13316	13321#	13323	13328#	13392#	13394	13399#	13402	13407#	13423	13428#	13430	13435#	
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FPP	042402	11410	11442	GIN1	042104	11436#	11443	11477					
GIN1	042104	11436#	11443	GIN2	042146	11447#	11478						
GIN2	042146	11447#	11478	GIN3	042174	11445	11452#						
GIN3	042174	11445	11452#	GNS	= ***** U	15770	15771	15772	15773	15774			
GNS	= ***** U	15770	15771	HERE	= 000000	8632#	8662*	8674*	8762				
HERE	= 000000	8632#	8662*	HICORE	037500	10859*	10862*	10869#	10901				
HICORE	037500	10859*	10862*										

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 FOVER 036534
 FPP 042402
 GIN1 042104
 GIN2 042146
 GIN3 042174
 GNS = ***** U
 HERE = 000000
 HICORE 037500

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MDM6C	01350C	4658	4666#			
MDM6D	013520	4667	4675#			
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MDM7A	013624	4714	4715	4721#		
MDM7B	013634	4716	4725#			
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MFP10A	025034	7872	7876#			
MFPS1	023532	7476	7485#			
MFPS2A	023622	7510	7511	7512	7518#	
MFPS2B	023632	7513	7522#			
MFPS2C	023652	7523	7531#			
MFPS3A	023730	7552	7553	7554	7560#	
MFPS3B	023740	7555	7564#			
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MFPS4A	024036	7594	7595	7596	7602#	
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MFPS5A	024144	7636	7637	7638	7644#	
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MFPS6A	024254	7678	7679	7680	7686#	
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MFPS7A	024364	7720	7721	7722	7728#	
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MOR5	026360	8259	8268#			
MOR6	026450	8292	8301#			
MOR7	026470	8303	8313#			
MOR8	026510	8314	8323#			
MOV1	017166	5912	5913	5919#		
MOV2	017176	5914	5924#			
MOV3	017214	5927	5928	5934#		
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MSGPWF	061160	15421	15429#			
MSG1	060642	15330	15362#			
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MTPS*	022744	7252	7260#			
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REG45	046034	12367	12370#	
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RESET3	040622	11092	11104#	
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TS107	007276	3007	3027	3047#	
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TS170	015242	5222	5228	5249#
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TS215	020166	6258	6280	6303#
TS216	020352	6305	6366	6380#
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TS230	022214	6953	7010	7034#
TS231	022322	7036	7066	7087#

CJKDB-D DCF11-AA CPU DIAG.
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 (CROSS REFERENCE TABLE -- USER SYMBOLS)

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EXX 000637

80FILL 062465
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373# 378

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	10982	11012	11016	11046	11074	11083	11104	11132	11147	11183	11187	11196	11219	11223	11247
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	12865	12872	12880	12902	12909	12917	12939	12946	12954	12976	12983	12991	13013	13020	13028
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	13245	13252	13260	13280	13287	13295	13316	13323	13331	13352	13359	13367	13387	13394	13402
	13423	13430	13438	13459	13466	13474	13494	13501	13509	13529	13536	13544	13565	13572	13580
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	14134	14141	14149	14169	14176	14184	14212	14220	14228	14235	14254	14262	14270	14277	14297
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14134	14141	14148	14169	14176	14183	14212	14220	14228	14235	14254	14262	14270	14277	14297
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782	800	823	848	917	942	966	991	1016	1041	1066	1091	1125	1143	1161
1179	1213	1226	1260	1273	1302	1315	1344	1357	1406	1417	1426	1454	1471	1495
1506	1533	1545	1573	1587	1619	1634	1667	1682	1715	1730	1759	1776	1804	1815
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2121	2131	2142	2151	2162	2190	2205	2246	2259	2288	2299	2330	2341	2365	2375
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2718	2729	2761	2771	2786	2797	2830	2841	2877	2892	2903	2934	2944	2977	2988
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3303	3312	3322	3334	3344	3372	3384	3413	3441	3470	3505	3515	3545	3573	3583
3613	3622	3651	3661	3688	3714	3740	3763	3773	3796	3806	3828	3839	3849	3873
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4330	4340	4351	4361	4370	4397	4407	4416	4426	4436	4464	4474	4483	4512	4521
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JNE
LOOP

	9090	9104	9124	9133	9142	9151	9160	9173	9182	9191	9200	9211	9247	9266	9287
	9300	9320	9329	9338	9347	9356	9369	9378	9387	9396	9407	9459	9478	9499	9513
	9533	9542	9551	9560	9569	9582	9591	9600	9609	9620	9654	9673	9694	9708	9728
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	1168	1200	1247	1289	1331	1396	1443	1485	1522	1560	1605	1652	1700	1743	1789
	1845	1901	1962	2009	2063	2101	2177	2228	2275	2316	2349	2390	2436	2471	2516
	2556	2588	2620	2652	2701	2744	2811	2857	2917	2958	3002	3044	3085	3110	3135
	3176	3249	3290	3355	3398	3426	3455	3488	3529	3559	3599	3635	3675	3701	3727
	3747	3780	3813	3856	3923	3984	4028	4092	4136	4179	4228	4267	4316	4382	4449
	4498	4567	4636	4704	4776	4814	4851	4882	4911	4958	5021	5090	5148	5183	5217
	5246	5278	5312	5340	5377	5404	5443	5485	5518	5573	5708	5864	5903	5939	5976
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POP	330#	15584	15585	15648											
PUSH	330#	15545	15547	15568	15607										
SETRA	15762#	15771	15772	15773	15774										
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	510	527	529	546	548	565	567	583	597	599	617	619	646	648	670
	672	690	692	714	734	736	753	755	771	773	789	791	807	809	831
	833	855	857	879	881	901	903	925	927	950	952	974	976	1000	1032
	1024	1026	1049	1051	1074	1076	1099	1113	1115	1132	1134	1150	1152	1168	1170
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TYPDEC	330#													
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SSERCD	316#	463	472	483	492	522	541	560	578	612	631	641	665	709
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	2332	2344	2368	2377	2386	2413	2422	2432	2458	2467	2491	2503	2529	2575
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	3228	3239	3270	3280	3305	3314	3324	3336	3346	3375	3387	3415	3443	3507
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SSFRANU

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ERRORS DETECTED: 0

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 RUN-TIME RATIO: 437/329=1.3
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