PDP11

TEST 14 TRAPS TEST

MD-11-DZKAR-A

EP-DZKAR-A-DI-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN USA

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                                .REPT 0


                                        IDENTIFICATION

                                PRODUCT CODE:           MAINDEC-11-DZKAR-A
                                PRODUCT NAME:           T14 TRAP TEST
                                DATE:                   APRIL 1976
                                MAINTAINER:             DIAGNOSTIC GROUP



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1. ABSTRACT

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

THIS PROGRAM HAS BEEN RENAMED FROM DON TO DZKAR.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11/20, 11/05 STANDARD COMPUTER

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES MEMORY FROM 0000 TO 17500.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED:

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTING

THE PROGRAM STARTS AND RESTARTS AT 200 FOR A 4K SYSTEM

4.2 STARTING ADDRESS OR ADDRESSES

(A) 200 = STARTING ADDRESS FOR 4K
202 = STARTING ADDRESS FOR 8K

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                                        204 = STARTING ADDRESS FOR 12K
                                        206 = STARTING ADDRESS FOR 16K
                                        210 = STARTING ADDRESS FOR 20K
                                        212 = STARTING ADDRESS FOR 24K
                                        214 = STARTING ADDRESS FOR 28K



                4.3     PROGRAM AND/OR OPERATOR ACTION

                        LOAD PROGRAM INTO MEMORY.  (BOTTOM 4K)
                        SET SWITCH REGISTER TO STARTING ADDRESS,
                        LOAD ADDRESS,
                        PRESS START,
                        THE PROGRAM WILL LOOP,
                        AND RING A BELL AFTER EACH ITERATIONS



                5.      OPERATION PROCEDURE



                5.1     OPERATIONAL SWITCH SETTINGS

                        NO SWITCHES ARE USED


        5.2     SUBROUTINE ABSTRACTS

                        5.2.1  BEGIN SA 200

                        5.2.2  SCOPE
                               -----

                        IS A "MOV %7,%0" THAT IS PLACED BETWEEN EACH SUBTEST
                        IN THE INSTRUCTION SECTION.  IF A SCOPE LOOP IS
                        NEEDED.  INSERT A BRANCH TO THE PREVIOUS SCOPE
                        LOCATION AT THE CURRENT SCOPE LOCATION.


                        5.2.3  HLT
                               ---

                        INDICATES THE UNIQUE ADDRESS THAT TAGS THE FAILING
                        SUBTEST.  THE INCORRECT DATA AT THE TIME OF THE
                        FAULURE MAY OR MAY NOT BE DISPLAYED IN
                        REGISTER ZERO, WHICH IS THE DATA REGISTER ON
                        A HALT.
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5.2.4 TRAPCATCHER

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 PRINCIPAL OF THIS ROUTINE IS: THE VECTOR
ENTRANCE ADDRESS POINTS TO THE NEXT SEQUENTIAL
WORD WHICH WILL CONTAIN A HALT (000000) (THIS
LOCATION IS ALSO THE STATUS 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 THE
LOCATION THE PROGRAM WAS AT. WHEN THE INTERRUPT
OR TRAP OCCURRED. (MEMORY AS SPECIFIED BY R6
CONTAINS THE PC OF THE INSTRUCTION FOLLOWING THE
INSTRUCTION WHERE THE TRAP OCCURRED).

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 STARTS THE TEST

IF AN ERROR IS DETECTED. THERE WILL BE A HALT.
WHEN A HALT OCCURS AND IT IS NECESSARY TO SCOPE
ON IT, PLACE INSERT A BRANCH INSTRUCTION IN
THE SCOPE LOCATION FOLLOWING THE HALT.
THE BRANCH INSTRUCTION SHOULD BRANCH YOU TO THE
PREVIOUS SCOPE LOCATION.

6. ERRORS

6.1 ALL ERRORS WILL CAUSE A HALT.

6.2 ERROR RECOVERY

ON TRAP ERRORS - RESTART AT STARTING ADDRESS DEPRESS
CONTINUE TO CONTINUE TEST

7. RESTRICTIONS

```
                                7.1     STARTING RESTRICTION

                                        NONE


                                7.2     OPERATIONAL RESTRICTION

                                        NONE


                                8.      MISCELLANEOUS


                                8.1     EXECUTION TIME

                                        FOR THE TEST ABOUT 45 SECONDS


                                9.      PROGRAM DESCRIPTION

                                        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 THAT ALL COMBINATION WILL TRAP.  CHECKED ALSO
                                        IS THAT ALL RESTRICTED INSTRUCTIONS WILL TRAP.
                                        VERIFICATION OF THE "TRT" INSTRUCTION (00003) WHICH IS
                                        USED FOR SOFTWARE DEBUG ROUTINES: ODT,DDT.  ALSO,
                                        THERE IS INCLUDED OF A SPECIAL REGISTER TEST TO SEE IF
                                        ANY AUTO DECREMENT OF REGISTER WILL CAUSE A TRAP
                                        OVERFLOW WHEN REGISTER 6 IS LESS THAN 400.  TRAP
                                        OVERFLOW SHOULD ALSO OCCUR WITH TRAPS AND INTERRUPTS
                                        WHEN REGISTER 6 IS LESS THAN 400.  SPECIAL CHECKS
                                        ARE MADE TO SEE IF BUS ERROR TRAPS OCCUR ON ODD
                                        ADDRESS WITH WORD INSTRUCTION AND NON EXISTENT MEMORY.


                                10.     LISTING


                                11.     FLOW CHART(S)

                                        .ENDR
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```
                                ;TEST 14
                                ;COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                                ;PDP-11 TRAP INSTRUCTION TEST AND ODD ON UNIQUE R6 OPERATIONS
                                ;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

                        000006          LP=%6
                        000000          TAB=%0
                        000001          LAST=%1
                        000002          FIRST=%2
                        010700          SCOPE=010700            ;MOV REGISTER 7 TO REGISTER ZERO TO TAG LAST TEST
                        000000          HLT=HALT
                        000003          TRT=3
                        000004          ITRAPS=4
                        000004          RTRAPS=4                ;RESERVED INST AND ILLEGAL ADDRESSES
                        000014          RTRAP4=14               ;FOR TRACE TRAP
                        000030          RTRAP3=30               ;FOR EMULATOR TRAP
                        000020          RTRAP2=20               ;FOR IOT TRAP
                        000034          RTRAP1=34               ;FOR TRAP INST
                        177564          TTCSR=177564
                        177560          TRCSR=177560
                        000240          BELL=240
                        000240          NOP=240
                        177776          STATUS=177776
                        070000          TRAPA=70000
                        000010          RTRAP=10
                        004700          ILLA=004700
                        000100          ILLB=100
                        177776          CC=177776
                        000000          .=0
                                        .REPT   40
                                        .+2
                                        HALT                    ;TRAPPED TO PREVIOUS ADDRESS
                                        .ENDR
000000  000002                          .+2
000002  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000004  000006                          .+2
000006  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000010  000012                          .+2
000012  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000014  000016                          .+2
000016  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000020  000022                          .+2
000022  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000024  000026                          .+2
000026  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000030  000032                          .+2
000032  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000034  000036                          .+2
000036  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000040  000042                          .+2
000042  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000044  000046                          .+2
000046  000000                          HALT                    ;TRAPPED TO PREVIOUS ADDRESS
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```
  317  000050  000052                          .+2
  318  000052  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  319  000054  000056                          .+2
  320  000056  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  321  000060  000062                          .+2
  322  000062  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  323  000064  000066                          .+2
  324  000066  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  325  000070  000072                          .+2
  326  000072  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  327  000074  000076                          .+2
  328  000076  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  329  000100  000102                          .+2
  330  000102  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  331  000104  000106                          .+2
  332  000106  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  333  000110  000112                          .+2
  334  000112  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  335  000114  000116                          .+2
  336  000116  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  337  000120  000122                          .+2
  338  000122  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  339  000124  000126                          .+2
  340  000126  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  341  000130  000132                          .+2
  342  000132  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  343  000134  000136                          .+2
  344  000136  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  345  000140  000142                          .+2
  346  000142  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  347  000144  000146                          .+2
  348  000146  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  349  000150  000152                          .+2
  350  000152  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  351  000154  000156                          .+2
  352  000156  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  353  000160  000162                          .+2
  354  000162  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  355  000164  000166                          .+2
  356  000166  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  357  000170  000172                          .+2
  358  000172  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  359  000174  000176                          .+2
  360  000176  000000                          HALT                ;TRAPPED TO PREVIOUS ADDRESS
  361
  362          000046                          .=46
  363  000046  007612                          $ENDAD
  364
  365          000052                          .=52
  366  000052  040000                          40000
  367
  368
  369          000200                          .=200
  370
  371  000200  000410                          BR          ST4K    ;14K
  372  000202  000425                          BR          ST8K    ;18K
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  373  000204  000431                          BR              ST12K   ;12K
  374  000206  000435                          BR              ST16K   ;16K
  375  000210  000441                          BR              ST20K   ;20K
  376  000212  000445                          BR              ST24K   ;24K
  377  000214  000451                          BR              ST28K   ;28K
  378  000216  000167  004224                  JMP     TONT            ;ERROR ON ERROR
  379  000222  005767  177614          ST4K:   TST     42              ;WITH ACT11 OR DDP1
  380  000226  001406                          BEQ     .+16
  381  000230  012767  000240  006022          MOV     #NOP,AUTO
  382  000236  012767  000240  006024          MOV     #NOP,AUTO1
  383  000244  012767  020000  005756          MOV     #20000,CORH
  384  000252  000167  000122                  JMP     BEGIN
  385  000256  012767  040000  005744  ST8K:   MOV     #40000,CORH
  386  000264  000167  000110                  JMP     BEGIN
  387  000270  012767  060000  005732  ST12K:  MOV     #60000,CORH
  388  000276  000167  000076                  JMP     BEGIN
  389  000302  012767  100000  005720  ST16K:  MOV     #100000,CORH
  390  000310  000167  000064                  JMP     BEGIN
  391  000314  012767  120000  005706  ST20K:  MOV     #120000,CORH
  392  000322  000167  000052                  JMP     BEGIN
  393  000326  016767  137446  005674  ST24K:  MOV     140000,CORH
  394  000334  000167  000040                  JMP     BEGIN
  395  000340  012767  160000  005662  ST28K:  MOV     #160000,CORH
  396  000346  000167  000026                  JMP     BEGIN
  397          000400                          .=400
  398
  399                                  ;TEST THAT A TRAP OCCURS ON ALL RESTRICTED INSTRUCTION
  400  000400  010700                  BEGIN:  SCOPE
  401  000402  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
  402  000406  012767  000420  177374          MOV     #RETA,RTRAP     ;RETURN LOCATION
  403  000414  070000                          TRAPA                   ;RESERVED INSTRUCTION, SHOULD TRAP
  404  000416  000000                          HLT
  405  000420  010700                  RETA:   SCOPE
  406                                  ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
  407  000422  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
  408  000426  012767  000436  177354          MOV     #RETB,RTRAP     ;RETURN POINTER
  409  000434  070000                          TRAPA                   ;RESERVED INSTRUCTION
  410  000436  020627  010044          RETB:   CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
  411  000442  001401                          BEQ     .+4
  412  000444  000000                          HLT                     ;NOT DECREMENTED TWO WORDS
  413  000446  010700                          SCOPE
  414                                  ;TEST THAT PROPER P.C. IS SAVED
  415  000450  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
  416  000454  012767  000464  177326          MOV     #RETC,RTRAP     ;RETURN FROM TRAP POINTER
  417  000462  070000                  INSTC:  TRAPA                   ;TRAP ON THIS INSTRUCTION
  418  000464  022767  000464  007352  RETC:   CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
  419  000472  001401                          BEQ     .+4
  420  000474  000000                          HLT                     ;INCORRECT P.C.
  421  000476  010700                          SCOPE
  422                                  ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
  423  000500  010700                          SCOPE
  424  000502  012706  010050                  MOV     #BUFF,LP        ;SET UP
  425  000506  012767  000524  177274          MOV     #RETD,RTRAP     ;SET UP
  426  000514  005067  177256                  CLR     CC              ;CLEAR CC AND PRIORITY
  427  000520  000257                          CCC
  428  000522  070000                          TRAPA                   ;TRAP
```

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   429  000524  026727  007316  000000  RETD:   CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
   430  000532  001401                          BEQ     .+4             ;TEST FOR ALL ZEROS
   431  000534  000000                          HLT                     ;INCORRECT STATUS
   432  000536  010700                          SCOPE
   433  000540  012706  010050                  MOV     #BUFF,LP        ;SET UP
   434  000544  012767  000564  177236          MOV     #RETE,RTRAP     ;SET UP
   435  000552  012767  000357  177216          MOV     #357,CC         ;SET PRIORITY
   436  000560  000277                          SCC                     ;SET CC
   437  000562  070000                          TRAPA                   ;TRAP
   438  000564  026727  007256  000357  RETE:   CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
   439  000572  001401                          BEQ     .+4             ;TEST FOR ALL ONES
   440  000574  000000                          HLT                     ;INCORRECT STATUS ON STACK
   441  000576  010700                          SCOPE
   442                                  ;TEST THAT "NEW" STATUS IS CORRECT
   443  000600  012706  010050                  MOV     #BUFF,LP
   444  000604  012767  000620  177176          MOV     #RETF,RTRAP
   445  000612  005067  177174                  CLR     RTRAP+2         ;CLEAR FUTURE PRIORITY AND CC
   446  000616  070000                          TRAPA
   447  000620  100001          RETF:   BPL     .+4             ;TEST FOR "C" CLEARED
   448  000622  000000                          HLT                     ;C NOT CLEARED
   449  000624  001001                          BNE     .+4
   450  000626  000000                          HLT                     ;Z NOT CLEARED
   451  000630  102001                          BVC     .+4
   452  000632  000000                          HLT                     ;V NOT CLEARED
   453  000634  103001                          BCC     .+4
   454  000636  000000                          HLT                     ;C NOT CLEARED
   455  000640  032767  000340  177130          BIT     #340,CC         ;TEST PRIORITY
   456  000646  001401                          BEQ     .+4
   457  000650  000000                          HLT                     ;PRIORITY NOT ZERO
   458  000652  010700                          SCOPE
   459  000654  012706  010050                  MOV     #BUFF,LP
   460  000660  012767  000576  177122          MOV     #RETG,RTRAP
   461  000666  012767  000357  177116          MOV     #357,RTRAP+2    ;SE. NEW "CC" AND PRIORITY
   462  000674  070000                          TRAPA                   ;TRAP HERE
   463  000676  100401          RETG:   BMI     .+4
   464  000700  000000                          HLT                     ;N NOT SET
   465  000702  001401                          BEQ     .+4
   466  000704  000000                          HLT                     ;Z NOT SET
   467  000706  102401                          BVS     .+4
   468  000710  000000                          HLT                     ;V NOT SET
   469  000712  103401                          BCS     .+4
   470  000714  000000                          HLT                     ;C NOT SET
   471  000716  016706  177054                  MOV     CC,LP
   472  000722  042706  000017                  BIC     #17,LP
   473  000726  022706  000340                  CMP     #340,LP
   474  000732  001401                          BEQ     .+4
   475  000734  000000                          HLT                     ;PRIORITY WAS CHANGED
   476  000736  010700                          SCOPE
   477  000740  012767  000012  177042          MOV     #12,10
   478  000746  005067  177040                  CLR     12
   479                                  ;TEST THAT A TRAP OCCURS FOR A "TRAP" INSTRUCTION
   480  000752  010700                          SCOPE
   481  000754  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
   482  000760  012767  000772  177046          MOV     #RETA1,RTRAP1   ;RETURN LOCATION
   483  000766  104400                          TRAP                    ;RESERVED INSTRUCTION, SHOULD TRAP
   484  000770  000000                          HLT
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   485  000772  010700                    RETA1:  SCOPE
   486                                    ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
   487  000774  012706  010050                    MOV     #BUFF,LP        ;LINK POINTER SETUP
   488  001000  012767  001010  177026            MOV     #RETB1,RTRAP1   ;RETURN POINTER
   489  001006  104400                            TRAP                    ;RESERVED INSTRUCTION
   490  001010  020627  010044            RETB1:  CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
   491  001014  001401                            BEQ     .+4
   492  001016  000000                            HLT                     ;NOT DECREMENTED TWO WORDS
   493  001020  010700                            SCOPE
   494                                    ;TEST THAT PROPER P.C. IS SAVED
   495  001022  012706  010050                    MOV     #BUFF,LP        ;LINK POINTER SETUP
   496  001026  012767  001036  177000            MOV     #RETC1,RTRAP1   ;RETURN FROM TRAP POINTER
   497  001034  104400                            TRAP                    ;TRAP ON THIS INSTRUCTION
   498  001036  022767  001036  007000  RETC1:  CMP     #.,BUFF-4       ;CHECK INCREMENTED P.C.
   499  001044  001401                            BEQ     .+4
   500  001046  000000                            HLT                     ;INCORRECT P.C.
   501  001050  010700                            SCOPE
   502                                    ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
   503  001052  010700                            SCOPE
   504  001054  012706  010050                    MOV     #BUFF,LP        ;SET UP
   505  001060  012767  001076  176746            MOV     #RETD1,RTRAP1   ;SET UP
   506  001066  005067  176704                    CLR     CC              ;CLEAR CC AND PRIORITY
   507  001072  000257                            CCC
   508  001074  104400                            TRAP                    ;TRAP
   509  001076  026727  006744  000000  RETD1:  CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
   510  001104  001401                            BEQ     .+4             ;TEST FOR ALL ZEROS
   511  001106  000000                            HLT                     ;INCORRECT STATUS
   512  001110  010700                            SCOPE
   513  001112  012706  010050                    MOV     #BUFF,LP        ;SET UP
   514  001116  012767  001134  176710            MOV     #RETE1,RTRAP1   ;SET UP
   515  001124  012767  000357  176644            MOV     #357,CC         ;SET PRIORITY
   516  001132  104400                            TRAP                    ;SET CC
   517  001134  026727  006706  000357  RETE1:  CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
   518  001142  001401                            BEQ     .+4             ;TEST FOR ALL ONES
   519  001144  000000                            HLT                     ;INCORRECT STATUS ON STACK
   520                                    ;TEST THAT "NEW" STATUS IS CORRECT
   521  001146  012706  010050                    MOV     #BUFF,LP
   522  001152  012767  001166  176654            MOV     #RETF1,RTRAP1
   523  001160  005067  176652                    CLR     RTRAP1+2        ;CLEAR FUTURE PRIORITY AND CC
   524  001164  104400                            TRAP
   525  001166  100001            RETF1:  BPL     .+4             ;TEST FOR "C" CLEARED
   526  001170  000000                            HLT                     ;C NOT CLEARED
   527  001172  001001                            BNE     .+4
   528  001174  000000                            HLT                     ;Z NOT CLEARED
   529  001176  102001                            BVC     .+4
   530  001200  000000                            HLT                     ;V NOT CLEARED
   531  001202  103001                            BCC     .+4
   532  001204  000000                            HLT                     ;C NOT CLEARED
   533  001206  032767  000340  176562            BIT     #340,CC         ;TEST PRIORITY
   534  001214  001401                            BEQ     .+4
   535  001216  000000                            HLT                     ;PRIORITY NOT ZERO
   536  001220  010700                            SCOPE
   537  001222  012706  010050                    MOV     #BUFF,LP
   538  001226  012767  001244  176600            MOV     #RETG1,RTRAP1
   539  001234  012767  000357  176574            MOV     #357,RTRAP1+2   ;SET NEW "CC" AND PRIORITY
   540  001242  104400                            TRAP                    ;TRAP HERE
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   541  001244  100401                  RETG1:  BMI     .+4
   542  001246  000000                          HLT                     ;N NOT SET
   543  001250  001401                          BEQ     .+4
   544  001252  000000                          HLT                     ;Z NOT SET
   545  001254  102401                          BVS     .+4
   546  001256  000000                          HLT                     ;V NOT SET
   547  001260  103401                          BCS     .+4
   548  001262  000000                          HLT                     ;C NOT SET
   549  001264  016706  176506                  MOV     CC,LP
   550  001270  042706  000017                  BIC     #17,LP
   551  001274  022706  000340                  CMP     #340,LP
   552  001300  001401                          BEQ     .+4
   553  001302  000000                          HLT                     ;PRIORITY WAS CHANGED
   554  001304  010700                          SCOPE
   555                          ;TEST THAT ALL COMBINATION OF "TRAP" WILL CAUSE A TRAP
   556  001306  012767  104400  000012          MOV     #TRAP,RB1       ;INITIALIZE BASE TRAP INSTRUCTION
   557  001314  012767  001332  176512          MOV     #RA1,34         ;RETURN FROM TRAP TO RA1
   558  001322  012706  010050          RC1:    MOV     #BUFF,LP        ;SET UP STACK POINTER
   559  001326  104400                  RB1:    TRAP                    ;TRAP INST WILL BE MODIFIED TO TRAP +377
   560  001330  000000                          HLT                     ;PREVIOUS INST FAILED TO TRAP
   561  001332  005267  177770          RA1:    INC     RB1             ;INCREMENT TRAP INSTRUCTION
   562  001336  022767  104777  177762          CMP     #104777,RB1     ;TRAP+377 TO UPPER LIMIT
   563  001344  103366                          BHIS    RC1             ;HAVE WE TESTED ALL
   564  001346  010700                          SCOPE                   ;YES
   565  001350  012767  000036  176456          MOV     #36,34
   566  001356  005067  176454                  CLR     36
   567                          ;TEST THAT A TRAP OCCURS ON AN "IOT" INSTRUCTION
   568  001362  010700                          SCOPE
   569  001364  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
   570  001370  012767  001402  176422          MOV     #RETA2,RTRAP2   ;RETURN LOCATION
   571  001376  000004                          IOT                     ;RESERVED INSTRUCTION, SHOULD TRAP
   572  001400  000000                          HLT
   573  001402  010700                  RETA2:  SCOPE
   574                          ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
   575  001404  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
   576  001410  012767  001420  176402          MOV     #RETB2,RTRAP2   ;RETURN POINTER
   577  001416  000004                          IOT                     ;RESERVED INSTRUCTION
   578  001420  020627  010044          RETB2:  CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
   579  001424  001401                          BEQ     .+4
   580  001426  000000                          HLT                     ;NOT DECREMENTED TWO WORDS
   581  001430  010700                          SCOPE
   582                          ;TEST THAT PROPER P.C. IS SAVED
   583  001432  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
   584  001436  012767  001446  176354          MOV     #RETC2,RTRAP2   ;RETURN FROM TRAP POINTER
   585  001444  000004                          IOT                     ;TRAP ON THIS INSTRUCTION
   586  001446  022767  001446  006370  RETC2:  CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
   587  001454  001401                          BEQ     .+4
   588  001456  000000                          HLT                     ;INCORRECT P.C.
   589  001460  010700                          SCOPE
   590                          ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
   591  001462  010700                          SCOPE
   592  001464  012706  010050                  MOV     #BUFF,LP        ;SET UP
   593  001470  012767  001506  176322          MOV     #RETD2,RTRAP2   ;SET UP
   594  001476  005067  176274                  CLR     CC              ;CLEAR CC AND PRIORITY
   595  001502  000257                          CCC
   596  001504  000004                          IOT                     ;TRAP
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  597  001506  026727  006334  000000  RETD2:  CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
  598  001514  001401                          BEQ     .+4             ;TEST FOR ALL ZEROS
  599  001516  000000                          HLT                     ;INCORRECT STATUS
  600  001520  010700                          SCOPE
  601  001522  012706  010050                  MOV     #BUFF,LP        ;SET UP
  602  001526  012767  001546  176264          MOV     #RETE2,RTRAP2   ;SET UP
  603  001534  012767  000357  176234          MOV     #357,CC         ;SET PRIORITY
  604  001542  000277                          SCC                     ;SET CC
  605  001544  000004                          IOT                     ;TRAP
  606  001546  026727  006274  000357  RETE2:  CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
  607  001554  001401                          BEQ     .+4             ;TEST FOR ALL ONES
  608  001556  000000                          HLT                     ;INCORRECT STATUS ON STACK
  609  001560  010700                          SCOPE
  610                                  ;TEST THAT "NEW" STATUS IS CORRECT
  611  001562  012706  010050                  MOV     #BUFF,LP
  612  001566  012767  001602  176224          MOV     #RETF2,RTRAP2
  613  001574  005067  176222                  CLR     RTRAP2+2        ;CLEAR FUTURE PRIORITY AND CC
  614  001600  000004                          IOT
  615  001602  100001                  RETF2:  BPL     .+4             ;TEST FOR "C" CLEARED
  616  001604  000000                          HLT                     ;C NOT CLEARED
  617  001606  001001                          BNE     .+4
  618  001610  000000                          HLT                     ;Z NOT CLEARED
  619  001612  102001                          BVC     .+4             ;Z NOT CLEARED
  620  001614  000000                          HLT                     ;V NOT CLEARED
  621  001616  103001                          BCC     .+4
  622  001620  000000                          HLT                     ;C NOT CLEARED
  623  001622  032767  000340  176146          BIT     #340,CC         ;TEST PRIORITY
  624  001630  001401                          BEQ     .+4
  625  001632  000000                          HLT                     ;PRIORITY NOT ZERO
  626  001634  010700                          SCOPE
  627  001636  012706  010050                  MOV     #BUFF,LP
  628  001642  012767  001660  176150          MOV     #RETG2,RTRAP2
  629  001650  012767  000357  176144          MOV     #357,RTRAP2+2   ;SET NEW "CC" AND PRIORITY
  630  001656  000004                          IOT                     ;TRAP HERE
  631  001660  100401                  RETG2:  BMI     .+4
  632  001662  000000                          HLT                     ;N NOT SET
  633  001664  001401                          BEQ     .+4
  634  001666  000000                          HLT                     ;Z NOT SET
  635  001670  102401                          BVS     .+4
  636  001672  000000                          HLT                     ;V NOT SET
  637  001674  103401                          BCS     .+4
  638  001676  000000                          HLT                     ;C NOT SET
  639  001700  016706  176072                  MOV     CC,LP
  640  001704  042706  000017                  BIC     #17,LP
  641  001710  022706  000340                  CMP     #340,LP
  642  001714  001401                          BEQ     .+4
  643  001716  000000                          HLT                     ;PRIORITY WAS CHANGED
  644  001720  010700                          SCOPE
  645  001722  012767  000022  176070          MOV     #22,20          ;.+2
  646  001730  005067  176066                  CLR     22              ;HALT
  647                                  ;TEST THAT A TRAP OCCURS ON AN EMT RESTRICTED INSTRUCTION
  648  001734  010700                          SCOPE
  649  001736  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
  650  001742  012767  001754  176060          MOV     #RETA3,RTRAP3   ;RETURN LOCATION
  651  001750  104000                          EMT                     ;RESERVED INSTRUCTION, SHOULD TRAP
  652  001752  000000                          HLT
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  653  001754  010700                    RETA3:  SCOPE
  654                                    ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
  655  001756  012706  010050                    MOV     #BUFF,LP        ;LINK POINTER SETUP
  656  001762  012767  001772  176040            MOV     #RETB3,RTRAP3   ;RETURN POINTER
  657  001770  104000                            EMT                     ;RESERVED INSTRUCTION
  658  001772  020627  010044          RETB3:    CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
  659  001776  001401                            BEQ     .+4
  660  002000  000000                            HLT                     ;NOT DECREMENTED TWO WORDS
  661                                    ;TEST THAT PROPER P.C IS SAVED
  662  002002  012706  010050                    MOV     #BUFF,LP        ;LINK POINTER SETUP
  663  002006  012767  002016  176014            MOV     #RETC3,RTRAP3   ;RETURN FROM TRAP POINTER
  664  002014  104000                            EMT                     ;TRAP ON THIS INSTRUCTION
  665  002016  022767  002016  006020  RETC3:    CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
  666  002024  001401                            BEQ     .+4
  667  002026  000000                            HLT                     ;INCORRECT P.C.
  668  002030  010700                            SCOPE
  669                                    ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
  670  002032  010700                            SCOPE
  671  002034  012706  010050                    MOV     #BUFF,LP        ;SET UP
  672  002040  012767  002056  175762            MOV     #RETD3,RTRAP3   ;SET UP
  673  002046  005067  175724                    CLR     CC              ;CLEAR CC AND PRIORITY
  674  002052  000257                            CCC
  675  002054  104000                            EMT                     ;TRAP
  676  002056  026727  005764  000000  RETD3:    CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
  677  002064  001401                            BEQ     .+4             ;TEST FOR ALL ZEROS
  678  002066  000000                            HLT                     ;INCORRECT STATUS
  679  002070  010700                            SCOPE                   ;INCORRECT STATUS
  680  002072  012706  010050                    MOV     #BUFF,LP        ;SET UP
  681  002076  012767  002116  175724            MOV     #RETE3,RTRAP3   ;SET UP
  682  002104  012767  000357  175664            MOV     #357,CC         ;SET PRIORITY
  683  002112  000277                            SCC                     ;SET CC
  684  002114  104000                            EMT                     ;TRAP
  685  002116  026727  005724  000357  RETE3:    CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
  686  002124  001401                            BEQ     .+4             ;TEST FOR ALL ONES
  687  002126  000000                            HLT                     ;INCORRECT STATUS ON STACK
  688  002130  010700                            SCOPE
  689                                    ;TEST THAT "NEW" STATUS IS CORRECT
  690  002132  012706  010050                    MOV     #BUFF,LP
  691  002136  012767  002152  175664            MOV     #RETF3,RTRAP3
  692  002144  005067  175662                    CLR     RTRAP3+2        ;CLEAR FUTURE PRIORITY AND CC
  693  002150  104000                            EMT
  694  002152  100001          RETF3:    BPL     .+4             ;TEST FOR "C" CLEARED
  695  002154  000000                            HLT                     ;C NOT CLEARED
  696  002156  001001                            BNE     .+4
  697  002160  000000                            HLT                     ;Z NOT CLEARED
  698  002162  102001                            BVC     .+4
  699  002164  000000                            HLT                     ;V NOT CLEARED
  700  002166  103001                            BCC     .+4
  701  002170  000000                            HLT                     ;C NOT CLEARED
  702  002172  032767  000340  175576            BIT     #340,CC         ;TEST PRIORITY
  703  002200  001401                            BEQ     .+4
  704  002202  000000                            HLT                     ;PRIORITY NOT ZERO
  705  002204  010700                            SCOPE
  706  002206  012706  010050                    MOV     #BUFF,LP
  707  002212  012767  002230  175610            MOV     #RETG3,RTRAP3
  708  002220  012767  000357  175604            MOV     #357,RTRAP3+2   ;SET NEW "CC" AND PRIORITY
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                                                ;TRAP HERE
002226  104000                        EMT
002230  100401                RETG3:  BMI     .+4
002232  000000                        HLT                     ;N NOT SET
002234  001401                        BEQ     .+4
002236  000000                        HLT                     ;Z NOT SET
002240  102401                        BVS     .+4
002242  000000                        HLT                     ;V NOT SET
002244  103401                        BCS     .+4
002246  000000                        HLT                     ;C NOT SET
002250  016706  175522                MOV     CC,LP
002254  042706  000017                BIC     #17,LP
002260  022706  000340                CMP     #340,LP
002264  001401                        BEQ     .+4
002266  000000                        HLT                     ;PRIORITY WAS CHANGED
002270  010700                        SCOPE
                                ;TEST THAT ALL COMBINATION OF EMT WILL CAUSE A TRAP
002272  010700                        SCOPE
002274  012767  104000  000012        MOV     #EMT,RB         ;INITIALIZE BASE EMT INSTRUCTION
002302  012767  012320  175520        MOV     #R4,30          ;RETURN FROM TRAP TO RA
002310  012706  010050        RC:     MOV     #BUFF,LP        ;SET UP STACK POINTER
002314  104000                RB:     EMT                     ;TRAP INST. WILL BE MODIFIED TO EMT+377
002316  000000                        HLT                     ;PRIVIOUS INST FAILED TO TRAP
002320  005267  177770        RA:     INC     RB              ;INCREMENT TRAP INSTRUCTION
002324  022767  104377  177762        CMP     #104377,RB      ;EMT+377 TO EMT?
002332  103366                        BHIS    RC              ;HAVE WE TESTED ALL
002334  010700                        SCOPE                   ;YES
002336  012767  000032  175464        MOV     #32,30          ;/.+
002344  005067  175462                CLR     32              ;HALT
                                ;TEST THAT A TRAP OCCURS ON AN "TRACE-TRT" INSTRUCTION
002350  010700                        SCOPE
002352  012706  010050                MOV     #BUFF,LP        ;LINK POINTER SETUP
002356  012767  002370  175430        MOV     #RETA4,RTRAP4   ;RETURN LOCATION
002364  000003                        TRT                     ;RESERVED INSTRUCTION, SHOULD TRAP
002366  000000                        HLT
002370  010700                RETA4:  SCOPE
                                ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
002372  012706  010050                MOV     #BUFF,LP        ;LINK POINTER SETUP
002376  012767  002406  175410        MOV     #RETB4,RTRAP4   ;RETURN POINTER
002404  000003                        TRT                     ;RESERVED INSTRUCTION
002406  020627  010044        RETB4:  CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
002412  001401                        BEQ     .+4
002414  000000                        HLT                     ;NOT DECREMENTED TWO WORDS
002416  010700                        SCOPE
                                ;TEST THAT PROPER P.C. IS SAVED
002420  012706  010050                MOV     #BUFF,LP        ;LINK POINTER SETUP
002424  012767  002434  175362        MOV     #RETC4,RTRAP4   ;RETURN FROM TRAP POINTER
002432  000003                        TRT                     ;TRAP ON THIS INSTRUCTION
002434  022767  002434  005402  RETC4:  CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
002442  001401                        BEQ     .+4
002444  000000                        HLT                     ;INCORRECT P.C.
002446  010700                        SCOPE
                                ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
002450  010700                        SCOPE
002452  012706  010050                MOV     #BUFF,LP        ;SET UP
002456  012767  002474  175330        MOV     #RETD4,RTRAP4   ;SET UP
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765  002464  005067  175306                  CLR     CC              ;CLEAR CC AND PRIORITY
766  002470  000257                          CCC
767  002472  000003                          TRT                     ;TRAP
768  002474  026727  005346  000000  RETD4:  CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
769  002502  001401                          BEQ     .+4             ;TEST FOR ALL ZEROS
770  002504  000000                          HLT                     ;INCORRECT STATUS
771  002506  010700                          SCOPE
772  002510  012706  010050                  MOV     #BUFF,LP        ;SET UP
773  002514  012767  002534  175272          MOV     #RETE4,RTRAP4   ;SET UP
774  002522  012767  000357  175246          MOV     #357,CC         ;SET PRIORITY
775  002530  000277                          SCC                     ;SET-SET CC
776  002532  000003                          TRT                     ;TRAP
777  002534  026727  005306  000357  RETE4:  CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
778  002542  001401                          BEQ     .+4             ;TEST FOR ALL ONES
779  002544  000000                          HLT                     ;INCORRECT STATUS ON STACK
780  002546  010700                          SCOPE
781                                  ;TEST THAT "NEW" STATUS IS CORRECT
782  002550  012706  010050                  MOV     #BUFF,LP
783  002554  012767  002570  175232          MOV     #RETF4,RTRAP4
784  002562  005067  175230                  CLR     RTRAP4+2        ;CLEAR FUTURE PRIORITY AND CC
785  002566  000003                          TRT
786  002570  100001          RETF4:          BPL     .+4             ;TEST FOR "C" CLEARED
787  002572  000000                          HLT                     ;C NOT CLEARED
788  002574  001001                          BNE     .+4
789  002576  000000                          HLT                     ;Z NOT CLEARED
790  002600  102001                          BVC     .+4
791  002602  000000                          HLT                     ;V NOT CLEARED
792  002604  103001                          BCC     .+4
793  002606  000000                          HLT                     ;C NOT CLEARED
794  002610  032767  000340  175160          BIT     #340,CC         ;TEST PRIORITY
795  002616  001401                          BEQ     .+4
796  002620  000000                          HLT                     ;PRIORITY NOT ZERO
797  002622  010700                          SCOPE
798  002624  012706  010050                  MOV     #BUFF,LP
799  002630  012767  002646  175156          MOV     #RETG4,RTRAP4
800  002636  012767  000357  175152          MOV     #357,RTRAP4+2   ;SET NEW "CC" AND PRIORITY
801  002644  000003                          TRT                     ;TRAP HERE
802  002646  100401          RETG4:          BMI     .+4
803  002650  000000                          HLT                     ;N NOT SET
804  002652  001401                          BEQ     .+4
805  002654  000000                          HLT                     ;Z NOT SET
806  002656  102401                          BVS     .+4
807  002660  000000                          HLT                     ;V NOT SET
808  002662  103401                          BCS     .+4
809  002664  000000                          HLT                     ;C NOT SET
810  002666  016706  175104                  MOV     CC,LP
811  002672  042706  000017                  BIC     #17,LP
812  002676  022706  000340                  CMP     #340,LP
813  002702  001401                          BEQ     .+4
814  002704  000000                          HLT                     ;PRIORITY WAS CHANGED
815  002706  010700                          SCOPE
816  002710  012767  000016  175076          MOV     #16,14
817  002716  005067  175074                  CLR     16
818                                  ;PDP-11 ILLEGAL AND ADDRESS INSTRUCTION TEST
819                                  ;ALL INSTRUCTIONS THAT ARE RESER
820                                  ;SHOULD TRAP TO LOCATION 4, AND THE
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                                        ;PC THAT POINTS TO THE TRAPPING INSTRUCTION
                                        ;SHOULD BE PLACED ON THE STACK
                                        ;TEST THAT A TRAP OCCURS ON AN ILLEGAL INSTRUCTION
002722  010700                                SCOPE
002724  012706  010050                      MOV     #BUFF,LP        ;LINK POINTER SETUP
002730  012767  002742  175046              MOV     #RETA5,RTRAP5   ;RETURN LOCATION
002736  000100                              JMP     %0              ;ILLEGAL INSTRUCTION, SHOULD TRAP
002740  000000                              HLT
002742  010700                      RETA5:  SCOPE
                                        ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
002744  012706  010050                      MOV     #BUFF,LP        ;LINK POINTER SETUP
002750  012767  002760  175026              MOV     #RETB5,RTRAP5   ;RETURN POINTER
002756  000100                              JMP     %0              ;RESERVED INSTRUCTION
002760  020627  010044              RETB5:  CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
002764  001401                              BEQ     .+4
002766  000000                              HLT                     ;NOT DECREMENTED TWO WORDS
002770  010700                              SCOPE
                                        ;TEST THAT PROPER P.C. IS SAVED
002772  012706  010050                      MOV     #BUFF,LP        ;LINK POINTER SETUP
002776  012767  003006  175000              MOV     #RETC5,RTRAP5   ;RETURN FROM TRAP POINTER
003004  000100                              JMP     %0              ;TRAP ON THIS INSTRUCTION
003006  022767  003006  005030      RETC5:  CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
003014  001401                              BEQ     .+4
003016  000000                              HLT                     ;INCORRECT P.C.
003020  010700                              SCOPE
                                        ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
003022  010700                              SCOPE
003024  012706  010050                      MOV     #BUFF,LP        ;SET UP
003030  012767  003046  174746              MOV     #RETD5,RTRAP5   ;SET UP
003036  005067  174734                      CLR     CC              ;CLEAR CC AND PRIORITY
003042  000257                              CCC
003044  000100                              JMP     %0              ;TRAP
003046  026727  004774  000000      RETD5:  CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
003054  001401                              BEQ     .+4             ;TEST FOR ALL ZEROS
003056  000000                              HLT                     ;INCORRECT STATUS
003060  010700                              SCOPE
003062  012706  010050                      MOV     #BUFF,LP        ;SET UP
003066  012767  003106  174710              MOV     #RETE5,RTRAP5   ;SET UP
003074  012767  000357  174674              MOV     #357,CC         ;SET PRIORITY
003102  000277                              SCC                     ;SET CC
003104  000100                              JMP     %0              ;TRAP
003106  026727  004734  000357      RETE5:  CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
003114  001401                              BEQ     .+4             ;TEST FOR ALL ONES
003116  000000                              HLT                     ;INCORRECT STATUS ON STACK
003120  010700                              SCOPE
                                        ;TEST THAT "NEW" STATUS IS CORRECT
003122  012706  010050                      MOV     #BUFF,LP
003126  012767  003142  174650              MOV     #RETF5,RTRAP5
003134  005067  174646                      CLR     RTRAP5+2        ;CLEAR FUTURE PRIORITY AND CC
003140  000100                              JMP     %0
003142  100001                      RETF5:  BPL     .+4             ;TEST FOR "C" CLEARED
003144  000000                              HLT                     ;C NOT CLEARED
003146  001001                              BNE     .+4
003150  000000                              HLT                     ;Z NOT CLEARED
003152  102001                              BVC     .+4
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                                                HLT                     ;V NOT CLEARED
                                                BCC     .+4
                                                HLT                     ;C NOT CLEARED
                        000357  174606          BIT     #357,CC         ;TEST PRIORITY
                                                BEQ     .+4
                                                HLT                     ;PRIORITY NOT ZERO
                                                SCOPE
                        010050                  MOV     #BUFF,LP
                        003220  174574          MOV     #RETG5,RTRAPS
                        000357  174570          MOV     #357,RTRAPS+2   ;SET NEW "CC" AND PRIORITY
                                                JMP     %0              ;TRAP HERE
                                        RETG5:  BMI     .+4
                                                HLT                     ;N NOT SET
                                                BEQ     .+4
                                                HLT                     ;Z NOT SET
                                                BVS     .+4
                                                HLT                     ;V NOT SET
                                                BCS     .+4
                                                HLT                     ;C NOT SET
                        174532                  MOV     CC,LP
                        000357                  CMP     #357,LP
                                                BEQ     .+4
                                                HLT                     ;PRIORITY WAS CHANGED
                                        ;TEST THAT A TRAP OCCURS ON ALL ILLEGAL INSTRUCTION
                                                SCOPE
                        010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
                        003274  174514          MOV     #RETH5,RTRAPS   ;RETURN POINTER
                                                JSR     %0,%0           ;RESERVED INSTRUCTION
                                                HLT
                                        RETH5:  SCOPE
                                        ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
                        010050                  MOV     #BUFF,LP
                        003312  174474          MOV     #RETJ,RTRAPS
                                                JSR     %0,%0
                        010044          RETJ:   CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
                                                BEQ     .+4
                                                HLT                     ;NOT DECREMENTED TWO WORDS
                                                SCOPE
                                        ;TEST THAT PROPER P.C. IS SAVED
                        010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
                        003340  174446          MOV     #RETK,RTRAPS    ;RETURN FROM TRAP POINTER
                                        INSTK:  JSR     %0,%0           ;TRAP ON THIS INSTRUCTION
                        003340  004476  RETK:   CMP     #INSTK+2,BUFF-4 ;CHECK FOR INCREMENTED P.C.
                                                BEQ     .+4
                                                HLT                     ;INCORRECT P.C.
                                                SCOPE
                                        ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
                                                SCOPE
                        010050                  MOV     #BUFF,LP        ;SET UP
                        003400  174414          MOV     #RETL,RTRAPS    ;SET UP
                        174402                  CLR     CC              ;CLEAR CC AND PRIORITY
                                                CCC
                                                JSR     %0,%0           ;TRAP
                        004442  000000  RETL:   CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
                                                BEQ     .+4             ;TEST FOR ALL ZEROS
                                                HLT                     ;INCORRECT STATUS
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   933  003412  010700                                SCOPE
   934  003414  012706  010050                        MOV     #BUFF,LP        ;SET UP
   935  003420  012767  003440  174356                MOV     #RETM,RTRAPS    ;SET UP
   936  003426  012767  000357  174342                MOV     #357,CC         ;SET PRIORITY
   937  003434  000277                                SCC                     ;SET CC
   938  003436  004000                                JSR     %0,%0           ;TRAP
   939  003440  026727  004402  000357  RETM:         CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
   940  003446  001401                                BEQ     .+4             ;TEST FOR ALL ONES
   941  003450  000000                                HLT                     ;INCORRECT STATUS ON STACK
   942  003452  010700                                SCOPE
   943                                  ;TEST THAT "NEW" STATUS IS CORRECT
   944  003454  012706  010050                        MOV     #BUFF,LP
   945  003460  012767  003474  174316                MOV     #RETN,RTRAPS
   946  003466  005067  174314                        CLR     RTRAPS+2        ;CLEAR FUTURE PRIORITY AND CC
   947  003472  004000                                JSR     %0,%0
   948  003474  100001                  RETN:         BPL     .+4             ;TEST FOR "C" CLEARED
   949  003476  000000                                HLT                     ;C NOT CLEARED
   950  003500  001001                                BNE     .+4
   951  003502  000000                                HLT                     ;Z NOT CLEARED
   952  003504  102001                                BVC     .+4
   953  003506  000000                                HLT                     ;V NOT CLEARED
   954  003510  103001                                BCC     .+4
   955  003512  000000                                HLT                     ;C NOT CLEARED
   956  003514  016700  174256                        MOV     CC,%0           ;TEMP STORAGE
   957  003520  001401                                BEQ     .+4
   958  003522  000000                                HLT                     ;PRIORITY NOT ZERO
   959  003524  010700                                SCOPE
   960  003526  012706  010050                        MOV     #BUFF,LP
   961  003532  012767  003550  174244                MOV     #RETQ,RTRAPS
   962  003540  012767  000357  174240                MOV     #357,RTRAPS+2   ;SET NEW "CC" AND PRIORITY
   963  003546  004000                                JSR     %0,%0           ;TRAP HERE
   964  003550  100401                  RETQ:         BMI     .+4
   965  003552  000000                                HLT                     ;N NOT SET
   966  003554  001401                                BEQ     .+4
   967  003556  000000                                HLT                     ;Z NOT SET
   968  003560  102401                                BVS     .+4
   969  003562  000000                                HLT                     ;V NOT SET
   970  003564  103401                                BCS     .+4
   971  003566  000000                                HLT                     ;C NOT SET
   972  003570  016700  174202                        MOV     CC,%0
   973  003574  022700  000357                        CMP     #357,%0
   974  003600  001401                                BEQ     .+4
   975  003602  000000                                HLT                     ;PRIORITY WAS CHANGED
   976  003604  010700                                SCOPE
   977
   978                                  ;TEST THAT A TRAP OCCURS ON AN ILLEGAL ADDRESS
   979  003606  010700                                SCOPE
   980  003610  012706  010050                        MOV     #BUFF,LP        ;LINK POINTER SETUP
   981  003614  012767  003630  174162                MOV     #RETP,RTRAPS    ;RETURN LOCATION
   982  003622  005767  174153                        TST 1                   ;ILLEGAL ADDRESS INSTRUCTION, SHOULD TRAP
   983  003626  000000                                HLT                     ;ILLEGAL ADDRESS DID NOT TRAP
   984  003630  010700                  RETP:         SCOPE
   985                                  ;TEST DECREMENT OF LINK POINTER ON A TRAP OPERATION
   986  003632  012706  010050                        MOV     #BUFF,LP        ;LINK POINTER SETUP
   987  003636  012767  003650  174140                MOV     #RETQ,RTRAPS    ;RETURN POINTER
   988  003644  005767  174131                        TST 1                   ;RESERVED INSTRUCTION
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  989  003650  020627  010044          RETQ:   CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
  990  003654  001401                          BEQ     .+4
  991  003656  000000                          HLT                     ;NOT DECREMENTED TWO WORDS
  992  003660  010700                          SCOPE
  993                                  ;TEST THAT PROPER P.C. IS SAVED
  994  003662  012706  010050                  MOV     #BUFF,LP        ;LINK POINTER SETUP
  995  003666  012767  003700  174110          MOV     #RETR,RTRAPS    ;RETURN FROM TRAP POINTER
  996  003674  005767  174101                  TST 1                   ;TRAP ON THIS INSTRUCTION
  997  003700  022767  003700  004136  RETR:   CMP     #.,BUFF-4       ;CHECK FOR INCREMENTED P.C.
  998  003706  001401                          BEQ     .+4
  999  003710  000000                          HLT                     ;INCORRECT P.C.
 1000  003712  010700                          SCOPE
 1001                                  ;TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
 1002  003714  010700                          SCOPE
 1003  003716  012706  010050                  MOV     #BUFF,LP        ;SET UP
 1004  003722  012767  003742  174054          MOV     #RETS,RTRAPS    ;SET UP
 1005  003730  005067  174042                  CLR     CC              ;CLEAR CC AND PRIORITY
 1006  003734  000257                          CCC
 1007  003736  005767  174037                  TST 1                   ;TRAP
 1008  003742  026727  004100  000000  RETS:   CMP     BUFF-2,#0       ;TEST THAT OLD STATUS WENT TO STACK
 1009  003750  001401                          BEQ     .+4             ;TEST FOR ALL ZEROS
 1010  003752  000000                          HLT                     ;INCORRECT STATUS
 1011  003754  010700                          SCOPE
 1012  003756  012706  010050                  MOV     #BUFF,LP        ;SET UP
 1013  003762  012767  004004  174014          MOV     #RETT,RTRAPS    ;SET UP
 1014  003770  012767  000357  174000          MOV     #357,CC         ;SET PRIORITY
 1015  003776  000277                          SCC                     ;SET CC
 1016  004000  005767  173775                  TST 1                   ;TRAP
 1017  004004  026727  004036  000357  RETT:   CMP     BUFF-2,#357     ;COMPARES STATUS ON STACK
 1018  004012  001401                          BEQ     .+4             ;TEST FOR ALL ONES
 1019  004014  000000                          HLT                     ;INCORRECT STATUS ON STACK
 1020  004016  010700                          SCOPE
 1021                                  ;TEST THAT "NEW" STATUS IS CORRECT
 1022  004020  012706  010050                  MOV     #BUFF,LP
 1023  004024  012767  004042  173752          MOV     #RETU,RTRAPS
 1024  004032  005067  173750                  CLR     RTRAPS+2        ;CLEAR FUTURE PRIORITY AND CC
 1025  004036  005767  173737                  TST 1                   ;TRAP HERE
 1026  004042  100001                  RETU:   BPL     .+4             ;TEST FOR "C" CLEARED
 1027  004044  000000                          HLT                     ;C NOT CLEARED
 1028  004046  001001                          BNE     .+4
 1029  004050  000000                          HLT                     ;Z NOT CLEARED
 1030  004052  102001                          BVC     .+4
 1031  004054  000000                          HLT                     ;V NOT CLEARED
 1032  004056  103001                          BCC     .+4
 1033  004060  000000                          HLT                     ;C NOT CLEARED
 1034  004062  032767  000357  173706          BIT     #357,CC         ;TEST PRIORITY FOR ZERO
 1035  004070  001401                          BEQ     .+4
 1036  004072  000000                          HLT                     ;PRIORITY NOT ZERO
 1037  004074  010700                          SCOPE
 1038  004076  012706  010050                  MOV     #BUFF,LP
 1039  004102  012767  004122  173674          MOV     #RETV,RTRAPS
 1040  004110  012767  000357  173670          MOV     #357,RTRAPS+2   ;SET NEW "CC" AND PRIORITY
 1041  004116  005767  173657                  TST 1                   ;TRAP HERE
 1042  004122  100401                  RETV:   BMI     .+4
 1043  004124  000000                          HLT                     ;N NOT SET
 1044  004126  001401                          BEQ     .+4
```

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1045  004130  000000                          HLT                     ;Z NOT SET
1046  004132  102401                          BVS     .+4
1047  004134  000000                          HLT                     ;V NOT SET
1048  004136  103401                          BCS     .+4
1049  004140  000000                          HLT                     ;C NOT SET
1050  004142  016700  173630                  MOV     CC,%0
1051  004146  022700  000357                  CMP     #357,%0
1052  004152  001401                          BEQ     .+4
1053  004154  000000                          HLT
1054  004156  010700                          SCOPE
1055                                  ;TEST THAT BIT 4; 20(8) WILL CAUSE A TRAP TO 14
1056  004160  010700                          SCOPE
1057  004162  012706  010050                  MOV     #BUFF,LP
1058  004166  012767  004206  173620          MOV     #RETAT,RTRAP4   ;SET UP TO TRAP TO 14
1059  004174  052767  000020  173574          BIS     #20,CC          ;SET TRACE BIT
1060  004202  000240                          NOP                     ;TRAP HERE
1061  004204  000000                          HLT                     ;TRACE BIT DOES NOT TRAP
1062  004206  010700                  RETAT:  SCOPE
1063                                  ;TEST LINK POINTER DECREMENTS
1064  004210  012706  010050                  MOV     #BUFF,LP
1065  004214  012767  004230  173572          MOV     #RETBT,RTRAP4
1066  004222  052767  000020  173546          BIS     #20,CC
1067  004230  020627  010044          RETBT:  CMP     LP,#BUFF-4
1068  004234  001401                          BEQ     .+4
1069  004236  000000                          HLT                     ;STACK POINTER WAS NOT PUSHED BY TRAP
1070  004240  010700                          SCOPE
1071                                  ;TEST FOR PROPER PC ON STACK
1072  004242  012706  010050                  MOV     #BUFF,LP
1073  004246  012767  004264  173540          MOV     #RETCT,RTRAP4
1074  004254  052767  000020  173514          BIS     #20,CC
1075  004262  000240                          NOP                     ;TRAP HERE
1076  004264  022767  004264  003552  RETCT:  CMP     #.,BUFF-4
1077  004272  001401                          BEQ     .+4
1078  004274  000000                          HLT                     ;CORRECT PC WAS NOT SAVED ON STACK
1079  004276  010700                          SCOPE
1080
1081                                  ;TEST THAT DECREMENT R6 TO A VALUE LESS THAN 400 TRAPS
1082  004300  012706  000150                  MOV     #150,%6         ;R6 = 150
1083  004304  012767  004316  173472          MOV     #TDEC1,4        ;STACK OVERFLOW TRAP POINTER
1084  004312  005746                          TST     -(6)            ;WITH R6 = 150 SHOULD TRAP
1085  004314  000000                          HLT                     ;AUTO DECREMENT WITH R6 LESS THAN 400
1086  004316  010700                  TDEC1:  SCOPE                   ;DID NOT TRAP
1087
1088                                  ;TEST FOR DECREMENT OF R6 ON OVERFLOW TRAP
1089  004320  012706  000150                  MOV     #150,%6         ;R6 = 150
1090  004324  012767  004334  173452          MOV     #TDEC2,4        ;TRAP POINTER
1091  004332  005746                          TST     -(6)            ;WITH R6 = 150 SHOULD TRAP
1092  004334  020627  000142          TDEC2:  CMP     %6,#142         ;DID R6 DECREMENT
1093  004340  001401                          BEQ     .+4
1094  004342  000000                          HLT                     ;R6 NOT = 142
1095  004344  010700                          SCOPE
1096
1097                                  ;TEST THAT OVERFLOW TRAP DOES NOT LOSE INFORMATION
1098  004346  012706  000150                  MOV     #150,%6
1099  004352  005067  173570                  CLR     146             ;STATUS WORD OF LOC 10
1100  004356  012767  004366  173420          MOV     #TDEC3,4        ;RETURN TO LOC 4
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1101  004364  005246                          INC     -(6)
1102  004366  005767  173554          TDEC3:  TST     146
1103  004372  001001                          BNE     .+4
1104  004374  000000                          HLT                     ;INCREMENT OPERATION NOT INHIBITED
1105  004376  010700                          SCOPE
1106  004400  012705  001000                  MOV     #1000,%5
1107  004404  012706  000400                  MOV     #400,%6
1108  004410  012767  004422  173366          MOV     #TDEC4,4
1109  004416  124645                          CMPB    -(6),-(5)
1110  004420  000000                          HLT                     ;STACK = 400 AND DECREMENTED, SHOULD TRAP
1111  004422  010700                  TDEC4:  SCOPE
1112
1113  004424  012706  000400                  MOV     #400,%6
1114  004430  012767  004442  173346          MOV     #TDEC5,4
1115  004436  134546                          BITB    -(5),-(6)
1116  004440  000000                          HLT                     ;NO STACK OVERFLOW TRAP
1117  004442  010700                  TDEC5:  SCOPE
1118  004444  000407                          BR      TDEC6
1119  004446  010700                  TONT:   SCOPE                   ;TEST TRAP ON TRAP - SHOULD CAUSE A HALT
1120
1121  004450  005006                          CLR     %6
1122  004452  012767  004464  173324          MOV     #TDEC6,4
1123  004460  000146                          JMP     -(6)
1124  004462  000000                          HLT                     ;TRAP ON TRAP SHOULD HALT
1125  004464  010700                  TDEC6:  SCOPE
1126                                          .MACR   VTRP    INST,A, B,DEST
1127                                  ;TEST THAT AN INST CAUSES AN OVERFLOW TRAP
1128
1129                                          MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1130                                          MOV     #VDEC'B,DEST    ;SET UP INST VECTOR
1131                                          MOV     #VDEC'A,4       ;SET UP OVERFLOW VECTOR
1132                                          INST                    ;THIS TRAP SHOULD CAUSE OVERFLOW
1133                                          HLT                     ;NO TRAP OCCURRED
1134                                  VDEC'B':HLT                     ;TRAP FLAG OVERFLOW DID NOT OCCUR
1135                                  VDEC'A':SCOPE                   ;NORMAL OVERFLOW RETURN
1136                                          .ENDM
1137
1138  004466                                  VTRP    70000,1,2,10
1139                                  ;TEST THAT AN 70000 CAUSES AN OVERFLOW TRAP
1140
1141  004466  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1142  004472  012767  004512  173310          MOV     #VDEC2,10       ;SET UP 70000 VECTOR
1143  004500  012767  004514  173276          MOV     #VDEC1,4        ;SET UP OVERFLOW VECTOR
1144  004506  070000                          70000                   ;THIS TRAP SHOULD CAUSE OVERFLOW
1145  004510  000000                          HLT                     ;NO TRAP OCCURRED
1146  004512  000000                  VDEC2:  HLT                     ;TRAP FLAG OVERFLOW DID NOT OCCUR
1147  004514  010700                  VDEC1:  SCOPE                   ;NORMAL OVERFLOW RETURN
1148  004516                                  VTRP    IOT,3,4,20
1149                                  ;TEST THAT AN IOT CAUSES AN OVERFLOW TRAP
1150
1151  004516  012706  000400                  MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1152  004522  012767  004542  173270          MOV     #VDEC4,20       ;SET UP IOT VECTOR
1153  004530  012767  004544  173246          MOV     #VDEC3,4        ;SET UP OVERFLOW VECTOR
1154  004536  000004                          IOT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
1155  004540  000000                          HLT                     ;NO TRAP OCCURRED
1156  004542  000000                  VDEC4:  HLT                     ;TRAP FLAG OVERFLOW DID NOT OCCUR
```

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1157  004544  010700                    VDEC3:SCOPE                     ;NORMAL OVERFLOW RETURN
1158  004546                                    VTRP    EMT,5,6,30
1159                                    ;TEST THAT AN EMT CAUSES AN OVERFLOW TRAP
1160
1161  004546  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1162  004552  012767  004572  173250            MOV     #VDEC6,30       ;SET UP EMT VECTOR
1163  004560  012767  004574  173216            MOV     #VDEC5,4        ;SET UP OVERFLOW VECTOR
1164  004566  104000                            EMT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
1165  004570  000000                            HLT                     ;NO TRAP OCCURRED
1166  004572  000000                    VDEC6:HLT                       ;TRAP FLAG OVERFLOW DID NOT OCCUR
1167  004574  010700                    VDEC5:SCOPE                     ;NORMAL OVERFLOW RETURN
1168  004576                                    VTRP    TRAP,7,8,34
1169                                    ;TEST THAT AN TRAP CAUSES AN OVERFLOW TRAP
1170
1171  004576  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1172  004602  012767  004622  173224            MOV     #VDEC8,34       ;SET UP TRAP VECTOR
1173  004610  012767  004624  173166            MOV     #VDEC7,4        ;SET UP OVERFLOW VECTOR
1174  004616  104400                            TRAP                    ;THIS TRAP SHOULD CAUSE OVERFLOW
1175  004620  000000                            HLT                     ;NO TRAP OCCURRED
1176  004622  000000                    VDEC8:HLT                       ;TRAP FLAG OVERFLOW DID NOT OCCUR
1177  004624  010700                    VDEC7:SCOPE                     ;NORMAL OVERFLOW RETURN
1178  004626                                    VTRP    TRT,9,10,14
1179                                    ;TEST THAT AN TRT CAUSES AN OVERFLOW TRAP
1180
1181  004626  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1182  004632  012767  004652  173154            MOV     #VDEC10,14      ;SET UP TRT VECTOR
1183  004640  012767  004654  173136            MOV     #VDEC9,4        ;SET UP OVERFLOW VECTOR
1184  004646  000003                            TRT                     ;THIS TRAP SHOULD CAUSE OVERFLOW
1185  004650  000000                            HLT                     ;NO TRAP OCCURRED
1186  004652  000000                    VDEC10:HLT                      ;TRAP FLAG OVERFLOW DID NOT OCCUR
1187  004654  010700                    VDEC9:SCOPE                     ;NORMAL OVERFLOW RETURN
1188  004656                                    VTRP    ILLA,12,11,4
1189                                    ;TEST THAT AN ILLA CAUSES AN OVERFLOW TRAP
1190
1191  004656  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1192  004662  012767  004702  173114            MOV     #VDEC11,4       ;SET UP ILLA VECTOR
1193  004670  012767  004704  173106            MOV     #VDEC12,4       ;SET UP OVERFLOW VECTOR
1194  004676  004700                            ILLA                    ;THIS TRAP SHOULD CAUSE OVERFLOW
1195  004700  000000                            HLT                     ;NO TRAP OCCURRED
1196  004702  000000                    VDEC11:HLT                      ;TRAP FLAG OVERFLOW DID NOT OCCUR
1197  004704  010700                    VDEC12:SCOPE                    ;NORMAL OVERFLOW RETURN
1198  004706  020627  000370                    CMP     %6,#370         ;STACK PUSHED FOUR WORDS?
1199  004712  001401                            BEQ     .+4
1200  004714  000000                            HLT                     ;TRAP OVERFLOW DID NOT OCCUR
1201  004716                                    VTRP    ILLB,14,13,4
1202                                    ;TEST THAT AN ILLB CAUSES AN OVERFLOW TRAP
1203
1204  004716  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1205  004722  012767  004742  173054            MOV     #VDEC13,4       ;SET UP ILLB VECTOR
1206  004730  012767  004744  173046            MOV     #VDEC14,4       ;SET UP OVERFLOW VECTOR
1207  004736  000100                            ILLB                    ;THIS TRAP SHOULD CAUSE OVERFLOW
1208  004740  000000                            HLT                     ;NO TRAP OCCURRED
1209  004742  000000                    VDEC13:HLT                      ;TRAP FLAG OVERFLOW DID NOT OCCUR
1210  004744  010700                    VDEC14:SCOPE                    ;NORMAL OVERFLOW RETURN
1211
1212                                    ;TEST FOR FALSE OVERFLOW TRAP
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1213                                            ;PROGRAM MAY HAVE RELOADED IF OVERFLOW FAILS
1214
1215  004746  012767  005014  173030            MOV     #FOVER,4        ;SET UP OVERFLOW POINTER
1216  004754  012706  001002                    MOV     #1002,%6
1217  004760  005746                            TST     -(6)            ;SHOULD NOT OVERFLOW
1218  004762  012706  002002                    MOV     #2002,%6
1219  004766  005746                            TST     -(6)            ;SHOULD NOT OVERFLOW
1220  004770  012706  004002                    MOV     #4002,%6
1221  004774  005746                            TST     -(6)            ;SHOULD NOT OVERFLOW
1222  004776  012706  010002                    MOV     #10002,%6
1223  005002  005746                            TST     -(6)
1224  005004  012706  020000                    MOV     #20000,%6       ;SHOULD NOT OVERFLOW
1225  005010  005746                            TST     -(6)
1226  005012  000401                            BR      .+4
1227  005014  000000                FOVER:      HLT                     ;FALSE OVERFLOW OCCURRED
1228  005016  010700                            SCOPE                   ;CHECK STACK TO FIND WHERE
1229                                          ;TEST THAT A TTY INTERRUPT CAUSES AN OVERFLOW TRAP
1230  005020  012767  000340  172750            MOV     #340,STATUS     ;LOCK OUT INTERRUPT
1231  005026  012706  000400                    MOV     #400,%6         ;SET UP STACK TO OVERFLOW
1232  005032  012767  005064  172744            MOV     #TDEC7,4        ;SET UP OVERFLOW TRAP
1233  005040  012767  005062  173016            MOV     #TDEC8,64       ;SET UP INTERRUPT VECTOR
1234  005046  012767  000100  172510            MOV     #100,TTCSR      ;SET INTERRUPT ENABLE
1235  005054  005067  172716                    CLR     STATUS          ;ALLOW INTERRUPT TO OCCUR
1236  005060  000000                            HLT                     ;NO INTERRUPT OCCURRED
1237  005062  000000                TDEC8:      HLT                     ;TRAP FLAG OVERFLOW DID NOT OCCUR
1238  005064  005067  172474        TDEC7:      CLR     TTCSR           ;CLEAR INTERRUPT ENABLE
1239  005070  010700                            SCOPE
1240  005072  012706  010050                    MOV     #BUFF,LP        ;SCOPE PROTECTION
1241  005076  012767  000006  172700            MOV     #6,4
1242  005104  005067  172674                    CLR     4
1243  005110  012767  006262  172666            MOV     #ATRAP,RTRAP5
1244  005116  000167  000034                    JMP     R7TRX           ;GO TO ILLEGAL ADDRESS TEST
1245  005122  012706  010050                    MOV     #BUFF,LP        ;SCOPE PROTECTION
1246  005126  012767  000006  172650            MOV     #6,4
1247  005134  005067  172644                    CLR     4
1248  005140  012767  006262  172636            MOV     #ATRAP,RTRAP5
1249  005146  000167  000004                    JMP     R7TRX           ;GO TO ILLEGAL ADDRESS TEST
1250  005152  000000                MAP:        0
1251  005154  000000                MAPT:       0
1252           000000                HERE=0
1253                                        ;DOES THE PROCESSOR TRAP WHEN %7 IS ODD?
1254  005156  010700                R7TRX:      SCOPE
1255  005160  012706  010050                    MOV     #BUFF,%6        ;SET UP STACK POINTER
1256  005164  012767  005202  172612            MOV     #R7TR1,4        ;RETURN FROM TRAP
1257  005172  012707  000001                    MOV     #1,%7           ;PC EQUALS ONE
1258  005176  000000                            HLT
1259  005200  000000                            HLT
1260  005202  022767  000001  002634  R7TR1:    CMP     #1,BUFF-4
1261  005210  001401                            BEQ     .+4             ;CORRECT PC WAS NOT SAVED ON STACK
1262  005212  000000                            HLT
1263
1264  005214  010700                            SCOPE
1265  005216  012706  010050                    MOV     #BUFF,%6        ;STACK POINTER
1266  005222  012767  005236  172554            MOV     #R7TR2,4
1267  005230  005207                            INC     %7              ;PC BECOMES ODD
1268  005232  000000                R7TR2A:     HLT
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1269  005234  000000                          HLT
1270  005236  022767  005233  002600  R7TR2:  CMP     #R7TR2A+1,BUFF-4
1271  005244  001401                          BEQ     .+4                 ;CORRECT PC NOT ON STACK
1272  005246  000000                          HLT
1273  005250  010700                          SCOPE
1274  005252  012706  010050                  MOV     #BUFF,%6
1275  005256  012767  005270  172520          MOV     #R7TR3,4
1276  005264  005307                          DEC     %7                  ;MAKE PC ODD
1277  005266  000000                          HLT                         ;SHOULD TRAP
1278  005270  022767  005265  002546  R7TR3:  CMP     #.-3,BUFF-4         ;CHECK VALUE OF PC ON STACK
1279  005276  001401                          BEQ     .+4
1280  005300  000000                          HLT                         ;WRONG VALUE ON STACK
1281
1282  005302  010700                          SCOPE
1283  005304  012706  010050                  MOV     #BUFF,%6
1284  005310  012767  005326  172466          MOV     #R7TR4,4
1285  005316  000261                          SEC                         ;CARRY EQUALS A 1
1286  005320  006107                          ROL     %7                  ;PC BECOMES ODD
1287  005322  000000                  TR4A:   HLT
1288  005324  000000                          HLT
1289  005326  022767  012645  002510  R7TR4:  CMP     #TR4A+TR4A+1,BUFF-4     ;CHECK FOR VALUE ON STACK
1290  005334  001401                          BEQ     .+4
1291  005336  000000                          HLT                         ;WRONG VALUE ON STACK
1292  005340  012767  000006  172436          MOV     #6,4                ;RESET UP A HALT FOR TRAP
1293                                  ;TEST TRAP ON TRAP
1294                                  ;TEST THAT TRACE BIT TRAPS ARE INHIBITED ON TRAP INST
1295
1296  005346  010700                          SCOPE
1297  005350  012706  010050                  MOV     #BUFF,%6
1298  005354  012767  005434  172432          MOV     #TRACE,14           ;TRACE TRAP
1299  005362  005027  000016                  CLR     #16                 ;
1300  005366  012767  005410  172424          MOV     #TONT1,20           ;IOT TRAP
1301  005374  005067  000054                  CLR     FLAG                ;SET ON TRACE TRAP
1302  005400  052767  000020  172370          BIS     #20,STATUS          ;SET TRACE BIT
1303  005406  000004                          IOT                         ;TRAP, NEW CC HAVE TRACE RESET
1304  005410  100001                  TONT1:  BPL     .+4                 ;IF TRACE TRAP OCCURRED WILL BRANCH
1305  005412  000000                          HLT                         ;NO TRACE TRAP AT END OF IOT INST.
1306  005414  010700                          SCOPE
1307  005416  012767  000016  172370          MOV     #16,14
1308  005424  012767  000022  172366          MOV     #22,20
1309  005432  000411                          BR      FLAG+2
1310  005434  012767  177777  000012  TRACE:  MOV     #-1,FLAG            ;SET FLAG DURING TRACE
1311  005442  005767  000006                  TST     FLAG
1312  005446  001401                          BEQ     .+4
1313  005450  000000                          HLT                         ;TRACE TRAP NOT INHIBITED
1314  005452  000002                          RTI                         ;TRAP
1315  005454  000000                  FLAG:   0
1316                                  ;TEST THAT THE TRACE BIT WILL CAUSE A TRAP
1317  005456  010700                          SCOPE
1318  005460  012706  010050                  MOV     #BUFF,%6            ;SET UP STACK POINTER
1319  005464  012767  005510  172322          MOV     #TRC1,14            ;TRACE TRAP RETURN
1320  005472  005067  172320                  CLR     16
1321  005476  012767  000020  172272          MOV     #20,CC              ;SET THE T BIT
1322  005504  000240                          NOP
1323  005506  000000                          HLT
1324  005510  036727  002332  000020  TRC1:   BIT     BUFF-2,#20          ;CHECK FOR T BIT ON STACK
```

```
  1325  005516  001001                        BNE     .+4
  1326  005520  000000                        HLT                     ;T BIT NOT SAVED ON STACKED
  1327  005522  010700                        SCOPE
```

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1328                                        ;TEST THAT AN RTI POPS THE T BIT
1329  005524  012706  010050                        MOV     #BUFF,%6        ;SET UP THE STACK
1330  005530  012746  000020                        MOV     #20,-(6)        ;FUTURE T BIT ON STACK
1331  005534  012746  005550                        MOV     #TRC2,-(6)      ;RTI RETURN
1332  005540  012767  005554  172246                MOV     #TRC3,14        ;TRACE TRAP INTERRUPT POINTER
1333  005546  000002                                RTI
1334
1335  005550  000240                    TRC2:       NOP                     ;TRACE IS SET SHOULD TRAP TO 14
1336  005552  000000                                HLT                     ;DID NOT TRACE TRAP
1337  005554  010700                    TRC3:       SCOPE
1338
1339                                        ;TEST THAT INTERRUPT OCCURS BEFORE TRAP
1340  005556  010700                                SCOPE
1341  005560  012706  010050                        MOV     #BUFF,%6
1342  005564  012767  000340  172204                MOV     #340,STATUS     ;HIGHEST PRIORITY LEVEL
1343  005572  012767  000100  171764                MOV     #100,TTCSR      ;INTERRUPT FOR TTY PUNCH/PRINTER
1344  005600  012767  005630  172226                MOV     #TR1,34         ;TRAP" VECTOR
1345  005606  012767  005632  172250                MOV     #TR2,64         ;TTY VECTOR
1346  005614  012767  000340  172214                MOV     #340,36         ;IF TRAP TRAPS, MOVE 340 TO PRIORITY
1347  005622  005067  172150                        CLR     STATUS          ;SHOULD TRAP AT IND OF CLR INST
1348  005626  104400                                TRAP                    ;TTY INTERRUPT SHOULD OVERRIDE TRAP
1349  005630  000000                    TR1:        HLT                     ;TRAP DID NOT OCCUR FIRST
1350  005632  005067  172200            TR2:        CLR     36
1351  005636  010700                                SCOPE
1352                                        ;WILL INTERRUPTS OCCURE BETWEEN TRAPS
1353  005640  012706  010050                        MOV     #BUFF,%6
1354  005644  012767  000340  172124                MOV     #340,STATUS
1355  005652  012767  000100  171704                MOV     #100,TTCSR
1356  005660  012767  005712  172146                MOV     #TR3,34         ;TRAP
1357  005666  012767  005714  172170                MOV     #TR5,64         ;TTY OUTPUT
1358  005674  012767  005716  172116                MOV     #TR4,20         ;IOT
1359  005702  012767  000340  172112                MOV     #340,22         ;IOT PRIORITY
1360  005710  104400                                TRAP                    ;THE ACT OF TRAPPING LOWER PRIORITY
1361  005712  000004                    TR3:        IOT                     ;INTERRUPT SHOULD OCCURE INPLACE OF IOT TRAP
1362  005714  000000                    TR5:        HLT                     ;NO INTERRUPT BETWEEN TRAPS
1363  005716  005067  172100            TR4:        CLR     22              ;CLR IOT PRIORITY
1364  005722  010700                                SCOPE
1365                                        ;TEST THAT "RESET" GOES TO OUTSIDE WORLD
1366  005724  010700                                SCOPE
1367  005726  012767  000100  171630                MOV     #100,TTCSR      ;SET INTERRUPT ENABLE
1368  005734  012767  000100  171616                MOV     #100,TRCSR      ;SET INTERRUPT ENABLE
1369  005742  000005                                RESET                   ;SHOULD CLEAR INTERRUPT ENABLE
1370  005744  032767  000100  171612                BIT     #100,TTCSR      ;TEST FOR CLEAR
1371  005752  001401                                BEQ     .+4
1372  005754  000000                                HLT                     ;RESET FAILED TO CLEAR TTCSR
1373  005756  032767  000100  171574                BIT     #100,TRCSR      ;TEST FOR CLEAR
1374  005764  001401                                BEQ     .+4
1375  005766  000000                                HLT                     ;RESET FAILED TO CLEAR TRCSR
1376                                        ;TEST THAT RESET DOES NOT HANG THE SYSTEM
1377  005770  010700                                SCOPE
1378  005772  012706  010050                        MOV     #BUFF,%6        ;SET STACK
1379  005776  005067  171774                        CLR     STATUS          ;ALLOW INTERRUPT
1380  006002  012767  006016  172054                MOV     #RESET1,64      ;TTY INTERRUPT VECTOR
1381  006010  052767  000100  171546                BIS     #100,TTCSR      ;SET INTERRUPT ENABLE
1382  006016  000005                    RESET1:     RESET                   ;IF THIS HANGS CHECK SACK
1383  006020  012767  000066  172036                MOV     #66,64          ;FOR FALSE INTERRUPT
```

```
                                        ;TEST RESET WITH TRACE ON
                                                SCOPE
006026  010700
006030  012706  010050                          MOV     #BUFF,%6        ;SET STACK
006034  012767  006056  171752                  MOV     #RESET2,14      ;SET UP TRACE VECTOR
006042  012767  000020  171726                  MOV     #20,STATUS      ;SET T BIT IN STATUS REGISTER
006050  000005                                  RESET                   ;SHOULD HAVE NO EFFECT
006052  000005                                  RESET                   ;NO EFFECT
006054  000000                                  HLT                     ;TRACE TRAP FAILED
006056  005067  171714          RESET2: CLR     STATUS                  ;CLEAR TRACK
006062  005067  171730                  CLR     16                      ;TRACE STATUS

                                        ;TEST THAT WHEN TTY INTERRUPTS IT POPS NEW STATUS
006066  000005                                  RESET
006070  012706  010050                          MOV     #BUFF,%6        ;SET UP STACK
006074  012767  006120  171762                  MOV     #TTY3,64        ;INTERRUPT VECTOR
006102  005067  171670                  CLR     STATUS                  ;DROP PROCESSOR PRIORITY
006106  012767  000357  171752                  MOV     #357,66         ;HIGH PRIORITY ON INTERRUPT
006114  005167  171444                  COM     TTCSR                   ;SHOULD SET INTERRUPT ENABLE & INTERRUPT
006120  016727  171652  000000  TTY3:   MOV     STATUS,#HERE    ;SAVE PROCESSOR STATUS
006126  027767  000357  177770          CMP     #357,.-2
006134  001401                          BEQ     .+4
006136  000000                          HLT                             ;INTERRUPT DID NOT POP CORRECT STATUS
006140  000005                          RESET                           ;CLR INTERRUPT ENABLE
006142  010700                          SCOPE
006144  012706  010050                  MOV     #BUFF,%6                ;STACK SET UP
006150  012767  006174  171706          MOV     #TTY4,64                ;INTERRUPT VECTOR
006156  005067  171704                  CLR     66                      ;CLR NEW STATUS
006162  012767  000157  171606          MOV     #157,STATUS             ;PROCESSOR STATUS
006170  005167  171370                  COM     TTCSR                   ;SET INTERRUPT ENABLE
006174  016727  171576  000000  TTY4:   MOV     STATUS,#HERE    ;SAVE NEW STATUS
006202  005767  177772                  TST     .-2
006206  001401                          BEQ     .+4
006210  000000                          HLT                             ;INTERRUPT DID NOT POP CORRECT STATUS
006212  005067  171346                  CLR     TTCSR
006216  000167  000010                  JMP     ADALL
                                ;ILLEGAL ADDRESS AND INSTRUCTION TEST FOR POP11
                                ;THIS ROUTINE TEST THAT NO LEGAL ADDRESS
                                ;TRAPS AND THAT AN ILLEGAL ADDRESS TRAPS TO LOCATION 4:

006222  160002                  TSH:    160002
006224  000000                  TSL:    0
006226  000000                  CORL:   0
006230  020000                  CORH:   20000                           ;CHANGE TO 40000 FOR 8K

006232  016700  177770          ADALL:  MOV     CORL,%0                 ;LL OF CORE TO REG ZERO
006236  012767  006262  171540          MOV     #ATRAP,4                        ;SET UP ADDRESS TRAP ENTRANCE
006244  012706  010050          NOR:    MOV     #BUFF,SP
006250  105720                          TSTB    (0)+                    ;IF OUT SIDE OF CORE, TRAP TO 4
006252  020067  177752                  CMP     %0,CORH                 ;IS POINTER IN SIDE CORE
006256  101772                          BLOS    NOR                     ;TEST THE REST OF CORE
006260  000000                  AUTO:   HLT                             ;OUTSIDE OF HIGH CORE, DID YOU USE CORRECT STARTING ADDR
                                ;RETURN HERE ON AN ADDRSS TRAP
006262  020067  177742          ATRAP:  CMP     %0,CORH                 ;SHOULD WE HAVE TRAPPED
006266  101001                          BHI     TRAPB
006270  000000                  AUTO1:  HLT                             ;NO, FALSE ADDRESS TRAP
006272  020067  177724          TRAPB:  CMP     %0,TSH
```

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1440  006276  001362                          BNE     NOR             ;SHOULD TRAP, NON EXISTANT CORE
1441                                                                  ;LOOP PROGRAM
1442  006300  010700                          SCOPE
1443  006302  012767  000006  171474          MOV     #6,4
1444  006310  005067  171472                  CLR     6
1445                            ;SPECIAL CASE OF ODD:.EVEN .BYTE AND REGISTER 6
1446          000000            HERE=0
1447
1448  006314  000167  000024                  JMP     R6TST
1449  006320  000000            K1:     0
1450  006322  000000            K2:     0
1451  006324  000000            K3:     0
1452  006326  000000            K4:     0
1453  006330  000000            K5:     0
1454  006332  000000            K6:     0
1455  006334  052525            K7:     052525
1456  006336  052400            K10:    052400
1457  006340  000000            K11:    0
1458  006342  000000            K12:    0
1459                            ;TEST AUTO INCREMENT AND DECREMENT OF R6 FOR .WORD AND .BYTES
1460  006344  005006            R6TST:  CLR     %6
1461  006346  112667  171426          MOVB    (6)+,HERE       ;SIX SHOULD INCREMENT BY TWO
1462  006352  020627  000002          CMP     %6,#2
1463  006356  001401                  BEQ     .+4
1464  006360  000000                  HLT                     ;R6 DID NOT AUTO INCREMENT BY TWO
1465  006362  010700                  SCOPE
1466
1467  006364  012706  001000          MOV     #1000,%6
1468  006370  114627  000000          MOVB    -(6),HERE       ;SHOULD DECREMENT BY TWO
1469  006374  020627  000776          CMP     %6,#776
1470  006400  001401                  BEQ     .+4
1471  006402  000000                  HLT                     ;R6 DID NOT AUTO DECRENT BY 2
1472  006404  010700                  SCOPE
1473
1474  006406  005006                  CLR     %6
1475  006410  112626                  MOVB    (6)+,(6)+       ;DOUBLOS AUTO INCREMENT OF R6
1476  006412  020627  000004          CMP     %6,#4
1477  006416  001401                  BEQ     .+4
1478  006420  000000                  HLT                     ;WRONG AUTO INCREMENT OF R6
1479  006422  010700                  SCOPE
1480
1481  006424  005006                  CLR     %6
1482  006426  005004                  CLR     %4
1483  006430  122624                  CMPB    (6)+,(4)+       ;TEST INCREMENT OF R6
1484  006432  020627  000002          CMP     %6,#2
1485  006436  001401                  BEQ     .+4
1486  006440  000000                  HLT                     ;WRONG INCREMENT OF R6
1487  006442  010700                  SCOPE
1488
1489  006444  005006                  CLR     %6
1490  006446  005004                  CLR     %4
1491  006450  122426                  CMPB    (4)+,(6)+       ;TEST INCREMENT OF R6
1492  006452  020627  000002          CMP     %6,#2
1493  006456  001401                  BEQ     .+4
1494  006460  000000                  HLT                     ;WRONG INCREMENT OF R6
1495  006462  010700                  SCOPE
```

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 1496
 1497  006464  005006                        CLR     %6
 1498  006466  005004                        CLR     %4
 1499  006470  122624                        CMPB    (6)+,(4)+       ;TEST INCREMENT OF R4
 1500  006472  020427  000001                CMP     %4,#1
 1501  006476  001401                        BEQ     .+4
 1502  006500  000000                        HLT                     ;WRONG INCREMENT OF R4
 1503  006502  010700                        SCOPE
 1504  006504  005006                        CLR     %6
 1505  006506  005004                        CLR     %4
 1506  006510  122426                        CMPB    (4)+,(6)+       ;TEST INCREMENT OF R6
 1507  006512  020627  000002                CMP     %6,#2
 1508  006516  001401                        BEQ     .+4
 1509  006520  000000                        HLT                     ;WRONG INCREMENT OF R6
 1510  006522  010700                        SCOPE
 1511
 1512  006524  005006                        CLR     %6
 1513  006526  005004                        CLR     %4
 1514  006530  122426                        CMPB    (4)+,(6)+       ;TEST INCREMENT OF R4
 1515  006532  020427  000001                CMP     %4,#1
 1516  006536  001401                        BEQ     .+4
 1517  006540  000000                        HLT                     ;WRONG INCREMENT OF R4
 1518  006542  010700                        SCOPE
 1519
 1520  006544  012706  001000                MOV     #1000,%6
 1521  006550  124627  000000                CMPB    -(6),#HERE      ;TEST DECREMENT OF R6
 1522  006554  022706  000776                CMP     #776,%6
 1523  006560  001401                        BEQ     .+4
 1524  006562  000000                        HLT                     ;WRONG DECREMENT OF R6
 1525  006564  010700                        SCOPE
 1526                          ;TEST TRANSFER OF .BYTE USING R6
 1527  006566  012767  123456  177534        MOV     #123456,K5
 1528  006574  012767  050505  177516        MOV     #050505,K1
 1529  006602  012705  006320                MOV     #K1,%5          ;%5=(050505)K1
 1530  006606  012706  006330                MOV     #K5,%6          ;%6(123456)K5
 1531  006612  112625                        MOVB    (6)+,(5)+       ;LOW .BYTE OF R6 TO R5
 1532  006614  022767  050456  177476        CMP     #050456,K1
 1533  006622  001401                        BEQ     .+4
 1534  006624  000000                        HLT                     ;FALSE TRANSFER OF .BYTE
 1535  006626  010700                        SCOPE
 1536
 1537  006630  012767  123456  177472        MOV     #123456,K5
 1538  006636  012767  050505  177454        MOV     #050505,K1
 1539  006644  012705  006320                MOV     #K1,%5          ;%5(050505)K1
 1540  006650  012706  006332                MOV     #K6,%6          ;%6(123456)K5
 1541  006654  114625                        MOVB    -(6),(5)+       ;LOW .BYTE OF R6 TO R5 (DECREMENT)
 1542  006656  026727  177436  050456        CMP     K1,#050456
 1543  006664  001401                        BEQ     .+4
 1544  006666  000000                        HLT                     ;FALSE R6 .BYTE TRANSFER
 1545  006670  010700                        SCOPE
 1546
 1547  006672  012767  123456  177420        MOV     #123456,K1
 1548  006700  012767  050505  177422        MOV     #050505,K5
 1549  006706  012705  006320                MOV     #K1,%5          ;(123456)
 1550  006712  012706  006330                MOV     #K5,%6          ;(050505)
 1551  006716  112526                        MOVB    (5)+,(6)+       ;LOW OF R5 TO LOW OF R6
```

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1552  006720  022767  050456  177402          CMP     #050456,K5
1553  006726  001401                          BEQ     .+4
1554  006730  000000                          HLT                             ;FALSE R6 .BYTE TRANSFER
1555  006732  010700                          SCOPE
1556
1557  006734  012767  123456  177356          MOV     #123456,K1
1558  006742  012767  050505  177360          MOV     #050505,K5
1559  006750  012705  006321                  MOV     #K1+1,%5                ;123456
1560  006754  012706  006330                  MOV     #K5,%6                  ;050505
1561  006760  112526                          MOVB    (5)+,(6)+               ;HIGH OF R5 TO LOW OF R6
1562  006762  026727  177342  050647          CMP     K5,#050647
1563  006770  001401                          BEQ     .+4
1564  006772  000000                          HLT                             ;FALSE R6 .BYTE TRANSFER
1565  006774  010700                          SCOPE
1566
1567  006776  012767  123456  177314          MOV     #123456,K1
1568  007004  012767  050505  177316          MOV     #050505,K5
1569  007012  012705  006321                  MOV     #K1+1,%5                ;R5=123456=-ODD ADDRESS
1570  007016  012706  006330                  MOV     #K5,%6                  ;R6=050505=-.EVEN ADDRESS
1571  007022  112625                          MOVB    (6)+,(5)+               ;LOW OF R6 TO HIGH OF R5
1572  007024  022767  042456  177266          CMP     #042456,K1
1573  007032  001401                          BEQ     .+4
1574  007034  000000                          HLT                             ;FAILED LOW OF 6 TO HIGH OF 5
1575  007036  010700                          SCOPE
1576                          ;TEST .BYTE OPERATION WITH SEQUENTIAL ODD;.EVEN ADDRESS
1577  007040  126767  177270  177267          CMPB    K7,K7+1                 ;SAME .WORD LOW TO HIGH
1578  007046  001401                          BEQ     .+4
1579  007050  000000                          HLT                             ;SHOULD COMPARE LOW TO HIGH
1580  007052  010700                          SCOPE
1581
1582  007054  126767  177255  177252          CMPB    K7+1,K7                 ;COMPARE ODD TO .EVEN SAME .WORD
1583  007062  001401                          BEQ     .+4
1584  007064  000000                          HLT                             ;ODD TO .EVEN .BYTE FAILURE
1585  007066  010700                          SCOPE
1586
1587  007070  126767  177243  177236          CMPB    K10+1,K7                ;SEQUENTIAL .BYTES
1588  007076  001401                          BEQ     .+4                     ;DIFFERENT .WORDS
1589  007100  000000                          HLT                             ;ODD TO .EVEN FAILED
1590  007102  010700                          SCOPE
1591
1592  007104  126767  177226  177220          CMPB    K10,K6
1593  007112  001401                          BEQ     .+4
1594  007114  000000                          HLT                             ;.EVEN TO EVEN FAILED
1595  007116  010700                          SCOPE
1596
1597  007120  126767  177211  177211          CMPB    K7+1,K10+1
1598  007126  001401                          BEQ     .+4
1599  007130  000000                          HLT                             ;ODD TO ODD FAILED
1600  007132  010700                          SCOPE
1601
1602  007134  126767  177176  177175          CMPB    K10,K10+1
1603  007142  001001                          BNE     .+4
1604  007144  000000                          HLT                             ;LOW TO HIGH IN SAME .WORD FAILED
1605  007146  010700                          SCOPE
1606
1607  007150  126767  177163  177160          CMPB    K10+1,K10
```

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1609  007156  001001                          BNE     .+4
1609  007160  000000                          HLT                     ;HIGH TO LOW IN SAME .WORD FAILED
1610  007162  010700                          SCOPE
1611
1612  007164  126767  177146  177143         CMPB    K10,K7+1
1613  007172  001001                          BNE     .+4
1614  007174  000000                          HLT                     ;.EVEN TO ODD FAILED
1615  007176  010700                          SCOPE
1616
1617                                  ;TEST SPECIAL CASE [R,(R)+]
1618
1619  007200  012700  006340                  MOV     #K11,%0         ;SOURCE AND DESTINATION BOTH R0
1620  007204  010020                          MOV     %0,(0)+         ;SOURCE NO MEMORY REFERENCE
1621  007206  026727  177126  006342          CMP     K11,#K11+2      ;DESTINATION IS MEMORY REFERENCE
1622  007214  001402                          BEQ     .+6
1623  007216  000167  000072                  JMP     CPU05           ;FAILED %(0),(0)+
1624  007222  010700                          SCOPE
1625  007224  012700  006340                  MOV     #K11,%0
1626  007230  110020                          MOVB    %0,(0)+
1627  007232  026727  177102  006341          CMP     K11,#K11+1
1628  007240  001401                          BEQ     .+4
1629  007242  000000                          HLT                     ;FAILED MOVB %0,(0)+
1630  007244  010700                          SCOPE
1631
1632  007246  012706  006340                  MOV     #K11,%6
1633  007252  110626                          MOVB    %6,(6)+
1634  007254  026727  177060  006342          CMP     K11,#K11+2
1635  007262  001401                          BEQ     .+4
1636  007264  000000                          HLT                     ;FAILED MOVB %6,(6)+
1637  007266  010700                          SCOPE
1638
1639  007270  012706  006340                  MOV     #K11,%6
1640  007274  010626                          MOV     %6,(6)+
1641  007276  026727  177036  006342          CMP     K11,#K11+2
1642  007304  001401                          BEQ     .+4
1643  007306  000000                          HLT                     ;FAILED MOV %6,(6)+
1644  007310  010700                          SCOPE
1645
1646  007312  000444                          BR      STAND
1647  007314  012700  006340          CPU05:  MOV     #K11,%0         ;SOURCE AND DESTINATION BOTH R0
1648  007320  010020                          MOV     %0,(0)+         ;SOURCE NO MEMORY REFERENCE
1649  007322  026727  177012  006340          CMP     K11,#K11        ;DESTINATION IS MEMORY REFERENCE
1650  007330  001401                          BEQ     .+4
1651  007332  000000                          HLT                     ;FAILED %(0),(0)+
1652  007334  010700                          SCOPE
1653
1654  007336  012700  006340                  MOV     #K11,%0
1655  007342  110020                          MOVB    %0,(0)+
1656  007344  026727  176770  006340          CMP     K11,#K11
1657  007352  001401                          BEQ     .+4
1658  007354  000000                          HLT                     ;FAILED MOVB %0,(0)+
1659  007356  010700                          SCOPE
1660
1661  007360  012706  006340                  MOV     #K11,%6
1662  007364  110626                          MOVB    %6,(6)+
1663  007366  026727  176746  006340          CMP     K11,#K11
```

```
1664  007374  001401                          BEQ     .+4
1665  007376  000000                          HLT                     ;FAILED MOVB %6,(6)+
1666  007400  010700                          SCOPE
1667
1668  007402  012706  006340                  MOV     #K11,%6
1669  007406  010626                          MOV     %6,(6)+
1670  007410  026727  176724  006340          CMP     K11,#K11
1671  007416  001401                          BEQ     .+4
1672  007420  000000                          HLT                     ;FAILED MOV %6,(6)+
1673  007422  010700                          SCOPE
1674
1675  007424  000277                  STAND:  SCC                     ;SET STATUS
1676  007426  005067  170344                  CLR     STATUS          ;CLEAR STATUS
1677  007432  103001                          BCC     .+4
1678  007434  000000                          HLT                     ;C NOT CLEAR
1679  007436  102001                          BVC     .+4
1680  007440  000000                          HLT                     ;V NOT CLEAR
1681  007442  001001                          BNE     .+4
1682  007444  000000                          HLT                     ;Z NOT CLEAR
1683  007446  100001                          BPL     .+4
1684  007450  000000                          HLT                     ;N NOT CLEAR
1685  007452  010700                          SCOPE
1686
1687  007454  000257                          CCC                     ;CLEAR CONDITION CODES
1688  007456  052767  000017  170312          BIS     #17,STATUS      ;SET STATUS TO ONES
1689  007464  103401                          BCS     .+4
1690
1691  007466  000000                          HLT                     ;C NOT SET
1692  007470  102401                          BVS     .+4
1693  007472  000000                          HLT                     ;V NOT SET
1694  007474  001401                          BEQ     .+4
1695  007476  000000                          HLT                     ;Z NOT SET
1696  007500  100401                          BMI     .+4
1697  007502  000000                          HLT                     ;N NOT SET
1698  007504  010700                          SCOPE
1699                          ;TEST THAT ALL RSERVED INSTRUCTIONS TRAP
1700  007506  012700  007700                  MOV     #TABLE,TAB      ;TABLE POINTER
1701  007512  012002                  GIN1:   MOV     (TAB)+,FIRST    ;FIRST OR CURRENT INSTRUCTION
1702  007514  012001                          MOV     (TAB)+,LAST     ;LAST INSTRUCTION OR GROUP
1703  007516  020267  000212                  CMP     FIRST,FINISH    ;TESTED ALL
1704  007522  001413                          BEQ     GIN3            ;YES BRANCH
1705  007524  010267  000206          GIN2:   MOV     FIRST,INST      ;SET UP INST
1706  007530  012767  007626  170252          MOV     #RET,10         ;SET UP RETURN FROM TRAP
1707  007536  012706  010050                  MOV     #BUFF,LP        ;SET UP LINK POINTER
1708  007542  005067  170230                  CLR     CC              ;CLEAR PRIORITY
1709  007546  000167  000164                  JMP     INST            ;EXECUTE RESERVED INSTRUCTION
1710  007552  012737  000207  177566  GIN3:   MOV     #207,@#177566   ;BELL ON PASS COMPLETE
1711  007560  105737  177564                  TSTB    @#177564
1712  007564  100375                          BPL     .-4             ;WAIT FOR FLAG
1713  007566  012737  000000  177566          MOV     #0,@#177566
1714  007574  105737  177564                  TSTB    @#177564
1715  007600  100375                          BPL     .-4
1716  007602  013700  000042                  MOV     @#42,%0
1717  007606  001405                          BEQ     DOAGN
1718  007610  000005                          RESET
1719  007612  004710                  $ENDAD: JSR     %7,@%0
```

```
1720  007614  000240                          NOP
1721  007616  000240                          NOP
1722  007620  000240                          NOP
1723  007622  000167  170552        DOAGN:    JMP     BEGIN           ;LOOP
1724                                ;TRAPPING SHOULD SEND YOU HERE
1725  007626  020627  010044        RET:      CMP     LP,#BUFF-4      ;TEST DECREMENT OF LP
1726  007632  001401                          BEQ     RET1
1727  007634  000000                          HLT                     ;WRONG DECREMENT
1728  007636  026727  000202  007740 RET1:    CMP     BUFF-4,#INST+2  ;LOC OF INST UNINCREMENTED
1729  007644  001401                          BEQ     RET2
1730  007646  000000                          HLT                     ;INST INC ON TRAP
1731  007650  005767  000172        RET2:     TST     BUFF-2
1732  007654  001401                          BEQ     .+4
1733  007656  000000                          HLT                     ;CONDITION CODES SET ON TRAP
1734  007660  005267  000052                  INC     INST
1735  007664  005202                          INC     FIRST
1736  007666  026701  000044                  CMP     INST,LAST
1737  007672  001707                          BEQ     GIN1            ;SET UP NEW GROUP
1738  007674  000167  177624                  JMP     GIN2            ;FINISH OLD GROUP
1739                                                                  ;END OF INSTRUCTION GROUP
1740  007700  000006        TABLE:    6                               ;END OF OPERATE
1741  007702  000077                  77
1742  007704  000210                  210                             ;RTS,RT1,JMP
1743  007706  000237                  240-1
1744  007710  006400                  6400
1745  007712  007777                  7777
1746  007714  070000                  70000
1747  007716  077777                  77777
1748  007720  106400                  106400
1749  007722  106777                  106777
1750  007724  107000                  107000
1751  007726  107777                  107777
1752  007730  170000                  170000
1753  007732  177777                  177777
1754  007734  007734  FINISH:  .                                     ;END FLAG
1755  007736  000000  INST:    HALT                                  ;WILL CONTAIN RESERVED INST
1756  007740  000000          HALT                                  ;SHOULD TRAP TO LOC 10
1757  007742  000000          HALT                                  ;LOC 10 SHOULD SEND YOU TO
1758  007744  000000          HALT                                  ;RET
1759  007746  000000          HALT
1760          010050  .=.+100
1761  010050  000000  BUFF:    0
1762          000001          .END
```

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.MAIN.  MACY11 27(732)  01-MAR-76  17:27  PAGE 35
DZKARA.P11      SYMBOL TABLE

ADALL   006232          LP      =%000006        RETD2   001506          RTRAP = 000010          TDEC7   005064
ATRAP   006262          MAP     005152          RETD3   002056          RTRAP1= 000034          TDEC8   005062
AUTO    006260          MAPT    005154          RETD4   002474          RTRAP2= 000020          TONT    004446
AUTO1   006270          NOP   = 000240          RETD5   003046          RTRAP3= 000030          TONT1   005410
BEGIN   000400          NOR     006244          RETE    000564          RTRAP4= 000014          TRACE   005434
BELL  = 000240          PC      =%000007        RETE1   001134          RTRAP5= 000004          TRAPA = 070000
BUFF    010050          RA      002320          RETE2   001546          R0      =%000000        TRAPB   006272
CC    = 177776          RA1     001332          RETE3   002116          R1      =%000001        TPCSR = 177560
CORH    006230          RB      002314          RETE4   002534          R2      =%000002        TRC1    005510
CORL    006226          RB1     001326          RETE5   003106          R3      =%000003        TRC2    005550
CPUOS   007314          RC      002310          RETF    000620          R4      =%000004        TRC3    005554
DOAGN   007622          RC1     001322          RETF1   001166          R5      =%000005        TRT   = 000003
FINISH  007734          RESET1  006016          RETF2   001602          R6TST   006344        TR1     005630
FIRST =%000002          RESET2  006056          RETF3   002152          R7TRX   005156        TR2     005632
FLAG    005454          RET     007626          RETF4   002570          R7TR1   005202        TR3     005712
FOVER   005014          RETA    000420          RETF5   003142          R7TR2   005236        TR4     005716
GIN1    007512          RETAT   004206          RETG    000676          R7TR2A  005232        TR4A    005322
GIN2    007524          RETA1   000772          RETG1   001244          R7TR3   005270        TRS     005714
GIN3    007552          RETA2   001402          RETG2   001660          R7TR4   005326        TSH     006222
HERE  = 000000          RETA3   001754          RETG3   002230          SCOPE = 010700        TSL     006224
HLT   = 000000          RETA4   002370          RETG4   002646          SP      =%000006        TTCSR = 177564
ILLA  = 004700          RETA5   002742          RETG5   003220          STAND   007424        TTY3    006120
ILLB  = 000100          RETB    000436          RETH5   003274          STATUS= 177776        TTY4    006174
INST    007736          RETBT   004230          RETJ    003312          ST12K   000270        VDEC1   004514
INSTC   000462          RETB1   001010          RETK    003340          ST16K   000302        VDEC10  004652
INSTK   003336          RETB2   001420          RETL    003400          ST20K   000314        VDEC11  004702
ITRAPS= 000004          RETB3   001772          RETM    003440          ST24K   000326        VDEC12  004704
K1      006320          RETB4   002406          RETN    003474          ST28K   000340        VDEC13  004742
K10     006336          RETB5   002760          RETO    003550          ST4K    000222        VDEC14  004744
K11     006340          RETC    000464          RETP    003630          ST8K    000256        VDEC2   004512
K12     006342          RETCT   004264          RETQ    003650          TAB     =%000000      VDEC3   004544
K2      006322          RETC1   001036          RETR    003700          TABLE   007700        VDEC4   004542
K3      006324          RETC2   001446          RETS    003742          TDEC1   004316        VDEC5   004574
K4      006326          RETC3   002016          RETT    004004          TDEC2   004334        VDEC6   004572
K5      006330          RETC4   002434          RETU    004042          TDEC3   004366        VDEC7   004624
K6      006332          RETC5   003006          RETV    004122          TDEC4   004422        VDEC8   004622
K7      006334          RETD    000524          RET1    007636          TDEC5   004442        VDEC9   004654
LAST  =%000001          RETD1   001076          RET2    007650          TDEC6   004464        $ENDAD  007612
.     = 010052

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *DZKARA,DZKARZ/SOL/PAGNUM=DZKARA/EN:ABS/LI:ME/DS:ERFZ
 RUN-TIME: 4 9 .5 SECONDS
 RUN-TIME RATIO: 94/15=6.0
 CORE USED:  7K  (13 PAGES)
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Spooler runtime 8 Seconds, [illegible] I/O disk reads, 3 disk writes, 34 pages