.REM*

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DCKTA-B-D
PRODUCT NAME:	KT11-C BASIC LOGIC TEST ONE
DATE CREATED:	AUGUST 1973
MAINTAINER:	DIAGNOSTIC ENGINEERING
AUTHOR:	RICK FADDEN

1.0 ABSTRACT

THIS PROGRAM AND THE NEXT (DCKTB) INCREMENTALLY TEST THE BASIC LOGIC FUNCTIONS OF THE KT11-C MEMORY MANAGEMENT OPTION FOR THE PDP-11/45. THEY FULLY TEST RELOCATION, DIRECT AND INDIRECT ADDRESSING OF THE MEMORY MANAGEMENT REGISTERS, AND CORRECT OPERATION OF ALL THE BITS IN THE REGISTERS. THE VARIOUS ABORTS ARE TESTED, AS IS PROPER "LOCKING" AND "UNLOCKING" OF THE ERROR TRACKING LOGIC.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11/45 WITH KT11-C OPTION

2.2 STORAGE

THE PROGRAM REQUIRES MEMORY LOCATIONS 0 TO 17474.

3.0 LOADING PROCEDURE

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

4.0 STARTING PROCEDURE

LOAD ADDRESS 200.
SET DESIRED SWITCH REGISTER SETTINGS (ALL DOWN FOR WORST CASE).
PRESS START.
THE PROGRAM WILL DISPLAY THE NUMBER OF THE CURRENT SUBTEST IN THE DISPLAY REGISTER, AND WILL RING THE BELL ON COMPLETION OF A PASS.

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SW 15=1 OR UP -- HALT ON ERROR
SW 14=1 OR UP -- SCOPE LOOP
SW 13=1 OR UP -- INHIBIT PRINTOUT
SW 11=1 OR UP -- INHIBIT ITERATIONS
SW 08=1 OR UP -- LOAD MICROBREAK REGISTER WITH VALUE IN
SW 00-07.

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST. IT RECORDS THE STARTING ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP IS REQUESTED FOR. IF SCOPE LOOP IS NOT REQUESTED, THERE WILL BE 1024 ITERATIONS ON THAT SUBTEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1 INHIBITS ITERATION OF SUBTESTS.

5.2.2 HLT

THIS EMT CALLS THE SUBROUTINE PRINT, WHICH PRINTS OUT THE LOCATION COUNTER AT THE TIME OF FAILURE AND THE CONTENTS OF THE PROCESSOR STATUS REGISTER. NOTE THAT THE LOCATION COUNTER WILL BE THE ADDRESS OF THE HLT PLUS TWO.

5.2.3 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0 DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

EACH VECTOR ENTRANCE ADDRESS IS LOADED WITH THE ADDRESS OF THE NEXT LOCATION. THE NEXT LOCATION IS LOADED WITH A HALT (000000). THUS AN ILLEGAL TRAP OR INTERRUPT WILL CAUSE A HALT AT THE TRAP LOCATION PLUS TWO.

IF A HALT OCCURS IN THE TRAP OR INTERRUPT AREA EXAMINE REGISTER SIX. IT WILL CONTAIN THE CURRENT STACK ADDRESS. THE CONTENTS OF THE CURRENT STACK ADDRESS IS THE VALUE OF THE LOCATION COUNTER WHEN THE TRAP OR INTERRUPT OCCURRED.

5.2.4 EMTSRV (EMT DECODER)

THIS ROUTINE DECODES ALL EMT CALLS, INCLUDING PATCHES AND THE HLT CALL WHICH PASSES CONTROL TO THE PRINT ROUTINE.

5.2.5 CLRALL

THIS ROUTINE CLEARS ALL THE PAR'S AND PDR'S OF THE KT11-C, AS WELL AS SR0.

5.2.6 RWALL

THIS ROUTINE MAPS ALL PAGES TO BANK 0 BY CLEARING ALL THE PAR'S. ALL PAGES ARE MADE 4K READ-WRITE BY LOADING ALL THE PDR'S WITH THE VALUE 77406.

5.2.7 RWISP

THIS ROUTINE MAPS ALL I-SPACE PAGES RW,4K, BANK 0.

5.2.8 RWDSP

THIS ROUTINE MAPS ALL D-SPACE PAGES RW,4K, BANK 0.

5.3 PROGRAM AND/OR OPERATOR ACTION

THE PROGRAM FIRST CHECKS THOSE PROPERTIES OF THE KT11-C WHICH CAN BE TESTED WITH MEMORY MANAGEMENT TURNED OFF. THEN, DESTINATION ONLY RELOCATION IS USED TO SHOW THAT BASIC RELOCATION IS WORKING CORRECTLY. FINALLY, FULL RELOCATION IS ENABLED AND MISCELLANEOUS ASPECTS OF THE KT11-C'S OPERATION ARE CHECKED.

6.0 ERRORS

6.1 ERROR PRINTOUT

PRINTOUTS ARE IN A STANDARD TWO-WORD FORMAT. THE FIRST WORD IS THE OCTAL VALUE OF THE PC+2 OF THE DETECTED ERROR. THE SECOND IS THE CONTENTS OF THE PROCESSOR STATUS REGISTER WHEN THE ERROR WAS DETECTED.

6.2 ERROR RECOVERY

IN GENERAL, TEST FAILURES WILL PRINTOUT AN ERROR MESSAGE AND CONTINUE. IF THE "HALT ON ERROR" SWITCH IS SET, HITTING CONTINUE WILL RECOVER. IF THE PROGRAM HANGS UP IN A LOOP, THE ERROR IS LIKELY TO BE A SIGNAL WHICH WAS NEVER RECEIVED. IF A HALT OCCURS IN THE TRAP AND VECTOR AREA THE PROGRAM MUST BE RESTARTED, IF THE PROGRAM HALTS IN THE MAIN FLOW, CONSULT THE LISTING IF NO MESSAGE IS TYPED OUT.

6.3 BRANCH SELF

A BRANCH TO SELF IS USED IN THE KT11-C DIAGNOSTICS TO INDICATED A FAILURE WHEN A HALT OR A HLT WORD TRAP CALL COULD LEAD TO PROBLEM.

7.0 RESTRICTIONS

PROGRAM MUST BE LOADED INTO LOWER 4K OF MEMORY.

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

EACH PASS TAKES APPROXIMATELY 1 MINUTE WITH CORE MEMORY.

8.2 STACK POINTERS

THE KERNEL STACK POINTER IS USUALLY INITIALIZED TO 1400. HOWEVER, IN CERTAIN TESTS IT MAY BE INITIALIZED TO A LOWER ADDRESS (VIRTUAL) TO MAKE UP FOR RELOCATION OF THE BANK.

THE SUPERVISOR STACK POINTER IS INITIALIZED TO 1000.

THE USER STACK POINTER IS INITIALIZED TO 400.

8.3 DISPLAY REGISTER

THE NUMBER OF THE CURRENT SUBTEST IS DISPLAYED.

8.4 EXECUTION ORDER CHECKING

SINCE THE KT11-C MAY CAUSE AN INCORRECT FETCH IF IT IS NOT WORKING CORRECTLY, THE ORDER OF EXECUTION OF ALL SUBTESTS IS CHECKED. THE SCOPE ROUTINE, WHEN IT CHANGES FROM ONE SUBTEST TO THE NEXT, INCREMENTS A COUNTER CALLED TESTCT. AT THE START OF EACH SUBTEST, THIS COUNTER IS CHECKED FOR THE CORRECT VALUE FOR THAT SUBTEST. IF TESTS ARE NOT EXECUTED IN THE CORRECT ORDER, TESTCT WILL NOT CONTAIN THE EXPECTED VALUE, AND AN ERROR PRINTOUT WILL OCCUR.

9.0 PROGRAM DESCRIPTION

THE PROGRAM INITIALLY TESTS THOSE FEATURES OF THE KT11-C OPTION WHICH CAN BE TESTED WITHOUT TURNING ON MEMORY MANAGEMENT. IT THEN USES THE MAINTENANCE MODE (DESTINATION ONLY RELOCATION) TO TEST TURNING MEMORY MANAGEMENT ON AND OFF AND TO FULLY CHECK OUT RELOCATION. ONCE RELOCATION HAS BEEN FULLY TESTED, FULL PAGING IS USED TO TEST THE REMAINING OPERATIONS OF THE OPTION.

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                                        ;KT11-C BASIC LOGIC TEST ONE (RICK FADDEN)
                                        ;COPYRIGHT 1972, 1973 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                                        ;REVISED TO REV. B BY BRUCE BURGESS
                                        ;       TEST22, BELL ON PASS COMPLETE SUBROUTINE, AND
                                        ;       ERROR PRINTOUT WITH ITERATIONS INHIBITED
                                        ;       MODIFICATIONS MAKE UP REV. B

                                        ;OPERATING INSTRUCTIONS
                                        ;       1.  LOAD TEST USING THE ABSOLUTE LOADER
                                        ;       2.  LOAD SA 200
                                        ;       3.  SET SR TO INITIAL SETTINGS
                                        ;       4.  PRESS START

                                        ;OPERATIONAL SWITCH SETTINGS:
                                        ;SW15=1 CAUSES HALT ON ERROR
                                        ;SW14=1 CAUSES SCOPE LOOPING
                                        ;SW13=1 INHIBITS ERROR PRINTOUT
                                        ;SW11=1 INHIBITS ITERATIONS
                                        ;SW08=1 LOAD MICROBREAK REGISTER WITH LOW BYTE OF SWITCH REGISTER

                                        ;DEFINITIONS
                    104400                      SCOPE=TRAP
                    000240                      NOP=240
                    000000                      R0=%0
                    000001                      R1=%1
                    000002                      R2=%2
                    000003                      R3=%3
                    000004                      R4=%4
                    000005                      R5=%5
                    000006                      R6=%6
                    000007                      R7=%7
                    000006                      SP=%6
                    000007                      PC=%7
                    177570                      SR=177570
                    177776                      PS=177776
                    177776                      STATUS=PS
                    104006                      HLT=104006
                    104010                      KTOFF=104010

                                        ;LOAD TRAP CATCHER INTO 0 THRU 777
                                        ;LOAD EACH VECTOR ADDRESS WITH THE ADDRESS OF THE NEXT
                                        ;LOCATION, AND LOAD EACH LOCATION IMMEDIATELY FOLLOWING
                                        ;A VECTOR ADDRESS WITH A HALT INSTRUCTION

                                        ;LOAD VECTOR AREA
                    000030                      .=30
000030  017324                          EMTSRV
000032  000340                          340
                    000034                      .=34
000034  016552                          SCOPEC
000036  000000                          0
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                                        ;LOAD STARTING AREA
                    000200                      .=200
000200  000167  001632                  JMP     START

                                        ;LOAD DATA AREA
                    000400                      .=400
000400  000000                          USTACK: 0
                    001000                      .=.+376
001000  000000                          SSTACK: 0
                    001400                      .=.+376
001400  000000                          KSTACK: 0
001402  000000  000000  000000                  .WORD 0,0,0,0
001410  000000
001412  000200                          K200:   200                     ;CONSTANTS
001414  123456                          K123:   123456
001416  134567                          K134:   134567
001420  100000                          KNR:    100000
001422  177564                          TCSR:   177564                  ;TELETYPE PRINTER CSR ADDRESS
001424  177566                          TDBR:   177566
001426  000000                          TEMPX:  0                       ;TEMPORARY STORAGE LOCATIONS
001430  000000                          TEMP1:  0
001432  000000                          TEMP2:  0
001434  177572                          SR0:    177572                  ;KT11-C STATUS REGISTER ADDRESSES
001436  177573                          SR0H:   177573
001440  177574                          SR1:    177574
001442  177575                          SR1H:   177575
001444  177576                          SR2:    177576
001446  177577                          SR2H:   177577
001450  172516                          SR3:    172516
001452  172517                          SR3H:   172517

001454                                  ADRTAB:
001454  177600                          UIPDR0: 177600                  ;USER I-SPACE PAGE DESCRIPTOR REGISTERS
001456  177602                          UIPDR1: 177602
001460  177604                          UIPDR2: 177604
001462  177606                          UIPDR3: 177606
001464  177610                          UIPDR4: 177610
001466  177612                          UIPDR5: 177612
001470  177614                          UIPDR6: 177614
001472  177616                          UIPDR7: 177616
001474  177620                          UDPDR0: 177620                  ;USER D-SPACE PAGE DESCRIPTOR REGISTERS
001476  177622                          UDPDR1: 177622
001500  177624                          UDPDR2: 177624
001502  177626                          UDPDR3: 177626
001504  177630                          UDPDR4: 177630
001506  177632                          UDPDR5: 177632
001510  177634                          UDPDR6: 177634
001512  177636                          UDPDR7: 177636
001514  177640                          UIPAR0: 177640                  ;USER I-SPACE PAGE ADDRESS REGISTERS
001516  177642                          UIPAR1: 177642
001520  177644                          UIPAR2: 177644
001522  177646                          UIPAR3: 177646
001524  177650                          UIPAR4: 177650
001526  177652                          UIPAR5: 177652
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001530  177654                  UIPAR6: 177654
001532  177656                  UIPAR7: 177656
001534  177660                  UDPAR0: 177660          ;USER D-SPACE PAGE ADDRESS REGISTERS
001536  177662                  UDPAR1: 177662
001540  177664                  UDPAR2: 177664
001542  177666                  UDPAR3: 177666
001544  177670                  UDPAR4: 177670
001546  177672                  UDPAR5: 177672
001550  177674                  UDPAR6: 177674
001552  177676                  UDPAR7: 177676

001554  172200                  SIPDR0: 172200          ;SUPERVISOR I-SPACE PAGE DESCRIPTOR REGISTERS
001556  172202                  SIPDR1: 172202
001560  172204                  SIPDR2: 172204
001562  172206                  SIPDR3: 172206
001564  172210                  SIPDR4: 172210
001566  172212                  SIPDR5: 172212
001570  172214                  SIPDR6: 172214
001572  172216                  SIPDR7: 172216
001574  172220                  SDPDR0: 172220          ;SUPERVISOR D-SPACE PAGE DESCRIPTOR REGISTERS
001576  172222                  SDPDR1: 172222
001600  172224                  SDPDR2: 172224
001602  172226                  SDPDR3: 172226
001604  172230                  SDPDR4: 172230
001606  172232                  SDPDR5: 172232
001610  172234                  SDPDR6: 172234
001612  172236                  SDPDR7: 172236
001614  172240                  SIPAR0: 172240          ;SUPERVISOR I-SPACE PAGE ADDRESS REGISTERS
001616  172242                  SIPAR1: 172242
001620  172244                  SIPAR2: 172244
001622  172246                  SIPAR3: 172246
001624  172250                  SIPAR4: 172250
001626  172252                  SIPAR5: 172252
001630  172254                  SIPAR6: 172254
001632  172256                  SIPAR7: 172256
001634  172260                  SDPAR0: 172260          ;SUPERVISOR D-SPACE PAGE ADDRESS REGISTERS
001636  172262                  SDPAR1: 172262
001640  172264                  SDPAR2: 172264
001642  172266                  SDPAR3: 172266
001644  172270                  SDPAR4: 172270
001646  172272                  SDPAR5: 172272
001650  172274                  SDPAR6: 172274
001652  172276                  SDPAR7: 172276

001654  172300                  KIPDR0: 172300          ;KERNEL I-SPACE PAGE DESCRIPTOR REGISTERS
001656  172302                  KIPDR1: 172302
001660  172304                  KIPDR2: 172304
001662  172306                  KIPDR3: 172306
001664  172310                  KIPDR4: 172310
001666  172312                  KIPDR5: 172312
001670  172314                  KIPDR6: 172314
001672  172316                  KIPDR7: 172316
001674  172320                  KDPDR0: 172320          ;KERNEL D-SPACE PAGE DESCRIPTOR REGISTERS
001676  172322                  KDPDR1: 172322
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001700  172324                  KDPDR2: 172324
001702  172326                  KDPDR3: 172326
001704  172330                  KDPDR4: 172330
001706  172332                  KDPDR5: 172332
001710  172334                  KDPDR6: 172334
001712  172336                  KDPDR7: 172336
001714  172340                  KIPAR0: 172340          ;KERNEL I-SPACE PAGE ADDRESS REGISTERS
001716  172342                  KIPAR1: 172342
001720  172344                  KIPAR2: 172344
001722  172346                  KIPAR3: 172346
001724  172350                  KIPAR4: 172350
001726  172352                  KIPAR5: 172352
001730  172354                  KIPAR6: 172354
001732  172356                  KIPAR7: 172356
001734  172360                  KDPAR0: 172360          ;KERNEL D-SPACE PAGE ADDRESS REGISTERS
001736  172362                  KDPAR1: 172362
001740  172364                  KDPAR2: 172364
001742  172366                  KDPAR3: 172366
001744  172370                  KDPAR4: 172370
001746  172372                  KDPAR5: 172372
001750  172374                  KDPAR6: 172374
001752  172376                  KDPAR7: 172376
        001752                  ADREND= .-2

001754  177600                  PDRTAB: 177600          ;STARTING ADDRESSES OF PDR'S FOR EACH MODE
001756  172200                          172200
001760  172300                  PDREND: 172300
001762  177640                  PARTAB: 177640          ;STARTING ADDRESSES OF PAR'S FOR EACH MODE
001764  172240                          172240
001766  172340                          172340

001770  001654                  STATAB: KIPDR0          ;ADDRESS OF KERNEL TABLE OF PDR'S AND PAR'S
001772  000000                          0
001774  001554                          SIPDR0          ;ADDRESS OF SUPERVISOR TABLE OF PDR'S AND PAR'S
001776  040000                          40000
002000  001454                          UIPDR0          ;ADDRESS OF USER TABLE OF PDR'S AND PAR'S
002002  140000                  STAEND: 140000

002004  000000                  STAPNT: 0
002006  000000                  PAGES:  0
002010  000000                  SAVEA:  0
002012  000000                  SAVEB:  0
002014  000250                  KTVEC:  250             ;KT11-C VECTOR ADDRESS
002016  000252                  KTSTA:  252
002020  177770                  UBRK:   177770          ;MICROBREAK REGISTER ADDRESS
002022  177770                  MSKB:   177770
002024  000401                  SETMSK: 401
002026  002777                  EXPMSK: 2777
002030  100360                  PDRMSK: 100360
002032  000000                  TESTCT: 0
002034  000000                  BLOCKS: 0

                                ;SET UP FOR START OF BASIC LOGIC TESTS
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002036  005037  177776          START:  CLR     @#PS                    ;INITIALIZE STATUS
002042  012706  001400                  MOV     #KSTACK,SP              ;SETUP KERNEL STACK
002046  012737  040000  177776          MOV     #40000,@#PS             ;INITIALIZE SUPERVISOR STACK
002054  012706  001000                  MOV     #SSTACK,SP
002060  012737  140000  177776          MOV     #140000,@#PS            ;INITIALIZE USER STACK
002066  012706  000400                  MOV     #USTACK,SP
002072  005037  177776                  CLR     @#PS
002076  012767  002000  014574          MOV     #2000,ICOUNT            ;INITIALIZE ITERATION COUNT
002104  012767  002124  014572          MOV     #TEST1+2,RETURN         ;SETUP SCOPE AND ITERATION LOOP RETURN
002112  012767  000001  177712          MOV     #1,TESTCT               ;INITIALIZE TEST COUNT
002120  000401                          BR      .+4                     ;SKIP SCOPE INSTRUCTION

                                ;SR0 AND SR1 SHOULD BE INITIALIZED TO 0
002122  104400                  TEST1:  SCOPE
002124  012737  000001  177570          MOV     #1,@#SR                 ;DISPLAY TEST NUMBER
002132  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002136  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002142  004767  014114                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002146  026727  177660  000001          CMP     TESTCT,#1               ;IS THIS TEST BEING EXECUTED IN THE
002154  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
002156  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002160  105777  177236                  TSTB    @TCSR                   ;WAIT FOR TTY READY TO AVOID KILLING BELL
002164  100375                          BPL     .-4
002166  000005                          RESET                           ;ISSUE INIT
002170  005777  177240                  TST     @SR0                    ;CHECK SR0
002174  001401                          BEQ     .+4
002176  104006                          HLT                             ;SR0 WAS NOT INITIALIZED TO ZERO
002200  005777  177234                  TST     @SR1                    ;CHECK SR1
002204  001401                          BEQ     .+4
002206  104006                          HLT                             ;SR1 WAS NOT INITIALIZED TO ZERO
002210  012767  000010  014462          MOV     #10,ICOUNT              ;DROP ITERATION COUNT SINCE RESET IS USED

                                ;CHECK READ/WRITE PROPERTIES OF ALL BITS IN SR0 EXCEPT 0 AND 8
                                ;BY ROTATING A ONE THRU THE BIT POSITIONS BEING CHECKED
002216  104400                  TEST2:  SCOPE
002220  012737  000002  177570          MOV     #2,@#SR                 ;DISPLAY TEST NUMBER
002226  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002232  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002236  004767  014020                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002242  026727  177564  000002          CMP     TESTCT,#2               ;IS THIS TEST BEING EXECUTED IN THE
002250  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
002252  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002254  012700  000001                  MOV     #1,R0                   ;R0 CONTAINS BIT INDICATING POSITION BEING
002260  010001                  LOOP2:  MOV     R0,R1                   ;TESTED-SETUP R1 TO SET THAT BIT IN
002262  010102                          MOV     R1,R2                   ;SR0 UNLESS IT'S BIT 0 OR BIT 8
002264  046701  177534                  BIC     SETMSK,R1               ;R2 CONTAINS THE EXPECTED CONTENTS OF SR0
002270  046702  177532                  BIC     EXPMSK,R2               ;CLEAR THE BIT IN R2 IF IT SHOULDN'T SET IN SR0
002274  010177  177134                  MOV     R1,@SR0                 ;SET THE BIT IN SR0 UNLESS IT'S BIT 0 OR BIT 8
002300  020277  177130                  CMP     R2,@SR0                 ;CHECK SR0
002304  001401                          BEQ     .+4                     ;BRANCH IF OK
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002306  104006                          HLT                             ;SR0 INCORRECT AFTER VALUE IN R1
                                                                        ;WAS LOADED INTO IT
002310  006300                          ASL     R0                      ;CHECK NEXT BIT POSITION
002312  103362                          BCC     LOOP2                   ;BRANCH IF NOT ALL DONE
002314  005077  177114                  CLR     @SR0                    ;REINITIALIZE SR0

                                ;BITS 0-11 OF ALL PAR'S SHOULD BE READ/WRITE
                                ;TEST BY ROTATING A BIT THRU EACH PAR
                                ;ALSO SHOWS THAT OUTPUT PATHS FROM PAR'S ARE OK
                                ;AND THAT EVERY PAR ADDRESS IS RESPONDED TO
002320  104400                  TEST3:  SCOPE
002322  012737  000003  177570          MOV     #3,@#SR                 ;DISPLAY TEST NUMBER
002330  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002334  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002340  004767  013716                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002344  026727  177462  000003          CMP     TESTCT,#3               ;IS THIS TEST BEING EXECUTED IN THE
002352  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
002354  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002356  012767  001000  014314          MOV     #1000,ICOUNT            ;RAISE ITERATION COUNT
002364  004767  013704                  JSR     %7,CLRALL               ;INITIALIZE KT11-C REGISTERS
002370  012703  001762                  MOV     #PARTAB,R3              ;R3 POINTS TO TABLE OF PAR ADDRESSES
002374  012700  000003                  MOV     #3,R0                   ;R0 IS COUNTER OF STATES LEFT TO TEST
002400  012301                  LOOP3:  MOV     (R3)+,R1                ;PUT ADDRESS OF 1ST PAR IN SET IN R1
002402  012702  000020                  MOV     #20,R2                  ;R2 IS COUNTER OF PAR'S LEFT TO TEST IN SET
002406  012704  000001          LOOP3A: MOV     #1,R4                   ;R4 IS BIT OF PAR BEING TESTED
002412  010411                  LOOP3B: MOV     R4,@R1                  ;SET BIT IN PAR
002414  020411                          CMP     R4,@R1                  ;CHECK PAR
002416  001401                          BEQ     .+4                     ;BRANCH IF OK
002420  104006                          HLT                             ;PAR WHOSE ADDRESS IS IN R1
                                                                        ;FAILED WHEN THE VALUE IN R4
                                                                        ;WAS LOADED INTO IT
002422  006304                          ASL     R4                      ;SETUP TO CHECK NEXT BIT POSITION
002424  020427  010000                  CMP     R4,#10000               ;ALL R/W BITS IN THIS PAR ALREADY CHECKED?
002430  001370                          BNE     LOOP3B                  ;NO-BRANCH TO CONTINUE
002432  005011                          CLR     @R1                     ;YES-CLEAR PAR JUST TESTED
002434  005721                          TST     (R1)+                   ;MOVE POINTER TO NEXT PAR
002436  077215                          SOB     R2,LOOP3A               ;TEST ALL PAR'S IN SET
002440  077021                          SOB     R0,LOOP3                ;TEST ALL 3 REGISTER SETS

                                ;BITS 0-3 AND 8-14 OF ALL PDR'S SHOULD BE READ/WRITE
                                ;BITS 4,5, AND 15 SHOULD ALWAYS BE ZERO
                                ;BITS 6 AND 7 SHOULD BE ZERO IF PDR IS WRITTEN
                                ;ACTUAL CLEARING AND SETTING OF 6 AND 7 IS TESTED LATER
                                ;THIS TEST ALSO SHOWS THAT OUTPUT PATHS FROM PDR'S ARE OK
                                ;AND THAT EVERY PDR ADDRESS IS RESPONDED TO
002442  104400                  TEST4:  SCOPE
002444  012737  000004  177570          MOV     #4,@#SR                 ;DISPLAY TEST NUMBER
002452  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002456  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002462  004767  013574                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002466  026727  177340  000004          CMP     TESTCT,#4               ;IS THIS TEST BEING EXECUTED IN THE
002474  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
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002476  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002500  004767  013570                  JSR     %7,CLRALL               ;INITIALIZE KT11-C REGISTERS
002504  012703  001754                  MOV     #PDRTAB,R3              ;R3 POINTS TO TABLE OF PDR ADDRESSES
002510  012301                  LOOP4:  MOV     (R3)+,R1                ;LOAD ADDRESS OF 1ST PDR IN STATE INTO R1
002512  012702  000020                  MOV     #20,R2                  ;USE R2 AS A COUNTER OF PDR'S
                                                                        ;LEFT TO TEST
002516  012700  000001          LOOP4A: MOV     #1,R0                   ;R0 INDICATES BIT POSITION BEING TESTED
002522  010005                  LOOP4B: MOV     R0,R5
002524  046705  177300                  BIC     PDRMSK,R5               ;R5 CONTAINS EXPECTED RESULTING CONTENTS OF PDR
002530  010011                          MOV     R0,@R1                  ;LOAD PDR
002532  021105                          CMP     @R1,R5                  ;CHECK RESULTING CONTENTS OF PDR
002534  001401                          BEQ     .+4
002536  104006                          HLT                             ;PDR WHOSE ADDRESS IS IN R1
                                                                        ;WAS INCORRECT AFTER VALUE IN R0
                                                                        ;WAS LOADED INTO IT
002540  006300                          ASL     R0                      ;ROTATE BIT
002542  103367                          BCC     LOOP4B                  ;BRANCH IF NOT DONE WITH THIS PDR
002544  005011                          CLR     @R1                     ;IF DONE WITH THIS PDR, CLEAR IT
002546  005721                          TST     (R1)+                   ;MOVE POINTER TO ADDRESS NEXT PDR
002550  077216                          SOB     R2,LOOP4A               ;TEST ALL PDR'S IN THIS GROUP
002552  020327  001760                  CMP     R3,#PDREND              ;TEST ALL 3 GROUPS OF PDRS-USER,
002556  003754                          BLE     LOOP4                   ;SUPERVISOR, AND KERNEL

                                ;NO DUAL ADDRESSING TEST FOR PAR'S AND PDR'S
                                ;SHOW THAT EACH PAR AND EACH PDR RESPONDS TO ONLY ONE ADDRESS
002560  104400                  TEST5:  SCOPE
002562  012737  000005  177570          MOV     #5,@#SR                 ;DISPLAY TEST NUMBER
002570  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002574  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002600  004767  013456                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002604  026727  177222  000005          CMP     TESTCT,#5               ;IS THIS TEST BEING EXECUTED IN THE
002612  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
002614  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002616  004767  013452                  JSR     %7,CLRALL               ;INITIALIZE ALL PAR'S AND PDR'S
                                                                        ;TO ZERO
002622  012701  001454                  MOV     #ADRTAB,R1              ;R1 POINTS TO ADDRESS OF PAR OR PDR
                                                                        ;LOADED
002626  012702  001454          LOP5A:  MOV     #ADRTAB,R2              ;R2 USED AS A POINTER TO CYCLE THRU
                                                                        ;ALL OTHER ADDRESSES OF PAR'S AND PDR'S
                                                                        ;TO CHECK FOR DUAL ADDRESSING
002632  012703  000140                  MOV     #96.,R3                 ;R3 USED AS A COUNTER
002636  012771  010421  000000          MOV     #10421,@(R1)            ;LOAD THE PAR OR PDR WHOSE ADDRESS IS IN R1
                                                                        ;SET ONE BIT IN EACH CHIP (4 BITS PER CHIP)
                                                                        ;IF READ/WRITE
002644  020201                  LOP5B:  CMP     R2,R1                   ;IF R1 CONTAINS ADDRESS OF
002646  001406                          BEQ     CONT5                   ;LOCATION LOADED, SKIP CHECKING IT
002650  005772  000000                  TST     @(R2)                   ;OTHERWISE, CHECK TO SEE IF THIS
                                                                        ;REGISTER RESPONDED TO THE ADDRESS
                                                                        ;OF THE ONE LOADED AS A DUAL
002654  001403                          BEQ     CONT5                   ;BRANCH IF OK
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002656  104006                          HLT                             ;DUAL ADDRESSING - ADDRESS POINTED
                                                                        ;TO BY R2 RESPONDED TO THE ADDRESS
                                                                        ;POINTED TO BY R1 IN AT LEAST ONE
                                                                        ;4 BIT SECTION (1 CHIP)
002660  005072  000000                  CLR     @(R2)                   ;REINITIALIZE FAULTY LOCATION
002664  005722                  CONT5:  TST     (R2)+                   ;MOVE POINTER R2
002666  077312                          SOB     R3,LOP5B                ;CHECK ALL PAR'S AND PDR'S
                                                                        ;TO SEE IF THEY RESPONDED TO THE
                                                                        ;ADDRESS POINTED TO BY R1
002670  022701  001752                  CMP     #ADREND,R1              ;HAVE ALL ADDRESSES BEEN CHECKED
                                                                        ;FOR DUALS?
002674  001402                          BEQ     DONE5                   ;YES - BRANCH TO DONE
002676  005031                          CLR     @(R1)+                  ;NO - MOVE POINTER R1 TO ADDRESS OF
                                                                        ;NEXT PAR OR PDR
002700  000752                          BR      LOP5A                   ;CHECK FOR DUALS OF THE
                                                                        ;ADDRESS POINTED TO BY R1
002702  012767  000100  013770  DONE5:  MOV     #100,ICOUNT             ;DROP ITERATION COUNT

                                ;SHOW THAT BYTE ADDRESSING OF PAR'S WORKS FOR HIGH AND LOW BYTES
                                ;CHECK ALL PAR'S
002710  104400                  TEST6:  SCOPE
002712  012737  000006  177570          MOV     #6,@#SR                 ;DISPLAY TEST NUMBER
002720  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
002724  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002730  004767  013326                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
002734  026727  177072  000006          CMP     TESTCT,#6               ;IS THIS TEST BEING EXECUTED IN THE
002742  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
002744  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

002746  012767  002000  013724          MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
002754  004767  013314                  JSR     %7,CLRALL               ;INITIALIZE KT11-C REGISTERS
002760  012703  001762                  MOV     #PARTAB,R3              ;R3 POINTS TO TABLE OF PAR ADDRESSES
002764  012700  000003                  MOV     #3,R0                   ;R0 IS COUNTER OF SETS LEFT TO TEST
002770  012301                  LOOP6:  MOV     (R3)+,R1                ;PUT ADDRESS OF 1ST PAR IN SET IN R1
002772  012702  000020                  MOV     #20,R2                  ;R2 IS COUNTER OF PAR'S LEFT TO TEST IN SET
002776  012711  177777          LOOP6A: MOV     #-1,@R1                 ;SET UP PAR BEING TESTED
003002  105011                          CLRB    @R1                     ;CLEAR LOW BYTE OF PAR
003004  022711  007400                  CMP     #7400,@R1               ;CHECK PAR
003010  001401                          BEQ     .+4                     ;BRANCH IF OK
003012  104006                          HLT                             ;DATOB TO LOW BYTE OF PAR WHOSE
                                                                        ;ADDRESS IS IN R1 FAILED
003014  012711  177777                  MOV     #-1,@R1                 ;SET UP PAR TO TEST HIGH BYTE
003020  105061  000001                  CLRB    1(R1)                   ;CLEAR HIGH BYTE
003024  022711  000377                  CMP     #377,@R1                ;CHECK PAR
003030  001401                          BEQ     .+4
003032  104006                          HLT                             ;DATOB TO HIGH BYTE OF PAR WHOSE
                                                                        ;ADDRESS IS IN R1 FAILED
003034  005721                          TST     (R1)+                   ;MOVE POINTER TO ADDRESS NEXT PAR
003036  077221                          SOB     R2,LOOP6A               ;TEST ALL PAR'S IN SET
003040  077025                          SOB     R0,LOOP6                ;TEST ALL 3 REGISTER SETS

                                ;SHOW THAT BYTE ADDRESSING OF PDR'S WORKS FOR HIGH AND LOW BYTES
003042  104400                  TEST7:  SCOPE
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003044  012737  000007  177570          MOV     #7,@#SR                 ;DISPLAY TEST NUMBER
003052  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
003056  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003062  004767  013174                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
003066  026727  176740  000007          CMP     TESTCT,#7               ;IS THIS TEST BEING EXECUTED IN THE
003074  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
003076  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

003100  004767  013170                  JSR     %7,CLRALL               ;INITIALIZE KT11-C REGISTERS
003104  012703  001754                  MOV     #PDRTAB,R3              ;R3 POINTS TO TABLE OF PDR ADDRESSES
003110  012700  000003                  MOV     #3,R0                   ;R0 IS COUNTER OF SETS LEFT TO TEST
003114  012301              LOOP7:      MOV     (R3)+,R1                ;PUT ADDRESS OF 1ST PDR IN SET INTO R1
003116  012702  000020                  MOV     #20,R2                  ;R2 IS COUNTER OF PDR'S LEFT TO TEST IN SET
003122  012711  177777      LOOP7A:     MOV     #-1,@R1                 ;SET UP PDR BEING TESTED
003126  105011                          CLRB    @R1                     ;CLEAR LOW BYTE OF PDR
003130  022711  077400                  CMP     #77400,@R1              ;CHECK PDR
003134  001401                          BEQ     .+4                     ;BRANCH IF OK
003136  104006                          HLT                             ;DATOB TO LOW BYTE OF PDR WHOSE
                                                                        ;ADDRESS IS IN R1 FAILED
003140  012711  177777                  MOV     #-1,@R1                 ;SET UP PDR TO TEST HIGH BYTE
003144  105061  000001                  CLRB    1(R1)                   ;CLEAR HIGH BYTE
003150  022711  000017                  CMP     #17,@R1                 ;CHECK PDR
003154  001401                          BEQ     .+4
003156  104006                          HLT                             ;DATOB TO HIGH BYTE OF PDR WHOSE
                                                                        ;ADDRESS IS IN R1 FAILED
003160  005721                          TST     (R1)+                   ;MOVE POINTER TO ADDRESS NEXT PDR
003162  077221                          SOB     R2,LOOP7A               ;TEST ALL PDR'S IN SET
003164  077025                          SOB     R0,LOOP7                ;TEST ALL 3 REGISTER SETS

                                ;INIT SHOULD HAVE NO EFFECT ON PAR'S
003166  104400                  TEST10: SCOPE
003170  012737  000010  177570          MOV     #10,@#SR                ;DISPLAY TEST NUMBER
003176  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
003202  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003206  004767  013050                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
003212  026727  176614  000010          CMP     TESTCT,#10              ;IS THIS TEST BEING EXECUTED IN THE
003220  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
003222  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

003224  012767  000010  013446          MOV     #10,ICOUNT              ;DROP ITERATION COUNT
003232  005067  000112                  CLR     TST10F                  ;CLEAR FLAG TO INDICATE FIRST PATTERN
003236  012704  005252                  MOV     #5252,R4                ;LOAD R4 WITH FIRST PATTERN
003242  012703  001762      TST10:      MOV     #PARTAB,R3              ;R3 POINTS TO TABLE OF PAR ADDRESSES
003246  012700  000003                  MOV     #3,R0                   ;R0 IS USED AS COUNTER OF SETS LEFT TO LOAD
003252  012301              LOOP10:     MOV     (R3)+,R1                ;LOAD R1 WITH ADDRESS OF FIRST PAR IN SET
003254  012702  000020                  MOV     #20,R2                  ;SETUP COUNTER TO LOAD PAR'S
003260  010421              LOP10A:     MOV     R4,(R1)+                ;LOAD PAR WITH PATTERN
003262  077202                          SOB     R2,LOP10A               ;LOAD ALL 16 PAR'S IN THIS SET
003264  077006                          SOB     R0,LOOP10               ;LOAD ALL 3 SETS
003266  105777  176130                  TSTB    @TCSR                   ;WAIT FOR ANY TTY OUTPUT TO FINISH
003272  100375                          BPL     .-4
003274  000005                          RESET                           ;ISSUE INIT
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003276  012703  001762                  MOV     #PARTAB,R3              ;R3 POINTS TO TABLE OF PAR ADDRESSES
003302  012700  000003                  MOV     #3,R0                   ;R0 IS USED AS A COUNTER OF SETS LEFT TO CHECK
003306  012301              LOP10B:     MOV     (R3)+,R1                ;LOAD R1 WITH ADDRESS OF 1ST PAR IN SET
003310  012702  000020                  MOV     #20,R2                  ;SETUP COUNTER TO CHECK PAR'S
003314  020411              LOP10C:     CMP     R4,@R1                  ;COMPARE PATTERN LOADED TO PRESENT
003316  001401                          BEQ     .+4                     ;CONTENTS OF PAR - BRANCH IF NOT CHANGED
003320  104006                          HLT                             ;PAR WHOSE ADDRESS IS IN R1
                                                                        ;WAS CHANGED BY INIT
                                                                        ;IT WAS LOADED WITH THE VALUE IN R4
                                                                        ;AND THEN INIT WAS ISSUED
003322  005721                          TST     (R1)+                   ;MOVE POINTER TO ADDRESS NEXT PAR
003324  077205                          SOB     R2,LOP10C               ;TEST ALL 16 PAR'S IN THIS SET
003326  077011                          SOB     R0,LOP10B               ;TEST ALL 3 SETS
003330  005767  000014                  TST     TST10F                  ;CHECK FOR BOTH PATTERNS USED
003334  001006                          BNE     TEST11                  ;IF DONE, GO TO NEXT TEST
003336  005267  000006                  INC     TST10F                  ;IF NOT, SET FLAG
003342  012704  002525                  MOV     #2525,R4                ;LOAD OTHER PATTERN INTO R4
003346  000735                          BR      TST10                   ;REPEAT TEST WITH 2ND PATTERN
003350  000000              TST10F: 0

                                ;INIT SHOULDN'T CLEAR OR SET ANY OF THE R/W BITS IN THE PDR'S
                                ;A CHECKERBOARD PATTERN IS LOADED INTO ALL PDR'S, THEN INIT
                                ;IS ISSUED AND THE PDR'S ARE CHECKED TO SEE IF THEY WERE ALTERRED
                                ;THEN THE COMPLEMENT OF THE FIRST PATTERN IS LOADED AND AFTER INIT IS
                                ;ISSUED THE PDR'S ARE CHECKED AGAIN
003352  104400                  TEST11: SCOPE
003354  012737  000011  177570          MOV     #11,@#SR                ;DISPLAY TEST NUMBER
003362  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
003366  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003372  004767  012664                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
003376  026727  176430  000011          CMP     TESTCT,#11              ;IS THIS TEST BEING EXECUTED IN THE
003404  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
003406  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

003410  005067  000112                  CLR     TST11F                  ;CLEAR FLAG TO INDICATE FIRST PATTERN
003414  012704  025012                  MOV     #25012,R4               ;LOAD PATTERN IN R4
003420  012703  001754      TST11:      MOV     #PDRTAB,R3              ;R3 POINTS TO TABLE OF PDR ADDRESSES
003424  012700  000003                  MOV     #3,R0                   ;R0 IS COUNTER OF SETS LEFT TO LOAD
003430  012301              LOOP11:     MOV     (R3)+,R1                ;LOAD R1 WITH ADDRESS OF FIRST PDR IN SET
003432  012702  000020                  MOV     #20,R2                  ;SETUP COUNTER TO LOAD PDR'S
003436  010421              LOP11A:     MOV     R4,(R1)+                ;LOAD PDR WITH PATTERN
003440  077202                          SOB     R2,LOP11A               ;LOAD ALL 16 IN THIS SET
003442  077006                          SOB     R0,LOOP11               ;LOAD ALL 3 SETS OF PDR'S
003444  105777  175752                  TSTB    @TCSR                   ;WAIT FOR ANY TTY OUTPUT TO FINISH
003450  100375                          BPL     .-4
003452  000005                          RESET                           ;ISSUE INIT
003454  012703  001754                  MOV     #PDRTAB,R3              ;R3 POINTS TO TABLE OF PDR ADDRESSES
003460  012700  000003                  MOV     #3,R0                   ;R0 IS COUNTER OF SETS LEFT TO LOAD
003464  012301              LOP11B:     MOV     (R3)+,R1                ;LOAD R1 WITH ADDRESS OF FIRST PDR IN SET
003466  012702  000020                  MOV     #20,R2                  ;SETUP COUNTER TO CHECK PDR'S
003472  020411              LOP11C:     CMP     R4,@R1                  ;COMPARE PATTERN LOADED INTO PDR
003474  001401                          BEQ     .+4                     ;WITH CONTENTS OF PDR AFTER INIT
003476  104006                          HLT                             ;PDR WHOSE ADDRESS IS IN R1
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                                                                        ;WAS CHANGED BY INIT
003500  005721                        TST     (R1)+                   ;MOVE POINTER TO ADDRESS NEXT PDR
003502  077205                        SOB     R2,LOP11C               ;CHECK ALL 16 PDR'S IN THIS SET
003504  077011                        SOB     R0,LOP11B               ;CHECK ALL 3 SETS OF PDR'S
003506  005767  000014                TST     TST11F                  ;CHECK FOR BOTH PATTERNS USED
003512  001006                        BNE     TEST12                  ;IF DONE, GO TO NEXT TEST
003514  005267  000006                INC     TST11F                  ;IF NOT, SET FLAG
003520  012704  052405                MOV     #52405,R4               ;LOAD 2ND PATTERN INTO R4
003524  000735                        BR      TST11                   ;REPEAT TEST WITH SECOND PATTERN
003526  000000              TST11F: 0

                                    ;SHOW THAT SR1 TRACKS WITH KT11-C OFF AND THAT IT IS READ-ONLY
                                    ;SHOW THAT IF NR ERROR IS SET IN SR0, SR1 STOPS TRACKING
                                    ;NOTE THAT MOST OF THIS TEST IS ACTUALLY EXECUTED TWICE, FIRST
                                    ;WITH THE REGISTER SET BIT (PS<11>) CLEAR, AND THEN WITH IT SET
003530  104400              TEST12: SCOPE
003532  012737  000012  177570      MOV     #12,@#SR                ;DISPLAY TEST NUMBER
003540  005037  177776              CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
003544  012706  001400              MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003550  004767  012506              JSR     %7,SETUP                ;INITIALIZE SR0,SR3
003554  026727  176252  000012      CMP     TESTCT,#12              ;IS THIS TEST BEING EXECUTED IN THE
003562  001401                      BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
003564  104006                      HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                    ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

003566  012767  002000  013104      MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
003574  005067  175630              CLR     TEMP1                   ;CLEAR FLAG TO INDICATE USING REGISTER SET 0
003600  016703  175630      LOOP12: MOV     SR0,R3                  ;SETUP R3 TO REFERENCE SR0
003604  005723                      TST     (R3)+
003606  012743  100000              MOV     #100000,-(R3)           ;SET NR ERROR BIT
003612  022777  171427  175620      CMP     #171427,@SR1            ;CHECK SR1
003620  001401                      BEQ     .+4
003622  104006                      HLT
                                                                    ;SR1 INCORRECT - SHOULD HAVE TRACKED
                                                                    ;CHANGE OF R7 BY +2 (LOW BYTE) AND
                                                                    ;R3 BY -2 (HIGH BYTE) AND "LOCKED UP"
                                                                    ;CONTAINING THAT VALUE
003624  005077  175604              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
003630  012701  001412              MOV     #K200,R1                ;SETUP R1 TO SET NR BIT
003634  016702  175576              MOV     SR0H,R2                 ;SETUP R2 TO REFERENCE HIGH BYTE
003640  005202                      INC     R2                      ;OF SR0
003642  112142                      MOVB    (R1)+,-(R2)             ;SET NR ERROR BIT
003644  022777  175011  175566      CMP     #175011,@SR1            ;CHECK SR1
003652  001401                      BEQ     .+4
003654  104006                      HLT
                                                                    ;SR1 INCORRECT - SHOULD HAVE TRACKED
                                                                    ;CHANGES OF R1 BY +1 (LOW BYTE) AND
                                                                    ;R2 BY -1 (HIGH BYTE)
003656  005077  175552              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
003662  016777  175532  175544      MOV     KNR,@SR0                ;SET NR ERROR BIT
003670  005777  175544              TST     @SR1                    ;CHECK SR1
003674  001401                      BEQ     .+4
003676  104006                      HLT
                                                                    ;SR1 INCORRECT - SHOULD SHOW NO
                                                                    ;REGISTERS CHANGED
003700  012777  177777  175532      MOV     #-1,@SR1                ;TRY TO WRITE SR1 - SHOULD BE READ-ONLY
003706  005777  175526              TST     @SR1
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003712  001401                      BEQ     .+4
003714  104006                      HLT
                                                                    ;SR1 WAS ALTERRED BY WRITING IT
                                                                    ;WHILE NR ERROR WAS STILL SET
003716  005077  175512              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
003722  012704  001413              MOV     #K200+1,R4              ;SETUP R4 TO SET NR BIT
003726  016705  175504              MOV     SR0H,R5                 ;SETUP R5 TO REFERENCE SR0 (HIGH BYTE)
003732  114425                      MOVB    -(R4),(R5)+             ;SET NR ERROR BIT
003734  022777  006774  175476      CMP     #6774,@SR1              ;CHECK SR1
003742  001401                      BEQ     .+4
003744  104006                      HLT
                                                                    ;SR1 INCORRECT - SHOULD HAVE TRACKED
                                                                    ;CHANGE OF R4 BY -1 (LOW BYTE)
                                                                    ;AND R5 BY +1 (HIGH BYTE)
003746  005077  175462              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
003752  010667  175450              MOV     R6,TEMPX                ;SAVE STACK POINTER
003756  012706  001422              MOV     #KNR+2,R6               ;SETUP R6 TO SET NR BIT
003762  016703  175446              MOV     SR0,R3                  ;SETUP R3 TO REFERENCE SR0
003766  014623                      MOV     -(R6),(R3)+             ;SET NR BIT
003770  016706  175432              MOV     TEMPX,R6                ;RESTORE STACK POINTER
003774  022777  011766  175436      CMP     #11766,@SR1             ;CHECK SR1
004002  001401                      BEQ     .+4
004004  104006                      HLT
                                                                    ;SR1 INCORRECT - SHOULD HAVE TRACKED
                                                                    ;CHANGE OF R6 BY -2 (LOW BYTE)
                                                                    ;AND OF R3 BY +2 (HIGH BYTE)
004006  005077  175422              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
004012  012700  001413              MOV     #K200+1,R0              ;SETUP R0 TO SET NR ERROR BIT
004016  016705  175414              MOV     SR0H,R5                 ;SETUP R5 TO REFERENCE SR0 (HIGH BYTE)
004022  005205                      INC     R5
004024  114045                      MOVB    -(R0),-(R5)             ;SET NR ERROR BIT
004026  022777  176770  175404      CMP     #176770,@SR1            ;CHECK SR1
004034  001402                      BEQ     .+6
004036  104006                      HLT                             ;SR1 INCORRECT - SHOULD HAVE
004040  000407                      BR      CONT12                  ;TRACKED CHANGE OF R0 BY -1
                                                                    ;(LOW BYTE) AND OF R5 BY -1 (HIGH
                                                                    ;BYTE)
004042  005077  175372              CLR     @SR1                    ;SHOW THAT SR1 IS READ-ONLY
004046  022777  176770  175364      CMP     #176770,@SR1            ;CHECK SR1
004054  001401                      BEQ     .+4
004056  104006                      HLT
                                                                    ;SR1 NOT READ-ONLY - ALTERRED BY A CLEAR
                                                                    ;INSTRUCTION WHILE AN ERROR BIT (NR)
                                                                    ;WAS STILL SET IN SR0
004060  005077  175350      CONT12: CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
004064  012737  040000  177776      MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
004072  010667  175330              MOV     R6,TEMPX                ;SAVE SUPERVISOR STACK POINTER
004076  016706  175332              MOV     SR0,R6                  ;SET SUPERVISOR R6 TO REFERENCE SR0
004102  012726  100000              MOV     #100000,(R6)+           ;SET NR BIT
004106  016706  175314              MOV     TEMPX,R6                ;RESTORE SUPERVISOR STACK POINTER
004112  042737  140000  177776      BIC     #140000,@#PS            ;RETURN TO KERNEL
004120  022777  013027  175312      CMP     #13027,@SR1             ;CHECK SR1
004126  001401                      BEQ     .+4
004130  104006                      HLT
                                                                    ;SR1 INCORRECT WHILE TRACKING IN
                                                                    ;SUPERVISOR MODE-SHOULD SHOW
                                                                    ;CHANGE OF R7 BY +2 (LOW BYTE)
                                                                    ;AND CHANGE OF R6 BY +2 (HIGH BYTE)
004132  005077  175276              CLR     @SR0                    ;CLEAR NR ERROR BIT TO RESUME TRACKING
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004136  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
004144  010667  175256                  MOV     R6,TEMPX                ;SAVE USER STACK POINTER
004150  016706  175260                  MOV     SR0,R6                  ;SET USER R6 TO REFERENCE SR0
004154  012726  100000                  MOV     #100000,(R6)+           ;SET NR ERROR BIT
004160  016706  175242                  MOV     TEMPX,R6                ;RESTORE USER STACK POINTER
004164  042737  140000  177776          BIC     #140000,@#PS            ;RETURN TO KERNEL
004172  022777  013027  175240          CMP     #13027,@SR1             ;CHECK SR1
004200  001401                          BEQ     .+4
004202  104006                          HLT                             ;SR1 INCORRECT WHILE TRACKING IN
                                                                        ;USER MODE-SHOULD SHOW CHANGE OF
                                                                        ;R7 BY +2 (LOW BYTE) AND CHANGE
                                                                        ;OF R6 BY +2 (HIGH BYTE)
004204  005077  175224                  CLR     @SR0                    ;CLEAR NR BIT TO RESUME TRACKING
004210  005767  175214                  TST     TEMP1                   ;CHECK FLAG TO SEE IF REGISTER SET 1 WAS TESTED
004214  100407                          BMI     TEST13                  ;BRANCH IF SET-BOTH REGISTER SETS
                                                                        ;ALREADY CHECKED
004216  005167  175206                  COM     TEMP1                   ;OTHERWISE SET FLAG
004222  012737  004000  177776          MOV     #4000,@#PS              ;SET REGISTER SET BIT
004230  000167  177344                  JMP     LOOP12                  ;REPEAT TEST USING OTHER SET OF
                                                                        ;REGISTERS


                                ;SR2 SHOULD CONTAIN ADDRESS OF LAST FETCH
                                ;WITH KT11-C TURNED OFF
004234  104400                  TEST13: SCOPE
004236  012737  000013  177570          MOV     #13,@#SR                ;DISPLAY TEST NUMBER
004244  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
004250  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004254  004767  012002                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
004260  026727  175546  000013          CMP     TESTCT,#13              ;IS THIS TEST BEING EXECUTED IN THE
004266  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
004270  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

004272  017701  175146          AD13:   MOV     @SR2,R1                 ;PICK UP SR2 - SHOULD CONTAIN ADDRESS
004276  022701  004272                  CMP     #AD13,R1                ;OF THIS INSTRUCTION
004302  001401                          BEQ     .+4
004304  104006                          HLT                             ;SR2 DID NOT CONTAIN  ADDRESS OF
                                                                        ;INSTRUCTION BEING EXECUTED

                                ;SHOW THAT INIT CLEARS SR3, AND THAT BITS 0-2 CAN BE SET AND CLEARED
                                ;ALSO SHOW THAT BYTE ADDRESSING OF SR3 WORKS
004306  104400                  TEST14: SCOPE
004310  012737  000014  177570          MOV     #14,@#SR                ;DISPLAY TEST NUMBER
004316  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
004322  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004326  004767  011730                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
004332  026727  175474  000014          CMP     TESTCT,#14              ;IS THIS TEST BEING EXECUTED IN THE
004340  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
004342  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

004344  012767  000010  012326          MOV     #10,ICOUNT              ;DROP ICOUNT SINCE RESET IS USED
004352  012777  000001  175070          MOV     #1,@SR3                 ;ROTATE A 1 THRU THE R/W BITS OF SR3
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004360  022777  000001  175062          CMP     #1,@SR3
004366  001401                          BEQ     .+4
004370  104006                          HLT                             ;SR3 INCORRECT WHEN SET TO 1
004372  012777  000002  175050          MOV     #2,@SR3
004400  022777  000002  175042          CMP     #2,@SR3
004406  001401                          BEQ     .+4
004410  104006                          HLT                             ;SR3 INCORRECT WHEN SET TO 2
004412  012777  000004  175030          MOV     #4,@SR3
004420  022777  000004  175022          CMP     #4,@SR3
004426  001401                          BEQ     .+4
004430  104006                          HLT                             ;SR3 INCORRECT WHEN SET TO 4
004432  012777  000007  175010          MOV     #7,@SR3                 ;SET ALL R/W BITS IN SR3
004440  105777  174756                  TSTB    @TCSR                   ;WAIT FOR ANY TTY OUTPUT TO FINISH
004444  100375                          BPL     .-4
004446  000005                          RESET                           ;ISSUE INIT
004450  005777  174774                  TST     @SR3
004454  001401                          BEQ     .+4
004456  104006                          HLT                             ;SR3 NOT CLEARED BY INIT
004460  012777  000007  174762          MOV     #7,@SR3
004466  105077  174756                  CLRB    @SR3                    ;CLEAR LOW BYTE OF SR3
004472  005777  174752                  TST     @SR3
004476  001401                          BEQ     .+4
004500  104006                          HLT                             ;SR3 INCORRECT AFTER A CLRB (LOW)
004502  012777  000007  174740          MOV     #7,@SR3
004510  105077  174736                  CLRB    @SR3H                   ;CLEAR HIGH BYTE OF SR3
004514  022777  000007  174726          CMP     #7,@SR3
004522  001401                          BEQ     .+4
004524  104006                          HLT                             ;SR3 INCORRECT AFTER A CLRB (HIGH)

                                ;SHOW THAT DESTINATION ONLY RELOCATION DOESN'T RELOCATE AN INSTRUCTION
                                ;FETCH (ONE CASE), AND THAT RESET CLEARS SR0<8>
                                ;AND TURNS OFF DESTINATION ONLY RELOCATION
                                ;IF THAT MUCH WORKS, YOU'LL GET THRU TO THE NEXT TEST
004526  104400                  TEST15: SCOPE
004530  012737  000015  177570          MOV     #15,@#SR                ;DISPLAY TEST NUMBER
004536  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
004542  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004546  004767  011510                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
004552  026727  175254  000015          CMP     TESTCT,#15              ;IS THIS TEST BEING EXECUTED IN THE
004560  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
004562  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

004564  004767  011504                  JSR     %7,CLRALL               ;THIS TEST SHOULDN'T GO THRU ANY PAR/PDR PAIR'S
                                                                        ;SO MAKE THEM ALL GIVE NON-RESIDENT
                                                                        ;AND PAGE LENGTH ERRORS IF ACCESSED
004570  012777  001006  175056          MOV     #1006,@KIPDR0           ;3 BLOCKS OF KERNEL PDR0 MUST BE MAPPED
                                                                        ;TO ALLOW TRAPS AND ABORTS
004576  012777  000400  174630          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
004604  000005                          RESET                           ;INIT SHOULD CLEAR DESTINATION ONLY  BIT
                                                                        ;IF THE FETCH IS RELOCATED THIS WILL GIVE A
                                                                        ;PL ABORT
004606  032777  000400  174620          BIT     #400,@SR0               ;IF KT11-C STILL ON, THIS SHOULD CAUSE
004614  001401                          BEQ     .+4                     ;PL AND NR ERRORS
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004616  000000                          HALT                    ;IF KT11-C IS OFF, BIT 8 OF SR0 READS
                                                                ;AS STILL SET
                                                                ;IF KT11-C IS ON, NO NR OR PL ABORT
                                                                ;OCCURRED AND RESET FAILED TO TURN KT11-C OFF
004620  005077  174610                  CLR     @SR0

                                ;SHOW THAT DESTINATION ONLY RELOCATION DOESN'T RELOCATE THE SOURCE
                                ;ADDRESS AND DOES RELOCATE THE DESTINATION
004624  104400                  TEST16: SCOPE
004626  012737  000016  177570          MOV     #16,@#SR                ;DISPLAY TEST NUMBER
004634  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
004640  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004644  004767  011412                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
004650  026727  175156  000016          CMP     TESTCT,#16              ;IS THIS TEST BEING EXECUTED IN THE
004656  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
004660  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

004662  004767  011406                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
004666  012777  000001  175020          MOV     #1,@KIPAR0              ;OFFSET KERNEL PAR/PDR PAIR 0 ONE BLOCK
004674  012777  077406  174752          MOV     #77406,@KIPDR0          ;FROM BANK 0, AND MAKE IT RW
004702  012701  004754                  MOV     #DATA16,R1              ;LOAD A BANK 0 ADDRESS INTO R1
004706  012777  000400  174520          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
004714  021111                          CMP     @R1,@R1                 ;THIS TEST WILL FAIL IF BOTH ARE
004716  001001                          BNE     .+4                     ;RELOCATED OR BOTH ARE NOT RELOCATED
004720  000000                          HALT                            ;SOURCE AND DESTINATION BOTH ADDRESSED
                                                                        ;SAME LOCATION
004722  000005                          RESET                           ;TURN OFF DESTINATION ONLY RELOCATION
004724  012701  004654                  MOV     #DATA16-100,R1          ;LOAD DESTINATION ADDRESS MINUS RELOCATION
                                                                        ;FACTOR INTO R1
004730  012702  004754                  MOV     #DATA16,R2              ;LOAD SOURCE ADDRESS INTO R2
004734  012777  000400  174472          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
004742  021211                          CMP     @R2,@R1                 ;USE SAME INSTRUCTION AND ADDRESS
004744  001401                          BEQ     .+4                     ;MODES AS BEFORE-SHOULD RELOCATE DESTINATION
                                                                        ;TO ADDRESS SAME LOCATION AS SOURCE
004746  000000                          HALT                            ;DESTINATION NOT RELOCATED OR INCORRECTLY
                                                                        ;RELOCATED OR SOURCE RELOCATED (IN
                                                                        ;DESTINATION ONLY RELOCATION)
004750  000005                          RESET                           ;TURN OFF RELOCATION
004752  000401                          BR      TEST17
004754  132465                  DATA16: 132465

                                ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU KERNEL PAGE 7 I-SPACE WILL
                                ;CLEAR THE DESTINATION ONLY RELOCATION BIT AND TURN OFF DESTINATION ONLY RELOCATION
004756  104400                  TEST17: SCOPE
004760  012737  000017  177570          MOV     #17,@#SR                ;DISPLAY TEST NUMBER
004766  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
004772  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004776  004767  011260                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
005002  026727  175024  000017          CMP     TESTCT,#17              ;IS THIS TEST BEING EXECUTED IN THE
005010  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
005012  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE
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005014  004767  011254                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
005020  012777  000001  174666          MOV     #1,@KIPAR0              ;MAP KERNEL PAGE 0 I-SPACE
                                                                        ;TO BANK 0 OFFSET BY 1 PAGE
005026  012777  077406  174620          MOV     #77406,@KIPDR0          ;OFFSET IS USED TO PROVE KT11-C IS
                                                                        ;TURNED OFF AFTER CLEARING BIT 8, SR0
005034  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE KERNEL PAGE 0
005040  012777  007600  174664          MOV     #7600,@KIPAR7           ;MAP KERNEL PAGE 7 I-SPACE
005046  012777  077406  174616          MOV     #77406,@KIPDR7          ;TO THE EXTERNAL BANK, RW,4K
005054  016702  174354                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
005060  012777  000400  174346          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
005066  005012                          CLR     @R2                     ;CLEAR SR0 THRU KERNEL PAGE 7
005070  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF
005072  001401                          BEQ     .+4
005074  000000                          HALT                            ;KT11-C STILL ON AFTER CLR SHOULD HAVE
                                                                        ;TURNED IT OFF
005076  032777  000400  174330          BIT     #400,@SR0               ;SHOW THAT BIT 8, SR0 IS NOW ZERO
005104  001402                          BEQ     .+6
005106  104006                          HLT                             ;DESTINATION ONLY RELOCATION BIT IS STILL ON
005110  000005                          RESET                           ;MAKE SURE THAT KT11-C IS OFF

                                ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU SUPERVISOR PAGE 7 I-SPACE
                                ;WILL TURN OFF DESTINATION ONLY RELOCATION
005112  004767  011156                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL PAR/PDR PAIRS
005116  012777  000001  174470          MOV     #1,@SIPAR0              ;MAP SUPERVISOR 0 I-SPACE
005124  012777  077406  174422          MOV     #77406,@SIPDR0          ;TO BANK 0 OFFSET BY 1 PAGE, RW
005132  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE SUPERVISOR 0
005136  012777  007600  174466          MOV     #7600,@SIPAR7           ;MAP SUPERVISOR 7 I-SPACE
005144  012777  077406  174420          MOV     #77406,@SIPDR7          ;TO THE EXTERNAL BANK, RW,4K
005152  016702  174256                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
005156  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
005164  012777  000400  174242          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
005172  005012                          CLR     @R2                     ;CLEAR SR0 THRU SUPERVISOR PAGE 7
005174  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF
005176  001401                          BEQ     .+4
005200  000777                          BR      .                       ;RELOCATION STILL ON AFTER CLR OF SR0
                                                                        ;THUR SUPERVISOR PAGE 7
005202  000005                          RESET                           ;MAKE SURE THAT KT11-C IS OFF
005204  005037  177776                  CLR     @#PS

                                ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU USER PAGE 7 I-SPACE
                                ;WILL TURN OFF DESTINATION ONLY RELOCATION
005210  004767  011060                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL PAR/PDR PAIRS
005214  012777  000001  174272          MOV     #1,@UIPAR0              ;MAP USER 0 I-SPACE TO
005222  012777  077406  174224          MOV     #77406,@UIPDR0          ;BANK 0 OFFSET BY 1 PAGE, RW
005230  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE USER 0
005234  012777  007600  174270          MOV     #7600,@UIPAR7           ;MAP USER 7 I-SPACE TO THE
005242  012777  077406  174222          MOV     #77406,@UIPDR7          ;EXTERNAL BANK, RW,4K
005250  016702  174160                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
005254  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
005262  012777  000400  174144          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
005270  005012                          CLR     @R2                     ;CLEAR SR0 THRU USER PAGE 7
005272  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF
005274  001401                          BEQ     .+4
005276  000777                          BR      .                       ;RELOCATION STILL ON
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005300  000005                          RESET                           ;MAKE SURE THAT KT11-C IS OFF
005302  005037  177776                  CLR     @#PS

                                ;SHOW THAT ALL BLOCK BOUNDARY REFERENCES REFERENCE THE CORRECT
                                ;I-SPACE PAR AND RELOCATE CORRECTLY WITHOUT D-SPACE ENABLED
                                ;USE DESTINATION ONLY RELOCATION
                                ;MAP ALL D-SPACE PAGES NON-RESIDENT
                                ;MAP ALL I-SPACE PAGES RESIDENT READ WRITE

                                ;       R0      - POINTS TO THE ADDRESS OF THE CURRENT I-SPACE PAR
                                ;                 IN THE ADDRESS TABLE
                                ;       R1      - CONTAINS VIRTUAL ADDRESS BEING USED TO REFERENCE START OF BLOCK
                                ;       R2      - CONTAINS VIRTUAL ADDRESS BEING USED TO REFERENCE END OF BLOCK
                                ;       R3      - POINTS TO EXPECTED CONTENTS OF START OF BLOCK
                                ;       R4      - POINTS TO EXPECTED CONTENTS OF END OF BLOCK
                                ;       R5      - USED TO REFERENCE SR0 TO TURN OFF DESTINATION ONLY RELOCATION
005306  104400                  TEST20: SCOPE
005310  012737  000020  177570          MOV     #20,@#SR                ;DISPLAY TEST NUMBER
005316  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
005322  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005326  004767  010730                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
005332  026727  174474  000020          CMP     TESTCT,#20              ;IS THIS TEST BEING EXECUTED IN THE
005340  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
005342  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

005344  004767  010724                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
005350  004767  011012                  JSR     %7,RWISP                ;MAKE ALL I SPACE PAR/PDR PAIR'S RW,
                                                                        ;BANK 0,4K
005354  013767  017700  174426          MOV     @#17700,SAVEA           ;SAVE CONTENTS OF LOCATIONS TO BE USED
005362  013767  017776  174422          MOV     @#17776,SAVEB           ;AS START AND END OF PHYSICAL BLOCK
005370  012737  123456  017700          MOV     #123456,@#17700         ;SET UP LOCATIONS TO BE REFERENCED
005376  012737  134567  017776          MOV     #134567,@#17776
005404  012703  001414                  MOV     #K123,R3                ;LOAD R3 AND R4 WITH ADDRESSES OF
005410  012704  001416                  MOV     #K134,R4                ;LOCATIONS CONTAINING EXPECTED CONTENTS
                                                                        ;OF START AND END OF BLOCK
                                                                        ;THIS ALLOWS USING THE SAME
                                                                        ;INSTRUCTIONS AS HAVE ALREADY
                                                                        ;BEEN SHOWN TO WORK CORRECTLY IN
                                                                        ;DESTINATION ONLY RELOCATION
005414  012767  000100  011256          MOV     #100,ICOUNT             ;CHANGE ITERATION COUNT
005422  012737  040000  177776          MOV     #40000,@#PS             ;CHANGE TO SUPERVISOR
005430  012706  001000                  MOV     #SSTACK,SP              ;SET UP SUPERVISOR STACK POINTER
005434  012737  140000  177776          MOV     #140000,@#PS            ;CHANGE TO USER
005442  012706  000400                  MOV     #USTACK,SP              ;SET UP USER STACK POINTER
005446  005037  177776                  CLR     @#PS                    ;RETURN TO KERNEL
005452  012767  001770  174324          MOV     #STATAB,STAPNT          ;SET UP TO REFERENCE MODE TABLE
                                                                        ;THIS TABLE CONTAINS FIRST ADDRESS
                                                                        ;OF TABLE OF ADDRESSES OF PAR'S AND
                                                                        ;PDR'S FOR EACH MODE, AND THE
                                                                        ;VALUE OF PROCESSOR STATUS FOR THE
                                                                        ;DESIRED MODE
005460  017700  174320          STAT20: MOV     @STAPNT,R0              ;PICK UP ADDRESS OF START OF
005464  062700  000040                  ADD     #40,R0                  ;ADDRESS TABLE FOR NEW MODE
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005470  062767  000002  174306          ADD     #2,STAPNT               ;MOVE POINTER TO ADDRESS VALUE TO
                                                                        ;LOAD IN PROCESSOR STATUS
005476  017737  174302  177776          MOV     @STAPNT,@#PS            ;SET PROCESSOR STATUS TO NEW MODE
005504  062767  000002  174272          ADD     #2,STAPNT               ;MOVE POINTER TO ADDRESS VALUES FOR NEXT MODE
005512  012767  000010  174266          MOV     #8.,PAGES               ;SET UP COUNTER OF PAGES LEFT TO TEST
005520  012770  007600  000016          MOV     #7600,@16(R0)           ;SET UP RELOCATED REFERENCE TO SR0,
005526  016705  173702                  MOV     SR0,R5                  ;USED TO TURN DESTINATION ONLY RELOCATION OFF
005532  005001                          CLR     R1                      ;INITIALIZE R1 TO CONTAIN VA OF START OF PAGE
005534  012702  000076                  MOV     #76,R2                  ;INITIALIZE R2 TO VA OF END OF PAGE
005540  012767  000200  174266  PAG20:  MOV     #128.,BLOCKS            ;SET UP BLOCK COUNT
005546  012770  000177  000000          MOV     #177,@(R0)              ;SET UP I-SPACE PAR TO RELOCATE VA
                                                                        ;TO LAST BLOCK IN BANK 0
005554  022767  000001  174224          CMP     #1,PAGES                ;IS THIS PAGE 7? (WAS USED
                                                                        ;FOR REFERENCE TO SR0)
005562  001005                          BNE     BLK20                   ;IF NOT, BRANCH
005564  012770  007600  177776          MOV     #7600,@-2(R0)           ;YES, SET UP PAGE 6 FOR REFERENCES TO SR0
005572  042705  020000                  BIC     #20000,R5               ;CHANGE R5 TO POINT TO SR0 THRU PAGE 6
005576  012777  000400  173630  BLK20:  MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
005604  021311                          CMP     @R3,@R1                 ;CK BOTTOM PAGE BOUNDARY
005606  001401                          BEQ     .+4
005610  000000                          HALT                            ;DESTINATION ONLY RELOCATION FAILED
                                                                        ;VA CONTAINED IN R1 FAILED TO RELOCATE
                                                                        ;TO TOP BLOCK OF BANK ZERO
005612  021412                          CMP     @R4,@R2                 ;CK UPPER PAGE BOUNDARY
005614  001401                          BEQ     .+4
005616  000000                          HALT                            ;DESTINATION ONLY RELOCATION FAILED
                                                                        ;VA CONTAINED IN R2 FAILED TO RELOCATE
                                                                        ;TO TOP BLOCK OF BANK ZERO
005620  005015                          CLR     @R5                     ;TURN OFF KT11-C
005622  005370  000000                  DEC     @(R0)                   ;MAP I-SPACE PAR 1 BLOCK LOWER
005626  062701  000100                  ADD     #100,R1                 ;SET UP R1 AND R2 TO REFERENCE
005632  062702  000100                  ADD     #100,R2                 ;NEXT VIRTUAL BLOCK
005636  005367  174172                  DEC     BLOCKS                  ;DECREMENT COUNT OF BLOCKS LEFT
005642  001355                          BNE     BLK20                   ;BRANCH IF NOT DONE WITH THIS PAGE
005644  005070  000000                  CLR     @(R0)                   ;IF DONE CLEAR PAR
005650  005367  174132                  DEC     PAGES                   ;DECREMENT COUNT OF PAGES LEFT
005654  001402                          BEQ     END20                   ;BRANCH IF ALL PAGES IN THIS MODE DONE
005656  005720                          TST     (R0)+                   ;MOVE ADDRESS TABLE POINTER TO ADDRESS NEXT PAR
005660  000727                          BR      PAG20                   ;TEST REFERENCES TO NEXT PAGE
005662  026727  174116  002002  END20:  CMP     STAPNT,#STAEND          ;CHECK FOR ALL MODES TESTED
005670  003673                          BLE     STAT20                  ;IF NOT, BRANCH
005672  005037  177776                  CLR     @#PS                    ;IF DONE, REINTIALIZE
005676  005077  173532                  CLR     @SR0
005702  016727  174102  017700          MOV     SAVEA,#17700
005710  016727  174076  017776          MOV     SAVEB,#17776

                                ;SHOW THAT THE INSTRUCTIONS USED IN THE NEXT TEST RELOCATE CORRECTLY IN
                                ;DESTINATION ONLY RELOCATION
005716  104400                  TEST21: SCOPE
005720  012737  000021  177570          MOV     #21,@#SR                ;DISPLAY TEST NUMBER
005726  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
005732  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005736  004767  010320                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
005742  026727  174064  000021          CMP     TESTCT,#21              ;IS THIS TEST BEING EXECUTED IN THE
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005750  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
005752  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

005754  012767  002000  010716          MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
005762  004767  010306                  JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
005766  012777  000001  173720          MOV     #1,@KIPAR0              ;OFFSET KERNEL I-SPACE PAGE 0
005774  012777  077406  173652          MOV     #77406,@KIPDR0          ;BY 1 BLOCK FROM BANK 0
006002  012777  007600  173722          MOV     #7600,@KIPAR7           ;MAP KERNEL I-SPACE PAGE 7 TO THE
006010  012777  077406  173654          MOV     #77406,@KIPDR7          ;EXTERNAL BANK, RW, 4K
006016  016701  173412                  MOV     SR0,R1                  ;SETUP R1 TO REFERENCE SR0
006022  016746  000054                  MOV     DST21A-100,-(SP)        ;SAVE CONTENTS OF LOCATIONS WHICH
006026  016746  000052                  MOV     DST21B-100,-(SP)        ;WOULD BE DESTROYED IF DESTINATION
006032  016746  000050                  MOV     DST21C-100,-(SP)        ;DOESN'T RELOCATE
006036  005067  000140                  CLR     DST21A                  ;INITIALIZE LOCATIONS TO BE
006042  012767  177777  000134          MOV     #-1,DST21B              ;WRITTEN INTO
006050  012767  177777  000130          MOV     #-1,DST21C
006056  012777  000400  173350          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
006064  022737  176543  005766          CMP     #176543,@#AD21A-100     ;COMPARE THE CONTENTS OF AD21A
        006066                  AD21A=.-4                               ;WITH ITSELF, RELOCATED THRU KERNEL
                                                                        ;I-SPACE 0
006072  001401                          BEQ     .+4
006074  104006                          HLT                             ;DESTINATION ONLY RELOCATION FAILED
                                                                        ;TO RELOCATE ONLY THE LAST CALCULATION
                                                                        ;OF THE CMP INSTRUCTION
006076  122737  165432  006000          CMPB    #165432,@#AD21B-100     ;COMPARE THE CONTENTS OF AD21B (LOW BYTE)
        006100                  AD21B=.-4                               ;WITH ITSELF, RELOCATED THRU KERNEL
006104  001401                          BEQ     .+4                     ;I-SPACE 0
006106  104006                          HLT                             ;DESTINATION ONLY RELOCATION
                                                                        ;FAILED TO RELOCATE ONLY THE FINAL ADDRESS
                                                                        ;CALCULATION OF THE CMPB INSTRUCTION
006110  012737  077711  006102          MOV     #77711,@#DST21A-100     ;EXECUTE REMAINING INSTRUCTIONS - CHECK
006116  005077  000066                  CLR     @AD21C                  ;AFTER KT11-C IS TURNED OFF
                                                                        ;SHOULD CLEAR DST21B
006122  105037  006106                  CLRB    @#DST21C-100            ;SHOULD CLEAR LOW BYTE OF DST21C
006126  005011                          CLR     @R1                     ;TURN OFF KT11-C
006130  022767  077711  000044          CMP     #77711,DST21A           ;CHECK LOCATION ADDRESSED BY MOV
006136  001401                          BEQ     .+4
006140  104006                          HLT                             ;MOV INSTRUCTION FAILED TO RELOCATE
                                                                        ;ONLY THE FINAL ADDRESS CALCULATION
006142  005767  000036                  TST     DST21B                  ;CHECK LOCATION ADDRESSED BY CLR
006146  001401                          BEQ     .+4
006150  104006                          HLT                             ;CLR INSTRUCTION FAILED TO RELOCATE
                                                                        ;CORRECTLY IN DESTINATION ONLY RELOCATION
006152  022767  177400  000026          CMP     #177400,DST21C          ;CHECK LOCATION ADDRESSED BY CLRB
006160  001401                          BEQ     .+4
006162  104006                          HLT                             ;CLRB INSTRUCTION FAILED TO RELOCATE
                                                                        ;CORRECTLY IN DESTINATION ONLY RELOCATION
006164  012667  177716                  MOV     (SP)+,DST21C-100        ;RESTORE LOCATIONS SAVED IN CASE OF ERROR
006170  012667  177710                  MOV     (SP)+,DST21B-100
006174  012667  177702                  MOV     (SP)+,DST21A-100
006200  000404                          BR      TEST22
006202  000000          DST21A: 0
006204  000000          DST21B: 0
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006206  000000          DST21C: 0
006210  006104          AD21C:  DST21B-100

                        ;TEST OF RELOCATION ADDERS - CHECK CORRECT PROPAGATION OF CARRY, AND CORRECT
                        ;OUTPUT FOR EACH POSSIBLE COMBINATION FOR EACH BIT POSITION
                        ;USE DESTINATION ONLY RELOCATION, KERNEL I-SPACE
                        ;TEST BY LOADING ONE OF THE VALUES TO BE INPUT TO THE ADDERS INTO KERNEL I-SPACE PAR 1
                        ;THE SECOND VALUE INPUT TO THE ADDERS IS THE LOWER 13 BITS OF THE
                        ;VIRTUAL ADDRESS (THE UPPER 3 BITS SELECT PAGE 1)
                        ;CHECK THE RESULTING PHYSICAL ADDRESS BY READING THE CONTENTS OF THE LOCATION,
                        ;AND IF THIS IS CORRECT, BY WRITING INTO THE LOCATION
                        ;NOTE THAT THIS TEST INCLUDES CHECKS OF ADDRESS WRAP AROUND
006212  104400          TEST22: SCOPE
006214  012737  000022  177570          MOV     #22,@#SR                ;DISPLAY TEST NUMBER
006222  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
006226  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
006232  004767  010024                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
006236  026727  173570  000022          CMP     TESTCT,#22              ;IS THIS TEST BEING EXECUTED IN THE
006244  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
006246  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

006250  004767  010020                  JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
006254  012777  077406  173372          MOV     #77406,@KIPDR0          ;MAP KERNEL 0 TO BANK 0, 4K, RW
006262  012777  077406  173366          MOV     #77406,@KIPDR1          ;MAKE KERNEL 1 RW, 4K
006270  012777  077406  173374          MOV     #77406,@KIPDR7          ;MAP KERNEL 7 RW, 4K, EXTERNAL BANK
006276  012777  007600  173426          MOV     #7600,@KIPAR7

                                        ;CHECK VIRTUAL ADDRESS OF 0 ADDED TO PAR OF -1 (FOR BIT POSITIONS
                                        ;RELEVANT TO THE ADDERS ONLY.  VA 20076, PAR 7777, RESULTING PA 777776)
006304  012777  007777  173404          MOV     #7777,@KIPAR1           ;SET PAR TO -1
006312  012737  030000  177776          MOV     #30000,@#PS             ;SET UP LOCATION TO BE REFERENCED
006320  012777  000400  173106          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
006326  022737  030000  020076  ADR22A: CMP     #30000,@#20076          ;IS PA 777776 BEING REFERENCED?
006334  001012                          BNE     ERR22A                  ;BRANCH ON FAILURE
006336  005037  020076          AD22A:  CLR     @#20076                 ;CLEAR PA 777776 THRU KERNEL PAGE 1
006342  005077  173066                  CLR     @SR0                    ;TURN OFF KT11-C
006346  032737  177740  177776          BIT     #177740,@#PS            ;CHECK TO SEE IF CORRECT LOCATION
006354  001401                          BEQ     .+4                     ;WAS REFERENCED
006356  104006                          HLT                             ;RELOCATION FAILED IN THE CLRB AT AD22A
006360  000405                          BR      CNT22B                  ;GO TO NEXT CHECK
006362  005077  173046          ERR22A: CLR     @SR0                    ;TURN OFF KT11-C
006366  104006                          HLT                             ;RELOCATION FAILED IN THE COMPARE
                                                                        ;AT LOCATION ADR22A
006370  005037  177776                  CLR     @#PS                    ;REINITIALIZE PROCESSOR STATUS

                                        ;CHECK VIRTUAL ADDRESS OF -1 ADDED TO PAR OF 0 (VALUES FOR BIT
                                        ;POSITIONS RELEVANT TO THE ADDERS ONLY, VA 37712, PAR 0, PA 17712)
006374  005077  173316          CNT22B: CLR     @KIPAR1                 ;SET PAR TO 0
006400  012737  125252  017712          MOV     #125252,@#DESTAD        ;LOAD PHYSICAL LOCATION TO BE REFERENCED
006406  012777  000400  173020          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
006414  022737  125252  037712  ADR22B: CMP     #125252,@#37712         ;RELOCATE THRU KERNEL PAGE 1
006422  001011                          BNE     ERR22B                  ;BRANCH ON FAILURE
006424  005037  037712          AD22B:  CLR     @#37712                 ;CLEAR THRU KERNEL PAGE 1
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006430  005077  173000                  CLR     @SR0                    ;TURN OFF KT11-C
006434  005737  017712                  TST     @#17712                 ;CHECK TO SEE IF CORRECT LOCATION
006440  001401                          BEQ     .+4                     ;WAS CLEARED
006442  104006                          HLT                             ;RELOCATION FAILED IN CLR AT AD22B
006444  000403                          BR      CNT22C                  ;GO TO NEXT CHECK
006446  005077  172762          ERR22B: CLR     @SR0                    ;TURN OFF KT11-C
006452  104006                          HLT                             ;RELOCATION FAILED IN THE COMPARE
                                                                        ;AT LOCATION ADR22B

                                        ;CHECK VIRTUAL ADDRESS OF 1 (BIT 6) ADDED TO PAR OF -1
                                        ;RESULTING PHYSICAL ADDRESS SHOULD BE ZERO
                                        ;NOTE THAT THIS IS A CHECK OF ADDRESS WRAP AROUND
006454  012777  007777  173234  CNT22C: MOV     #7777,@KIPAR1           ;SET UP PAR TO -1
006462  012737  034343  000000          MOV     #34343,@#0              ;SET UP A VALUE IN LOCATION TO
                                                                        ;BE REFERENCED (0)
006470  012777  000400  172736          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
006476  022737  034343  020100  ADR22C: CMP     #34343,@#20100          ;EFFECTIVELY ADDS 1 TO PAR ADDRESS
                                                                        ;TO GET PHYSICAL ADDRESS OF 0
006504  001013                          BNE     ERR22C                  ;BRANCH ON FAILURE
006506  012737  000002  020100  AD22C:  MOV     #2,@#20100              ;WRITE SAME LOCATION
006514  005077  172714                  CLR     @SR0                    ;TURN OFF KT11-C
006520  022737  000002  000000          CMP     #2,@#0                  ;CHECK LOCATION WHICH SHOULD HAVE
006526  001401                          BEQ     .+4                     ;BEEN REFERENCED
006530  104006                          HLT                             ;RELOCATION FAILED IN MOV AT AD22C
006532  000406                          BR      CNT22D                  ;GO TO NEXT CHECK
006534  005077  172674          ERR22C: CLR     @SR0                    ;TURN OFF KT11-C
006540  104006                          HLT                             ;RELOCATION FAILED IN THE COMPARE
006542  012737  000002  000000          MOV     #2,@#0                  ;AT LOCATION ADR22C

                                        ;CHECK VIRTUAL ADDRESS OF -1 (BITS 6-12) ADDED TO PAR OF 1
                                        ;(PLUS HIGH BITS SET, BUT THEY DON'T ALTER CARRY CONDITION TESTED FOR)
                                        ;RESULTING PHYSICAL ADDRESS SHOULD BE ZERO
006550  012777  007601  173140  CNT22D: MOV     #7601,@KIPAR1           ;SET UP PAR TO 1, WITH HIGH BITS SET
006556  012737  043434  000000          MOV     #43434,@#0              ;SET UP A VALUE IN LOCATION TO
                                                                        ;BE REFERENCED (0)
006564  012777  000400  172642          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
006572  022737  043434  037700  ADR22D: CMP     #43434,@#37700          ;ALL HIGH BITS OF VA ARE 1, ADDED TO
                                                                        ;A ONE IN LOWEST BIT OF PAR TO PROPAGATE
                                                                        ;CARRY - RESULTING PHYSICAL ADDRESS 0
006600  001013                          BNE     ERR22D                  ;BRANCH ON FAILURE
006602  012737  000002  037700  AD22D:  MOV     #2,@#37700              ;WRITE SAME LOCATION
006610  005077  172620                  CLR     @SR0                    ;TURN OFF KT11-C
006614  022737  000002  000000          CMP     #2,@#0                  ;CHECK LOCATION WHICH SHOULD HAVE
006622  001401                          BEQ     .+4                     ;BEEN REFERENCED
006624  104006                          HLT                             ;RELOCATION FAILED IN MOV AT AD22D
006626  000406                          BR      CNT22E                  ;GO TO NEXT CHECK
006630  005077  172600          ERR22D: CLR     @SR0                    ;TURN OFF KT11-C
006634  104006                          HLT                             ;RELOCATION FAILED IN THE COMPARE
                                                                        ;AT LOCATION ADR22D
006636  012737  000002  000000          MOV     #2,@#0                  ;RESTORE LOCATION REFERENCED

                                        ;CHECK VIRTUAL ADDRESS -1 (BITS 6 - 12) ADDED TO PAR OF -1
                                        ;SHOULD GIVE RESULTING PA 17600
                                        ;NOTE THAT THIS IS A CASE OF ADDRESS WRAP AROUND
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006644  012777  007777  173044  CNT22E: MOV     #7777,@KIPAR1           ;SET UP PAR TO -1
006652  013746  017600                  MOV     @#17600,-(SP)           ;SAVE CONTENTS OF LOCATION TO BE
                                                                        ;REFERENCED
006656  012737  076767  017600          MOV     #76767,@#17600          ;LOAD LOCATION TO BE REFERENCED
006664  012777  000400  172542          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
006672  022737  076767  037700  ADR22E: CMP     #76767,@#37700          ;READ LOCATION (VA=-1 (BITS 6 - 12) ,PAR=-1)
                                                                        ;SHOULD GIVE PA 17600 (THRU KERNEL
                                                                        ;PAGE 1)
006700  001011                          BNE     ERR22E                  ;BRANCH ON FAILURE
006702  005037  037700          AD22E:  CLR     @#37700                 ;WRITE SAME LOCATION
006706  005077  172522                  CLR     @SR0                    ;TURN OFF KT11-C
006712  005737  017600                  TST     @#17600                 ;CHECK TO SEE IF CORRECT LOCATION
006716  001401                          BEQ     .+4                     ;WAS CLEARED (HIGH BYTE)
006720  104006                          HLT                             ;RELOCATION FAILED IN THE CLR AT AD22E
006722  000403                          BR      END22E
006724  005077  172504          ERR22E: CLR     @SR0                    ;TURN OFF KT11-C
006730  104006                          HLT                             ;RELOCATION FAILED IN THE COMPARE AT
                                                                        ;LOCATION ADR22E
006732  012637  017600          END22E: MOV     (SP)+,@#17600           ;RESTORE LOCATION REFERENCED

                                        ;SHOW THAT SETTING SR0<0> TURNS ON FULL RELOCATION
                                        ;SHOW THAT ALL ADDRESS CALCULATIONS ARE RELOCATED
                                        ;SHOW THAT INIT CLEARS SR0<0> AND TURNS OFF RELOCATION
006736  104400                  TEST23: SCOPE
006740  012737  000023  177570          MOV     #23,@#SR                ;DISPLAY TEST NUMBER
006746  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
006752  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
006756  004767  007300                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
006762  026727  173044  000023          CMP     TESTCT,#23              ;IS THIS TEST BEING EXECUTED IN THE
006770  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
006772  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

006774  012767  000010  007676          MOV     #10,ICOUNT              ;DROP ITERATION COUNT
007002  004767  007266                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
007006  012777  000001  172700          MOV     #1,@KIPAR0              ;MAP KERNEL I-SPACE PAGE 0 TO
007014  012777  077406  172632          MOV     #77406,@KIPDR0          ;BANK 0 OFFSET BY 1 BLOCK
007022  012777  007600  172702          MOV     #7600,@KIPAR7           ;MAP KERNEL I-SPACE PAGE 7 TO
007030  012777  077406  172634          MOV     #77406,@KIPDR7          ;THE EXTERNAL BANK
007036  012767  052525  010646          MOV     #52525,DESTAD           ;INITIALIZE LOCATION  TO BE REFERENCED
007044  162706  000100                  SUB     #100,SP                 ;ALTER STACK POINTER DUE TO BANK 0 OFFSET
007050  005277  172360                  INC     @SR0                    ;TURN ON RELOCATION
007054  000000                  ADD23:  HALT                            ;WITH RELOCATION ON, SHOULD FETCH
007056  000000                          HALT                            ;FROM 1 BLOCK ABOVE THIS
007060  000000                          HALT                            ;(ADD23A)
007062  000000                          HALT
007064  000000                          HALT
007066  000000                          HALT
007070  032777  000001  172336          BIT     #1,@SR0                 ;WHEN KT11-C IS TURNED OFF, NEXT
                                                                        ;FETCH SHOULD BE FROM HERE -
007076  001401                          BEQ     .+4                     ;CHECK BIT 0, SHO
007100  104006                          HLT                             ;KT11-C IS NOT RELOCATING THE FETCH BUT
                                                                        ;SR0<0> STILL SET
                                                                        ;AFTER AN INIT
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007102  005077  172326                CLR     @SR0
007106  000432                        BR      TEST24
        007154                          .=ADD23+100
007154  022737  052525  017612  ADD23A: CMP     #52525,@#DESTAD-100     ;WHEN KT11-C IS TURNED ON, NEXT
                                                                        ;INSTRUCTION EXECUTED SHOULD
                                                                        ;BE HERE - CK RELOCATION OF SOURCE
007162  001401                        BEQ     .+4                     ;AND DESTINATION CALCULATIONS
007164  000000                        HALT                            ;FULL RELOCATION FAILED IN A SOURCE OR
                                                                        ;DESTINATION ADDRESS CALCULATION
                                                                        ;IN THE INSTRUCTION AT ADD23A
007166  000005                        RESET                           ;ISSUE INIT TO TURN OFF KT11-C
007170  000000                        HALT                            ;INIT DIDN'T TURN OFF FULL RELOCATION
007172  000777                        BR      .                       ;PROBLEM SHOULD BE FIXED BEFORE CONTINUING

                                ;SHOW THAT A DATO OF 0 TO SR0<0> WILL CLEAR SR0<0> AND
                                ;TURN OFF RELOCATION
007174  104400                  TEST24: SCOPE
007176  012737  000024  177570        MOV     #24,@#SR                ;DISPLAY TEST NUMBER
007204  005037  177776                CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
007210  012706  001400                MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
007214  004767  007042                JSR     %7,SETUP                ;INITIALIZE SR0,SR3
007220  026727  172606  000024        CMP     TESTCT,#24              ;IS THIS TEST BEING EXECUTED IN THE
007226  001401                        BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
007230  104006                        HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

007232  012767  002000  007440        MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
007240  162706  000100                SUB     #100,SP                 ;ALTER STACK POINTER DUE TO BANK 0 OFFSET
007244  004767  007024                JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
007250  012777  000001  172436        MOV     #1,@KIPAR0              ;MAP KERNEL I-SPACE PAGE 0 TO
007256  012777  077406  172370        MOV     #77406,@KIPDR0          ;BANK 0 OFFSET BY 1 BLOCK
007264  012777  007600  172440        MOV     #7600,@KIPAR7           ;MAP KERNEL I-SPACE PAGE 7 TO
007272  012777  077406  172372        MOV     #77406,@KIPDR7          ;THE EXTERNAL BANK
007300  012777  000001  172126        MOV     #1,@SR0                 ;TURN ON KT11-C
007306  000000                  ADD24:  HALT                            ;WHEN KT11-C IS TURNED ON, SHOULD
007310  000000                        HALT                            ;FETCH FROM ONE BLOCK ABOVE
007312  000000                        HALT                            ;THIS (ADD24A)
007314  000240                        NOP
007316  000240                        NOP
007320  032777  000001  172106        BIT     #1,@SR0                 ;AFTER KT11-C IS TURNED OFF, CHECK
007326  001401                        BEQ     .+4                     ;SR0<0>
007330  104006                        HLT                             ;KT11-C NOT RELOCATING BUT SR0<0> STILL
                                                                        ;SET AFTER A BIC #1,@SR0
007332  000433                        BR      TEST25

        007406                          .=ADD24+100
007406  042777  000001  172020  ADD24A: BIC     #1,@SR0                 ;WHEN KT11-C IS TURNED ON, SHOULD
                                                                        ;RELOCATE FETCH TO HERE - TURN
                                                                        ;OFF KT11-C VIA BIC OF SR0<0>
007414  000000                        HALT                            ;KT11-C STILL RELOCATING AFTER
007416  000005                        RESET                           ;BIC OF SR0<0>
007420  000777                        BR

                                ;SHOW THAT A REFERENCE TO A NON-RESIDENT PAGE
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                                ;WILL ABORT TO THE KT11-C ABORT VECTOR ADDRESS (250)
                                ;WITH BIT 15 OF SR0 SET,  SR0, SR1, AND SR2 ARE CHECKED FOR
                                ;THE CORRECT VALUES, AS ARE KIPDR0 AND KIPDR1
                                ;SHOW THAT BIT 15 OF SR0 CAN BE CLEARED AND THAT
                                ;SR2 IS READ ONLY

007422  104400                  TEST25: SCOPE
007424  012737  000025  177570        MOV     #25,@#SR                ;DISPLAY TEST NUMBER
007432  005037  177776                CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
007436  012706  001400                MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
007442  004767  006614                JSR     %7,SETUP                ;INITIALIZE SR0,SR3
007446  026727  172360  000025        CMP     TESTCT,#25              ;IS THIS TEST BEING EXECUTED IN THE
007454  001401                        BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
007456  104006                        HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

007460  004767  006610                JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
007464  012777  077406  172200        MOV     #77406,@KIPDR7          ;MAP KERNEL PAGE 7 I-SPACE TO
007472  012777  007600  172232        MOV     #7600,@KIPAR7           ;THE EXTERNAL BANK
007500  012777  077406  172146        MOV     #77406,@KIPDR0          ;MAP KERNEL 0 TO BANK 0, RW, 4K
007506  012777  007542  172300        MOV     #INT25,@KTVEC           ;SETUP ABORT RETURN
007514  005077  172276                CLR     @KTSTA
007520  012704  020000                MOV     #20000,R4               ;USE R4 TO REFERENCE NR KERNEL
                                                                        ;ONE I-SPACE
007524  005277  171704                INC     @SR0                    ;TURN ON KT11-C
007530  005724                  ADR25:  TST     (R4)+                   ;REFERENCE NR KERNEL 1 I-SPACE
007532  000000                  ADR25A: HALT                            ;SHOULD HAVE ABORTED ALREADY
007534  005077  171674                CLR     @SR0                    ;TURN OFF KT11-C
007540  000457                        BR      DONE25
007542  017701  171666          INT25:  MOV     @SR0,R1                 ;SAVE CONTENTS OF SR0
007546  005277  171662                INC     @SR0                    ;TURN OFF KT11-C
007552  022701  100003                CMP     #100003,R1              ;CHECK SAVED CONTENTS OF SR0
007556  001401                        BEQ     .+4
007560  104006                        HLT                             ;SR0 INCORRECT AFTER NR ABORT
                                                                        ;(SEE SAVED CONTENTS IN R1)
007562  022777  000024  171650        CMP     #24,@SR1                ;CHECK SR1
007570  001401                        BEQ     .+4
007572  104006                        HLT                             ;SR1 INCORRECT - SHOULD HAVE
                                                                        ;RECORDED AUTOINCREMENT OF R4
007574  022777  007530  171642        CMP     #ADR25,@SR2             ;CK SR2
007602  001402                        BEQ     .+6
007604  104006                        HLT                             ;SR2 INCORRECT=SHOULD CONTAIN ADDRESS
007606  000407                        BR      .+20                    ;OF LAST FETCH BEFORE THE ABORT
007610  005077  171630                CLR     @SR2                    ;TRY TO WRITE INTO SR2
007614  022777  007530  171622        CMP     #ADR25,@SR2             ;SR2 SHOULD BE READ ONLY
007622  001401                        BEQ     .+4
007624  104006                        HLT                             ;SR2 NOT READ ONLY
007626  022777  077506  172020        CMP     #77506,@KIPDR0          ;CHECK KERNEL 0 I-SPACE PDR
007634  001401                        BEQ     .+4
007636  104006                        HLT                             ;KERNEL I-SPACE PDR 0 INCORRECT
                                                                        ;W BIT SHOULD HAVE BEEN SET BY THE STACK WRITE
007640  005777  172012                TST     @KIPDR1                 ;CHECK KERNEL 1 I-SPACE PDR
007644  001401                        BEQ     .+4
007646  104006                        HLT                             ;KERNEL I-SPACE PDR 1 INCORRECT
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007650  021627  007532                  CMP     (R6),#ADR25A            ;CHECK VALUE PUSHED ON STACK
007654  001401                          BEQ     .+4
007656  104006                          HLT                             ;INCORRECT VALUE ON STACK
007660  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
007662  005077  171546                  CLR     @SR0                    ;CLEAR BIT 15
007666  032777  100000  171540          BIT     #100000,@SR0
007674  001401                          BEQ     .+4
007676  104006                          HLT                             ;BIT 15 OF SR0 DIDN'T CLEAR
007700  005077  172112          DONE25: CLR     @KTSTA                  ;CHANGE TRAP VECTOR TO CAUSE A
007704  016777  172106  172102          MOV     KTSTA,@KTVEC            ;HALT ON A FALSE TRAP


                                ;SHOW THAT THE D-SPACE ENABLE BITS WORK CORRECTLY
007712  104400                  TEST26: SCOPE
007714  012737  000026  177570          MOV     #26,@#SR                ;DISPLAY TEST NUMBER
007722  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
007726  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
007732  004767  006324                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
007736  026727  172070  000026          CMP     TESTCT,#26              ;IS THIS TEST BEING EXECUTED IN THE
007744  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
007746  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

007750  004767  006320                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
007754  012767  000010  006716          MOV     #10,ICOUNT
007762  012777  077406  171664          MOV     #77406,@KIPDR0          ;MAKE KERNEL 0 1-SPACE RW
007770  012777  077406  171676          MOV     #77406,@KDPDR0          ;MAKE KERNEL 0 D-SPACE RW,4K
007776  012777  077406  171550          MOV     #77406,@SIPDR0          ;MAKE SUPERVISOR 0 I SPACE RW
010004  012777  077406  171442          MOV     #77406,@UIPDR0          ;MAKE USER 0 I SPACE RW
010012  012777  077406  171436          MOV     #77406,@UIPDR1          ;MAKE PAGE 1 OF EACH I-SPACE
010020  012777  077406  171530          MOV     #77406,@SIPDR1          ;RW,4K,BANK 0
010026  012777  077406  171622          MOV     #77406,@KIPDR1
010034  012777  077406  171630          MOV     #77406,@KIPDR7          ;MAP PAGE 7 I AND D SPACES
010042  012777  077406  171522          MOV     #77406,@SIPDR7          ;OF ALL MODES 4K, RW, EXTERNAL
010050  012777  077406  171414          MOV     #77406,@UIPDR7
010056  012777  077406  171626          MOV     #77406,@KDPDR7
010064  012777  077406  171520          MOV     #77406,@SDPDR7
010072  012777  077406  171412          MOV     #77406,@UDPDR7
010100  012777  007600  171624          MOV     #7600,@KIPAR7
010106  012777  007600  171516          MOV     #7600,@SIPAR7
010114  012777  007600  171410          MOV     #7600,@UIPAR7
010122  012777  007600  171622          MOV     #7600,@KDPAR7
010130  012777  007600  171514          MOV     #7600,@SDPAR7
010136  012777  007600  171406          MOV     #7600,@UDPAR7
010144  005077  171646                  CLR     @KTSTA                  ;INITIALIZE KT11-C ABORT RETURN
                                                                        ;STATUS
                                ;CHECK D-SPACE REFERENCES WITH NO D-SPACE ENABLE BITS SET

                                ;SHOW THAT A REFERENCE TO KERNEL D-SPACE WITH NO D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE KERNEL D-SPACE
010150  012777  010200  171636          MOV     #RT26A,@KTVEC           ;SETUP ABORT RETURN IN CASE
010156  012737  000000  177776          MOV     #0,@#PS                 ;SET MODE TO KERNEL
010164  005277  171244                  INC     @SR0                    ;TURN ON KT11-C
010170  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
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                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010174  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010176  000403                          BR      E26A+2
010200  104010                  RT26A:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010202  104006                          HLT                             ;REFERENCE TO KERNEL D-SPACE WITH
                                                                        ;NO D-SPACE ENABLE SET
                                                                        ;REFERENCED KERNEL D-SPACE INSTEAD
                                                                        ;OF KERNEL I-SPACE
010204  022626                  E26A:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

                                ;SHOW THAT A REFERENCE TO SUPERVISOR D-SPACE WITH NO D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE SUPERVISOR D-SPACE
010206  012777  010236  171600          MOV     #RT26B,@KTVEC           ;SETUP ABORT RETURN IN CASE
010214  012737  040000  177776          MOV     #40000,@#PS                     ;SET MODE TO SUPERVISOR
010222  005277  171206                  INC     @SR0                    ;TURN ON KT11-C
010226  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010232  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010234  000403                          BR      E26B+2
010236  104010                  RT26B:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010240  104006                          HLT                             ;REFERENCE TO SUPERVISOR D-SPACE WITH
                                                                        ;NO D-SPACE ENABLE SET
                                                                        ;REFERENCED SUPERVISOR D-SPACE INSTEAD
                                                                        ;OF SUPERVISOR I-SPACE
010242  022626                  E26B:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

                                ;SHOW THAT A REFERENCE TO USER D-SPACE WITH NO D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE USER D-SPACE
010244  012777  010274  171542          MOV     #RT26C,@KTVEC           ;SETUP ABORT RETURN IN CASE
010252  012737  140000  177776          MOV     #140000,@#PS                    ;SET MODE TO USER
010260  005277  171150                  INC     @SR0                    ;TURN ON KT11-C
010264  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010270  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010272  000403                          BR      E26C+2
010274  104010                  RT26C:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
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010276  104006                          HLT                             ;REFERENCE TO USER D-SPACE WITH
                                                                        ;NO D-SPACE ENABLE SET
                                                                        ;REFERENCED USER D-SPACE INSTEAD
                                                                        ;OF USER I-SPACE
010300  022626                  E26C:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

                                ;CHECK D-SPACE REFERENCES WITH KERNEL D-SPACE ENABLE SET

010302  012777  000004  171140          MOV     #4,@SR3                 ;ENABLE KERNEL D-SPACE
                                ;SHOW THAT A REFERENCE TO KERNEL D-SPACE WITH KERNEL D-SPACE ENABLE
                                ;SET WILL ACTUALLY REFERENCE KERNEL D-SPACE
010310  012777  010342  171476          MOV     #RT26D,@KTVEC           ;SETUP ABORT RETURN
010316  012737  000000  177776          MOV     #0,@#PS                 ;SET MODE TO KERNEL
010324  005277  171104                  INC     @SR0                    ;TURN ON KT11-C
010330  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE - SHOULD ABORT
010334  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING TO
                                                                        ;KERNEL AND EXECUTING A RESET
010336  104006                          HLT                             ;REFERENCE TO KERNEL D-SPACE WITH
                                                                        ;KERNEL D-SPACE ENABLE SET
                                                                        ;DID NOT USE KERNEL D-SPACE
010340  000402                          BR      E26D+2
010342  104010                  RT26D:  KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010344  022626                  E26D:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

010346  012777  000004  171074          MOV     #4,@SR3                 ;ENABLE KERNEL D-SPACE
                                ;SHOW THAT A REFERENCE TO SUPERVISOR D-SPACE WITH KERNEL D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE SUPERVISOR D-SPACE
010354  012777  010404  171432          MOV     #RT26E,@KTVEC           ;SETUP ABORT RETURN IN CASE
010362  012737  040000  177776          MOV     #40000,@#PS                     ;SET MODE TO SUPERVISOR
010370  005277  171040                  INC     @SR0                    ;TURN ON KT11-C
010374  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010400  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010402  000403                          BR      E26E+2
010404  104010                  RT26E:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010406  104006                          HLT                             ;REFERENCE TO SUPERVISOR D-SPACE WITH
                                                                        ;KERNEL D-SPACE ENABLE SET
                                                                        ;REFERENCED SUPERVISOR D-SPACE INSTEAD
                                                                        ;OF SUPERVISOR I-SPACE
010410  022626                  E26E:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

010412  012777  000004  171030          MOV     #4,@SR3                 ;ENABLE KERNEL D-SPACE
                                ;SHOW THAT A REFERENCE TO USER D-SPACE WITH KERNEL D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE USER D-SPACE
010420  012777  010450  171366          MOV     #RT26F,@KTVEC           ;SETUP ABORT RETURN IN CASE
010426  012737  140000  177776          MOV     #140000,@#PS                    ;SET MODE TO USER
010434  005277  170774                  INC     @SR0                    ;TURN ON KT11-C
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010440  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010444  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010446  000403                          BR      E26F+2
010450  104010                  RT26F:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010452  104006                          HLT                             ;REFERENCE TO USER D-SPACE WITH
                                                                        ;KERNEL D-SPACE ENABLE SET
                                                                        ;REFERENCED USER D-SPACE INSTEAD
                                                                        ;OF USER I-SPACE
010454  022626                  E26F:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

                                ;CHECK D-SPACE REFERENCES WITH SUPERVISOR D-SPACE ENABLE SET

010456  012777  000002  170764          MOV     #2,@SR3                 ;ENABLE SUPERVISOR D-SPACE
                                ;SHOW THAT A REFERENCE TO KERNEL D-SPACE WITH SUPERVISOR D-SPACE ENABLE
                                ;SET WILL NOT ACTUALLY REFERENCE KERNEL D-SPACE
010464  012777  010514  171322          MOV     #RT26G,@KTVEC           ;SETUP ABORT RETURN IN CASE
010472  012737  000000  177776          MOV     #0,@#PS                 ;SET MODE TO KERNEL
010500  005277  170730                  INC     @SR0                    ;TURN ON KT11-C
010504  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                        ;D-SPACE IS NR, I-SPACE IS RW
                                                                        ;NO ABORT SHOULD OCCUR SINCE
                                                                        ;CORRESPONDING D-SPACE ENABLE
                                                                        ;IS NOT SET
010510  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A
                                                                        ;RESET
010512  000403                          BR      E26G+2
010514  104010                  RT26G:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
010516  104006                          HLT                             ;REFERENCE TO KERNEL D-SPACE WITH
                                                                        ;SUPERVISOR D-SPACE ENABLE SET
                                                                        ;REFERENCED KERNEL D-SPACE INSTEAD
                                                                        ;OF KERNEL I-SPACE
010520  022626                  E26G:   CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER

010522  012777  000002  170720          MOV     #2,@SR3                 ;ENABLE SUPERVISOR D-SPACE
                                ;SHOW THAT A REFERENCE TO SUPERVISOR D-SPACE WITH SUPERVISOR D-SPACE ENABLE
                                ;SET WILL ACTUALLY REFERENCE SUPERVISOR D-SPACE
010530  012777  010562  171256          MOV     #RT26H,@KTVEC           ;SETUP ABORT RETURN
010536  012737  040000  177776          MOV     #40000,@#PS                     ;SET MODE TO SUPERVISOR
010544  005277  170664                  INC     @SR0                    ;TURN ON KT11-C
010550  005737  020000                  TST     @#20000                 ;D-SPACE REFERENCE - SHOULD ABORT
010554  104010                          KTOFF                           ;TURN OFF KT11-C VIA TRAPPING TO
                                                                        ;KERNEL AND EXECUTING A RESET
010556  104006                          HLT                             ;REFERENCE TO SUPERVISOR D-SPACE WITH
                                                                        ;SUPERVISOR D-SPACE ENABLE SET
                                                                        ;DID NOT USE SUPERVISOR D-SPACE
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010560  000402                          BR      E26H+2
010562  104010          RT26H:  KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                        ;TO KERNEL AND EXECUTING A RESET
010564  022626          E26H:   CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER

010566  012777  000002  170654          MOV     #2,@SR3         ;ENABLE SUPERVISOR D-SPACE
                        ;SHOW THAT A REFERENCE TO USER D-SPACE WITH SUPERVISOR D-SPACE ENABLE
                        ;SET WILL NOT ACTUALLY REFERENCE USER D-SPACE
010574  012777  010624  171212          MOV     #RT26I,@KTVEC   ;SETUP ABORT RETURN IN CASE
010602  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
010610  005277  170620                  INC     @SR0            ;TURN ON KT11-C
010614  005737  020000                  TST     @#20000         ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                ;D-SPACE IS NR, I-SPACE IS RW
                                                                ;NO ABORT SHOULD OCCUR SINCE
                                                                ;CORRESPONDING D-SPACE ENABLE
                                                                ;IS NOT SET
010620  104010                          KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A
                                                                ;RESET
010622  000403                          BR      E26I+2
010624  104010          RT26I:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A RESET
010626  104006                          HLT                     ;REFERENCE TO USER D-SPACE WITH
                                                                ;SUPERVISOR D-SPACE ENABLE SET
                                                                ;REFERENCED USER D-SPACE INSTEAD
                                                                ;OF USER I-SPACE
010630  022626          E26I:   CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER

                        ;CHECK D-SPACE REFERENCES WITH USER D-SPACE ENABLE SET

010632  012777  000001  170610          MOV     #1,@SR3         ;ENABLE USER D-SPACE
                        ;SHOW THAT A REFERENCE TO KERNEL D-SPACE WITH USER D-SPACE ENABLE
                        ;SET WILL NOT ACTUALLY REFERENCE KERNEL D-SPACE
010640  012777  010670  171146          MOV     #RT26J,@KTVEC   ;SETUP ABORT RETURN IN CASE
010646  012737  000000  177776          MOV     #0,@#PS         ;SET MODE TO KERNEL
010654  005277  170554                  INC     @SR0            ;TURN ON KT11-C
010660  005737  020000                  TST     @#20000         ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                ;D-SPACE IS NR, I-SPACE IS RW
                                                                ;NO ABORT SHOULD OCCUR SINCE
                                                                ;CORRESPONDING D-SPACE ENABLE
                                                                ;IS NOT SET
010664  104010                          KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A
                                                                ;RESET
010666  000403                          BR      E26J+2
010670  104010          RT26J:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A RESET
010672  104006                          HLT                     ;REFERENCE TO KERNEL D-SPACE WITH
                                                                ;USER D-SPACE ENABLE SET
                                                                ;REFERENCED KERNEL D-SPACE INSTEAD
                                                                ;OF KERNEL I-SPACE
010674  022626          E26J:   CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER

010676  012777  000001  170544          MOV     #1,@SR3         ;ENABLE USER D-SPACE
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                        ;SHOW THAT A REFERENCE TO SUPERVISOR D-SPACE WITH USER D-SPACE ENABLE
                        ;SET WILL NOT ACTUALLY REFERENCE SUPERVISOR D-SPACE
010704  012777  010734  171102          MOV     #RT26K,@KTVEC   ;SETUP ABORT RETURN IN CASE
010712  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
010720  005277  170510                  INC     @SR0            ;TURN ON KT11-C
010724  005737  020000                  TST     @#20000         ;D-SPACE REFERENCE IF D-SPACE ENABLED
                                                                ;D-SPACE IS NR, I-SPACE IS RW
                                                                ;NO ABORT SHOULD OCCUR SINCE
                                                                ;CORRESPONDING D-SPACE ENABLE
                                                                ;IS NOT SET
010730  104010                          KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A
                                                                ;RESET
010732  000403                          BR      E26K+2
010734  104010          RT26K:  KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                ;TO KERNEL AND EXECUTING A RESET
010736  104006                          HLT                     ;REFERENCE TO SUPERVISOR D-SPACE WITH
                                                                ;USER D-SPACE ENABLE SET
                                                                ;REFERENCED SUPERVISOR D-SPACE INSTEAD
                                                                ;OF SUPERVISOR I-SPACE
010740  022626          E26K:   CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER

010742  012777  000001  170500          MOV     #1,@SR3         ;ENABLE USER D-SPACE
                        ;SHOW THAT A REFERENCE TO USER D-SPACE WITH USER D-SPACE ENABLE
                        ;SET WILL ACTUALLY REFERENCE USER D-SPACE
010750  012777  011002  171036          MOV     #RT26L,@KTVEC   ;SETUP ABORT RETURN
010756  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
010764  005277  170444                  INC     @SR0            ;TURN ON KT11-C
010770  005737  020000                  TST     @#20000         ;D-SPACE REFERENCE - SHOULD ABORT
010774  104010                          KTOFF                   ;TURN OFF KT11-C VIA TRAPPING TO
                                                                ;KERNEL AND EXECUTING A RESET
010776  104006                          HLT                     ;REFERENCE TO USER D-SPACE WITH
                                                                ;USER D-SPACE ENABLE SET
                                                                ;DID NOT USE USER D-SPACE
011000  000402                          BR      E26L+2
011002  104010          RT26L:  KTOFF                   ;TURN OFF KT11-C VIA TRAPPING
                                                        ;TO KERNEL AND EXECUTING A RESET
011004  022626          E26L:   CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER
011006  005077  170436          CLR     @SR3            ;REINITIALIZE SR3
011012  016777  171000  170774  MOV     KTSTA,@KTVEC    ;REINITIALIZE TRAP VECTOR TO CAUSE
011020  005077  170772          CLR     @KTSTA          ;HALT ON FALSE TRAP OR ABORT

                        ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU KERNEL PAGE 7 D-SPACE
                        ;WILL TURN OFF DESTINATION ONLY RELOCATION
011024  104400          TEST27: SCOPE
011026  012737  000027  177570          MOV     #27,@#SR        ;DISPLAY TEST NUMBER
011034  005037  177776                  CLR     @#PS            ;INITIALIZE PROCESSOR STATUS
011040  012706  001400                  MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
011044  004767  005212                  JSR     %7,SETUP        ;INITIALIZE SR0,SR3
011050  026727  170756  000027          CMP     TESTCT,#27      ;IS THIS TEST BEING EXECUTED IN THE
011056  001401                          BEQ     .+4             ;CORRECT SEQUENCE?- BRANCH IF YES
011060  104006                          HLT                     ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE
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011062  012767  000100  005610          MOV     #100,ICOUNT
011070  004767  005200                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
011074  012777  000001  170632          MOV     #1,@KDPAR0              ;MAP KERNEL 0 D-SPACE TO BANK 0,
011102  012777  077406  170564          MOV     #77406,@KDPDR0          ;RW, OFFSET BY 1 BLOCK
011110  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE KERNEL 0
011114  012777  007600  170630          MOV     #7600,@KDPAR7           ;MAP KERNEL 7 D-SPACE TO THE
011122  012777  077406  170562          MOV     #77406,@KDPDR7          ;EXTERNAL BANK
011130  012777  000004  170312          MOV     #4,@SR3                 ;ENABLE KERNEL D-SPACE
011136  016702  170272                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
011142  012777  000400  170264          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
011150  005012                          CLR     @R2                     ;CLEAR SR0 THRU KERNEL 7 D-SPACE
011152  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF-IF STILL ON,
011154  001401                          BEQ     .+4                     ;THE CMP WILL REFERENCE 2 LOCATIONS
                                                                        ;WHICH AREN'T EQUAL
011156  000000                          HALT                            ;KT11-C IS STILL ON
011160  000005                          RESET                           ;MAKE SURE THAT KT11-C IS OFF
011162  005077  170262                  CLR     @SR3                    ;REINITIALIZE SR3
011166  005037  177776                  CLR     @#PS                    ;REINITIALIZE PROCESSSOR STATUS

                                ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU SUPERVISOR PAGE 7 D-SPACE
                                ;WILL TURN OFF DESTINATION ONLY RELOCATION
011172  004767  005076                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
011176  012777  000001  170430          MOV     #1,@SDPAR0              ;MAP SUPERVISOR 0 D-SPACE TO BANK 0,
011204  012777  077406  170362          MOV     #77406,@SDPDR0          ;RW, OFFSET BY 1 BLOCK
011212  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE SUPERVISOR 0
011216  012777  007600  170426          MOV     #7600,@SDPAR7           ;MAP SUPERVISOR 7 D-SPACE TO THE
011224  012777  077406  170360          MOV     #77406,@SDPDR7          ;EXTERNAL BANK
011232  012777  000002  170210          MOV     #2,@SR3                 ;ENABLE SUPERVISOR D-SPACE
011240  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
011246  016702  170162                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
011252  012777  000400  170154          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
011260  005012                          CLR     @R2                     ;CLEAR SR0 THRU SUPERVISOR 7 D-SPACE
011262  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF - IF STILL ON
011264  001401                          BEQ     .+4                     ;THE CMP WILL REFERENCE 2 LOCATIONS
                                                                        ;WHICH AREN'T EQUAL
011266  000777                          BR      .                       ;KT11-C IS STILL ON
011270  000005                          RESET                           ;MAKE SURE KT11-C IS OFF
011272  005077  170152                  CLR     @SR3                    ;REINITIALIZE SR3
011276  005037  177776                  CLR     @#PS                    ;REINITIALIZE PROCESSOR STATUS

                                ;SHOW THAT A DATO OF 0 TO BIT 8, SR0 THRU USER PAGE 7 D-SPACE
                                ;WILL TURN OFF DESTINATION ONLY PAGING
011302  004767  004766                  JSR     %7,CLRALL               ;INITIALLY CLEAR ALL KT11-C REGISTERS
011306  012777  000001  170220          MOV     #1,@UDPAR0              ;MAP USER 0 D-SPACE TO BANK 0, RW,
011314  012777  077406  170152          MOV     #77406,@UDPDR0          ;OFFSET BY 1 BLOCK
011322  012701  004754                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE USER 0
011326  012777  007600  170216          MOV     #7600,@UDPAR7           ;MAP USER 7 D-SPACE TO THE
011334  012777  077406  170150          MOV     #77406,@UDPDR7          ;EXTERNAL BANK
011342  012777  000001  170100          MOV     #1,@SR3                 ;ENABLE USER D-SPACE
011350  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
011356  016702  170052                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
011362  012777  000400  170044          MOV     #400,@SR0               ;TURN ON DESTINATION ONLY RELOCATION
011370  005012                          CLR     @R2                     ;CLEAR SR0 THRU USER 7 D-SPACE
011372  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-C IS OFF - IF STILL ON, THE
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011374  001401                          BEQ     .+4                     ;CMP WILL REFERENCE 2 LOCATIONS WHICH AREN'T
                                                                        ;EQUAL
011376  000777                          BR      .                       ;KT11-C IS STILL ON
011400  000005                          RESET                           ;MAKE SURE KT11-C IS OFF
011402  005077  170042                  CLR     @SR3                    ;REINITIALIZE SR3
011406  005037  177776                  CLR     @#PS                    ;REINITIALIZE PROCESSOR STATUS

                                ;SHOW THAT WITH ALL D-SPACES ENABLED ALL BLOCK BOUNDARY REFERENCES
                                ;REFERENCE THE CORRECT D-SPACE PAR AND RELOCATE CORRECTLY
                                ;USE DESTINATION ONLY RELOCATION AND ENABLE D-SPACE
                                ;MAP ALL I-SPACE PAGES NON-RESIDENT
                                ;MAP ALL D-SPACE PAGES RESIDENT READ WRITE

                                ;       R0      - POINTS TO THE ADDRESS OF THE CURRENT D-SPACE PAR IN THE
                                ;                 ADDRESS TABLE
                                ;       R1      - VIRTUAL ADDRESS BEING USED TO REFERENCE START OF BLOCK
                                ;       R2      - VIRTUAL ADDRESS BEING USED TO REFERENCE END OF BLOCK
                                ;       R3      - POINTS TO EXPECTED CONTENTS OF START OF BLOCK
                                ;       R4      - POINTS TO EXPECTED CONTENTS OF END OF BLOCK
                                ;       R5      - USED TO REFERENCE SR0 TO TURN OFF DESTINATION ONLY RELOCATION
011412  104400                  TEST30: SCOPE
011414  012737  000030  177570          MOV     #30,@#SR                ;DISPLAY TEST NUMBER
011422  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
011426  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011432  004767  004624                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
011436  026727  170370  000030          CMP     TESTCT,#30              ;IS THIS TEST BEING EXECUTED IN THE
011444  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
011446  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

011450  004767  004620                  JSR     %7,CLRALL               ;INITIALIZE KT11-C - CLEAR ALL REGISTERS
011454  004767  004750                  JSR     %7,RWDSP                ;MAKE ALL D SPACE PAGES RW, BANK 0,4K
011460  013767  017700  170322          MOV     @#17700,SAVEA           ;SAVE CONTENTS OF LOCATIONS TO BE USED
011466  013767  017776  170316          MOV     @#17776,SAVEB           ;AS START AND END OF PHYSICAL BLOCK
011474  012737  123456  017700          MOV     #123456,@#17700         ;SET UP LOCATIONS TO BE REFERENCED
011502  012737  134567  017776          MOV     #134567,@#17776
011510  012777  000007  167732          MOV     #7,@SR3                 ;ENABLE ALL D-SPACES
011516  012703  001414                  MOV     #K123,R3                ;LOAD R3 AND R4 WITH ADDRESSES OF
011522  012704  001416                  MOV     #K134,R4                ;LOCATIONS CONTAINING EXPECTED CONTENTS
                                                                        ;OF START AND END OF BLOCK
                                                                        ;THIS ALLOWS USING THE SAME INSTRUCTIONS
                                                                        ;AS HAVE ALREADY BEEN SHOWN TO WORK
                                                                        ;CORRECTLY IN DESTINATION ONLY RELOCATION
011526  012767  000100  005144          MOV     #100,ICOUNT             ;CHANGE ITERATION COUNT
011534  012737  040000  177776          MOV     #40000,@#PS             ;CHANGE TO SUPERVISOR
011542  012706  001000                  MOV     #SSTACK,SP              ;SET UP SUPERVISOR STACK POINTER
011546  012737  140000  177776          MOV     #140000,@#PS            ;CHANGE TO USER
011554  012706  000400                  MOV     #USTACK,SP              ;SET UP USER STACK POINTER
011560  005037  177776                  CLR     @#PS                    ;RETURN TO KERNEL
011564  012767  001770  170212          MOV     #STATAB,STAPNT          ;SET UP TO REFERENCE MODE TABLE
                                                                        ;THIS TABLE CONTAINS THE FIRST
                                                                        ;ADDRESSES OF THE TABLES OF PAR AND PDR
                                                                        ;ADDRESSES FOR EACH MODE, AND THE
                                                                        ;VALUE OF THE PROCESSOR STATUS FOR EACH
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                                                                        ;MODE
011572  017700  170206          STATEL: MOV     @STAPNT,R0              ;PICK UP ADDRESS OF START OF
011576  062700  000060                  ADD     #60,R0                  ;ADDRESS TABLE FOR NEW MODE
011602  062767  000002  170174          ADD     #2,STAPNT               ;MOVE POINTER TO ADDRESS VALUE TO
                                                                        ;LOAD INTO PROCESSOR STATUS
011610  017737  170170  177776          MOV     @STAPNT,@#PS            ;SET PROCESSOR STATUS TO NEW MODE
011616  062767  000002  170160          ADD     #2,STAPNT               ;MOVE POINTER TO ADDRESS VALUE
                                                                        ;FOR NEXT MODE
011624  012767  000010  170154          MOV     #8.,PAGES               ;SETUP COUNTER OF PAGES LEFT TO TEST
011632  012770  007600  000016          MOV     #7600,@16(R0)           ;SET UP RELOCATED REFERENCE TO SR0
011640  016705  167570                  MOV     SR0,R5                  ;USED TO TURN DESTINATION ONLY
                                                                        ;RELOCATION OFF
011644  005001                          CLR     R1                      ;INITIALIZE R1 TO CONTAIN VA OF
                                                                        ;START OF PAGE
011646  012702  000076                  MOV     #76,R2                  ;INITIALIZE R2 TO VA OF END OF PAGE
011652  012767  000200  170154  PAGEL:  MOV     #128.,BLOCKS            ;SET UP BLOCK COUNT
011660  012770  000177  000000          MOV     #177,@(R0)              ;SET UP D-SPACE PAR TO RELOCATE VA TO LAST BLOCK
011666  022767  000001  170112          CMP     #1,PAGES                ;IS THIS PAGE 7? (WAS USED
                                                                        ;FOR REFERENCE TO SR0)
011674  001005                          BNE     BLKL                    ;IF NOT, BRANCH
011676  012770  007600  177776          MOV     #7600,@-2(R0)           ;YES, SET UP PAGE 6 FOR REFERENCES TO SR0
011704  042705  020000                  BIC     #20000,R5               ;CHANGE R5 TO POINT TO SR0 THRU PAGE 6
011710  012777  000400  167516  BLKL:   MOV     #400,@SR0               ;TURN ON DESTINATION ONLY PAGING
011716  021311                          CMP     @R3,@R1                 ;CK BOTTOM BLOCK BOUNDARY
011720  001401                          BEQ     .+4
011722  000000                          HALT                            ;DESTINATION ONLY RELOCATION FAILED
                                                                        ;VA CONTAINED IN R1 FAILED TO RELOCATE
                                                                        ;TO TOP BLOCK OF BANK ZERO
011724  021412                          CMP     @R4,@R2                 ;CK UPPER BLOCK BOUNDARY
011726  001401                          BEQ     .+4
011730  000000                          HALT                            ;DESTINATION ONLY RELOCATION FAILED
                                                                        ;VA CONTAINED IN R2 FAILED TO RELOCATE
                                                                        ;TO TOP BLOCK OF BANK ZERO
011732  005015                          CLR     @R5                     ;TURN OFF KT11-C
011734  005370  000000                  DEC     @(R0)                   ;MAP D-SPACE PAR 1 BLOCK LOWER
011740  062701  000100                  ADD     #100,R1                 ;SET UP R1 AND R2 TO REFERENCE
011744  062702  000100                  ADD     #100,R2                 ;NEXT VIRTUAL BLOCK
011750  005367  170060                  DEC     BLOCKS                  ;DECREMENT COUNT OF BLOCKS LEFT
011754  001355                          BNE     BLKL                    ;BRANCH IF NOT DONE WITH THIS PAGE
011756  005070  000000                  CLR     @(R0)                   ;IF DONE WITH PAGE, CLEAR PAR
011762  005367  170020                  DEC     PAGES                   ;DECREMENT COUNT OF PAGES LEFT
011766  001402                          BEQ     ENDPAG                  ;BRANCH IF ALL PAGES IN THIS MODE DONE
011770  005720                          TST     (R0)+                   ;MOVE ADDRESS TABLE POINTER TO ADDRESS NEXT PAR
011772  000727                          BR      PAGEL                   ;TEST REFERENCES TO NEXT PAGE
011774  026727  170004  002002  ENDPAG: CMP     STAPNT,#STAEND          ;CHECK FOR ALL MODES TESTED
012002  003673                          BLE     STATEL                  ;IF NOT, BRANCH
012004  005037  177776                  CLR     @#PS                    ;IF DONE, REINTIALIZE
012010  005077  167420                  CLR     @SR0
012014  016727  167770  017700          MOV     SAVEA,#17700
012022  016727  167764  017776          MOV     SAVEB,#17776

                        ;SHOW THAT WRITING A PAGE WILL SET THE W BIT IN THE CORRESPONDING
                        ;PDR, AND THAT NO OTHER W BITS SET AT THE SAME TIME
                        ;SHOW THAT WRITING THE PDR (VIA A DATO) WILL CLEAR THE W BIT
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                        ;SINCE THIS IS DONE FOR ALL PDR'S, THIS IS ALSO
                        ;A TEST OF INDIRECT ADDRESSING (VIA A VIRTUAL ADDRESS) OF THE PDR'S


                        ;FIRST TEST ALL I-SPACE PDR'S
                        ;ALL D SPACES ARE DISABLED
012030  104400          TEST31: SCOPE
012032  012737  000031  177570          MOV     #31,@#SR                ;DISPLAY TEST NUMBER
012040  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
012044  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012050  004767  004206                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
012054  026727  167752  000031          CMP     TESTCT,#31              ;IS THIS TEST BEING EXECUTED IN THE
012062  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
012064  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

012066  012767  000400  004604          MOV     #400,ICOUNT             ;LOAD ITERATION COUNT
012074  004767  004224                  JSR     %7,RWALL                ;MAP ALL PAGES 4K, BANK 0, RW
012100  012777  007600  167624          MOV     #7600,@KIPAR7           ;MAP KERNEL 7 I-SPACE TO EXTERNAL BANK
012106  012777  007600  167516          MOV     #7600,@SIPAR7           ;MAP SUPERVISOR 7 I-SPACE TO EXTERNAL BANK
012114  012777  007600  167410          MOV     #7600,@UIPAR7           ;MAP USER 7 I-SPACE TO EXTERNAL BANK
012122  005077  167322                  CLR     @SR3                    ;CLEAR ALL D-SPACE ENABLES
012126  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
012134  012706  001000                  MOV     #SSTACK,R6              ;SET UP SUPERVISOR STACK
012140  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
012146  012706  000400                  MOV     #USTACK,R6              ;SET UP USER STACK
012152  005037  177776                  CLR     @#PS                    ;REINITIALIZE STATUS TO KERNEL MODE
012156  012704  001454                  MOV     #ADRTAB,R4              ;LOAD R4 WITH THE ADDRESS OF THE ADDRESS TABLE
012162  012705  000020          LOP31A: MOV     #20,R5                  ;R5 IS A COUNTER OF THE PDR'S LEFT TO CHECK
                                                                        ;IN THE CURRENT SET
012166  022734  077406          LOP31B: CMP     #77406,@(R4)+           ;CHECK THE CONTENTS OF THE PDR
012172  001401                          BEQ     .+4
012174  104006                          HLT                             ;PDR INCORRECT - W BIT SET OR ANOTHER
                                                                        ;BIT INCORRECT IN PDR WHOSE ADDRESS
                                                                        ;IS IN THE LOCATION POINTED TO BY R4
012176  077505                          SOB     R5,LOP31B               ;TEST ALL PDR'S IN THE SET
012200  062704  000040                  ADD     #40,R4                  ;MOVE POINTER TO FIRST ADDRESS OF NEXT SET
012204  020427  001752                  CMP     R4,#ADREND
012210  003001                          BGT     CNT31A                  ;BRANCH IF DONE
012212  000763                          BR      LOP31A
012214  012700  001770  CNT31A: MOV     #STATAB,R0              ;LOAD R0 WITH THE ADDRESS OF THE STATE TABLE
012220  012001          LOP31C: MOV     (R0)+,R1                ;R1 POINTS TO THE ADDRESS
                                                                ;OF THE 1ST PDR IN THIS MODE
012222  012702  017776                  MOV     #17776,R2               ;SET UP VIRTUAL ADDRESS TO BE REFERENCED IN R2
012226  012037  177776                  MOV     (R0)+,@#PS              ;SET UP STATUS FOR THE CURRENT MODE
012232  005277  167176          LOP31D: INC     @SR0                    ;TURN ON KT11-C
012236  011212                          MOV     (R2),(R2)               ;WRITE INTO THE PAGE BEING TESTED
012240  005077  167170                  CLR     @SR0                    ;TURN OFF KT11-C
012244  032771  000100  000000          BIT     #100,@(R1)              ;CHECK THE W BIT
012252  001001                          BNE     .+4
012254  104006                          HLT                             ;THE W BIT WAS NOT SET IN THE PDR
                                                                        ;WHOSE ADDRESS IS POINTED TO BY R1,
                                                                        ;AFTER THE CORRESPONDING PAGE WAS
                                                                        ;WRITTEN
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                                ;NOW CHECK ALL PDR'S TO SHOW THAT NO OTHER W-BITS WERE SET
012256  012703  001454                MOV     #ADRTAB,R3              ;R3 POINTS TO THE ADDRESS OF THE
012262  012704  000020        LOP31E: MOV     #20,R4                  ;PDR BEING CHECKED
012266  020103                LOP31F: CMP     R1,R3                   ;DON'T CHECK THIS PDR IF IT IS THE
012270  001405                        BEQ     CNT31B                  ;ONE WHOSE W-BIT SHOULD HAVE BEEN
                                                                        ;SET (CORRESPONDING TO THE PAGE WRITTEN)
012272  032773  000100  000000        BIT     #100,@(R3)              ;CHECK THE W-BIT
012300  001401                        BEQ     .+4
012302  104006                        HLT                             ;W BIT SET IN THE PDR WHOSE ADDRESS
                                                                        ;IS POINTED TO BY R3, AS WELL AS
                                                                        ;IN THE PDR CORRESPONDING TO THE PAGE
                                                                        ;THAT WAS WRITTEN (ADDRESS OF PDR
                                                                        ;CORRESPONDING TO THE PAGE THAT
                                                                        ;WAS WRITTEN IS POINTED TO BY R1)
012304  005723                CNT31B: TST     (R3)+                   ;MOVE POINTER
012306  077411                        SOB     R4,LOP31F               ;CHECK ALL PDR'S IN THIS GROUP
012310  062703  000040                ADD     #40,R3                  ;IF DONE WITH THIS GROUP, MOVE POINTER
                                                                        ;TO NEXT GROUP OF ADDRESSES
012314  020327  001752                CMP     R3,#ADREND              ;BRANCH IF SOME PDR'S NOT YET CHECKED
012320  002760                        BLT     LOP31E
                                ;SHOW THAT WRITING THE PDR WILL CLEAR THE W BIT
012322  012771  077406  000000        MOV     #77406,@(R1)            ;CLEAR W BIT VIA DATO TO PDR
012330  032771  000100  000000        BIT     #100,@(R1)              ;CHECK W BIT
012336  001401                        BEQ     .+4
012340  104006                        HLT                             ;W BIT DIDN'T CLEAR WHEN PDR
                                                                        ;WAS WRITTEN (R1 POINTS TO
                                                                        ;THE ADDRESS OF THE PDR)
012342  005721                CNT31C: TST     (R1)+                   ;MOVE POINTER
012344  062702  020000                ADD     #20000,R2               ;CHANGE VA TO REFERENCE NEXT PAGE
012350  103330                        BCC     LOP31D                  ;BRANCH TO TEST NEXT PAGE IN THIS MODE
012352  020027  002002                CMP     R0,#STAEND              ;IF DONE IN THIS MODE, CHECK FOR ALL MODES DONE
012356  002720                        BLT     LOP31C                  ;LOOP UNTIL ALL MODES HAVE BEEN TESTED
012360  005077  167064                CLR     @SR3                    ;REINITIALIZE SR3
012364  005077  167044                CLR     @SR0                    ;REINITIALIZE SR0

                                ;NOW TEST ALL D-SPACE PDR'S
                                ;ALL D SPACES ARE ENABLED
012370  104400                TEST32: SCOPE
012372  012737  000032  177570        MOV     #32,@#SR                ;DISPLAY TEST NUMBER
012400  005037  177776                CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
012404  012706  001400                MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012410  004767  003646                JSR     %7,SETUP                ;INITIALIZE SR0,SR3
012414  026727  167412  000032        CMP     TESTCT,#32              ;IS THIS TEST BEING EXECUTED IN THE
012422  001401                        BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
012424  104006                        HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

012426  012767  000400  004244        MOV     #400,ICOUNT             ;LOAD ITERATION COUNT
012434  004767  003664                JSR     %7,RWALL                ;MAP ALL PAGES 4K, BANK 0, RW
012440  012777  007600  167304        MOV     #7600,@KDPAR7           ;MAP KERNEL 7 D-SPACE TO EXTERNAL BANK
012446  012777  007600  167176        MOV     #7600,@SDPAR7           ;MAP SUPERVISOR 7 D-SPACE TO EXTERNAL BANK
012454  012777  007600  167070        MOV     #7600,@UDPAR7           ;MAP USER 7 D-SPACE TO EXTERNAL BANK
012462  012777  000007  166760        MOV     #7,@SR3                 ;ENABLE ALL D-SPACES
012470  012737  040000  177776        MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
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012476  012706  001000                MOV     #SSTACK,R6              ;SET UP SUPERVISOR STACK
012502  012737  140000  177776        MOV     #140000,@#PS            ;SET MODE TO USER
012510  012706  000400                MOV     #USTACK,R6              ;SET UP USER STACK
012514  005037  177776                CLR     @#PS                    ;REINITIALIZE STATUS TO KERNEL MODE
012520  012704  001454                MOV     #ADRTAB,R4              ;LOAD R4 WITH THE ADDRESS OF THE ADDRESS TABLE
012524  012705  000020        LOP32A: MOV     #20,R5                  ;R5 IS A COUNTER OF THE PDR'S LEFT TO CHECK
                                                                        ;IN THE CURRENT SET
012530  022734  077406        LOP32B: CMP     #77406,@(R4)+           ;CHECK THE CONTENTS OF THE PDR
012534  001401                        BEQ     .+4
012536  104006                        HLT                             ;PDR INCORRECT - W BIT SET OR ANOTHER
                                                                        ;BIT INCORRECT IN PDR WHOSE ADDRESS
                                                                        ;IS IN THE LOCATION POINTED TO BY R4
012540  077505                        SOB     R5,LOP32B               ;TEST ALL PDR'S IN THE SET
012542  062704  000040                ADD     #40,R4                  ;MOVE POINTER TO FIRST ADDRESS OF NEXT SET
012546  020427  001752                CMP     R4,#ADREND
012552  003001                        BGT     CNT32A                  ;BRANCH IF DONE
012554  000763                        BR      LOP32A
012556  012700  001770        CNT32A: MOV     #STATAB,R0              ;LOAD R0 WITH THE ADDRESS OF THE STATE TABLE
012562  012001                LOP32C: MOV     (R0)+,R1                ;R1 POINTS TO THE ADDRESS
                                                                        ;OF THE 1ST PDR IN THIS MODE
012564  062701  000020                ADD     #20,R1
012570  012702  017776                MOV     #17776,R2               ;SET UP VIRTUAL ADDRESS TO BE REFERENCED IN R2
012574  012037  177776                MOV     (R0)+,@#PS              ;SET UP STATUS FOR THE CURRENT MODE
012600  005277  166630        LOP32D: INC     @SR0                    ;TURN ON KT11-C
012604  011212                        MOV     (R2),(R2)               ;WRITE INTO THE PAGE BEING TESTED
012606  005077  166622                CLR     @SR0                    ;TURN OFF KT11-C
012612  032771  000100  000000        BIT     #100,@(R1)              ;CHECK THE W BIT
012620  001001                        BNE     .+4
012622  104006                        HLT                             ;THE W BIT WAS NOT SET IN THE PDR
                                                                        ;WHOSE ADDRESS IS POINTED TO BY R1,
                                                                        ;AFTER THE CORRESPONDING PAGE WAS
                                                                        ;WRITTEN
                                ;NOW CHECK ALL PDR'S TO SHOW THAT NO OTHER W-BITS WERE SET
012624  012703  001454                MOV     #ADRTAB,R3              ;R3 POINTS TO THE ADDRESS OF THE
012630  012704  000020        LOP32E: MOV     #20,R4                  ;PDR BEING CHECKED
012634  020103                LOP32F: CMP     R1,R3                   ;DON'T CHECK THIS PDR IF IT IS THE
012636  001405                        BEQ     CNT32B                  ;ONE WHOSE W-BIT SHOULD HAVE BEEN
                                                                        ;SET (CORRESPUNDING TO THE PAGE WRITTEN)
012640  032773  000100  000000        BIT     #100,@(R3)              ;CHECK THE W-BIT
012646  001401                        BEQ     .+4
012650  104006                        HLT                             ;W BIT SET IN THE PDR WHOSE ADDRESS
                                                                        ;IS POINTED TO BY R3, AS WELL AS
                                                                        ;IN THE PDR CORRESPONDING TO THE PAGE
                                                                        ;THAT WAS WRITTEN (ADDRESS OF PDR
                                                                        ;CORRESPONDING TO THE PAGE THAT
                                                                        ;WAS WRITTEN IS POINTED TO BY R1)
012652  005723                CNT32B: TST     (R3)+                   ;MOVE POINTER
012654  077411                        SOB     R4,LOP32F               ;CHECK ALL PDR'S IN THIS GROUP
012656  062703  000040                ADD     #40,R3                  ;IF DONE WITH THIS GROUP, MOVE POINTER
                                                                        ;TO NEXT GROUP OF ADDRESSES
012662  020327  001752                CMP     R3,#ADREND              ;BRANCH IF SOME PDR'S NOT YET CHECKED
012666  002760                        BLT     LOP32E
                                ;SHOW THAT WRITING THE PDR WILL CLEAR THE W BIT
012670  012771  077406  000000        MOV     #77406,@(R1)            ;CLEAR W BIT VIA DATO TO PDR
```

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012676  032771  000100  000000          BIT     #100,@(R1)              ;CHECK W BIT
012704  001401                          BEQ     .+4
012706  104006                          HLT                             ;W BIT DIDN'T CLEAR WHEN PDR
                                                                        ;WAS WRITTEN (R1 POINTS TO
                                                                        ;THE ADDRESS OF THE PDR)
012710  005721                  CNT32C: TST     (R1)+                   ;MOVE POINTER
012712  062702  020000                  ADD     #20000,R2               ;CHANGE VA TO REFERENCE NEXT PAGE
012716  103330                          BCC     LOP32D                  ;BRANCH TO TEST NEXT PAGE IN THIS MODE
012720  020027  002002                  CMP     R0,#STAEND              ;IF DONE IN THIS MODE, CHECK FOR ALL MODES DONE
012724  002716                          BLT     LOP32C                  ;LOOP UNTIL ALL MODES HAVE BEEN TESTED
012726  005077  166516                  CLR     @SR3                    ;REINITIALIZE SR3
012732  005077  166476                  CLR     @SR0                    ;REINITIALIZE SR0

                                ;SHOW THAT A REFERENCE TO A NR PAGE WILL SET BOTH THE NR AND PL
                                ;ERROR BITS IF IT IS OUTSIDE THE MAPPED PAGE LENGTH
012736  104400                  TEST33: SCOPE
012740  012737  000033  177570          MOV     #33,@#SR                ;DISPLAY TEST NUMBER
012746  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
012752  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012756  004767  003300                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
012762  026727  167044  000033          CMP     TESTCT,#33              ;IS THIS TEST BEING EXECUTED IN THE
012770  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
012772  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

012774  004767  003324                  JSR     %7,RWALL                ;MAP ALL PAGES RW,4K,BANK 0
013000  012777  000003  166650          MOV     #3,@KIPDR1              ;MAP KERNEL I-SPACE 1 NR, 1 PAGE
013006  012777  007600  166716          MOV     #7600,@KIPAR7           ;MAP KERNEL 7 I-SPACE TO THE EXTERNAL BANK
013014  012777  013042  166772          MOV     #RET33,@KTVEC           ;SETUP ABORT RETURN
013022  005077  166770                  CLR     @KTSTA
013026  005277  166402                  INC     @SR0                    ;TURN ON KT11-C
013032  005737  030000                  TST     @#30000                 ;REFERENCE NR KERNEL 1 - SHOULD ABORT
013036  000000                          HALT                            ;NO NR ABORT
013040  000405                          BR      DONE33
013042  022777  140003  166364  RET33:  CMP     #140003,@SR0            ;CHECK SR0
013050  001401                          BEQ     .+4
013052  104006                          HLT                             ;SR0 INCORRECT - SHOULD SHOW REFERENCE
                                                                        ;TO KERNEL I-SPACE PAGE 1, AND BOTH
                                                                        ;NR AND PL ERRORS SHOULD BE SET
013054  005077  166354          DONE33: CLR     @SR0
013060  016777  166732  166726          MOV     KTSTA,@KTVEC            ;RESTORE TRAP CATCHER

                                ;SHOW THAT KERNEL, USER, AND SUPERVISOR STACKS ARE IN THE
                                ;RESPECTIVE D-SPACES WHEN D-SPACE ENABLES ARE SET
                                ;D-SPACES ARE OFFSET FROM I-SPACES, AND AN IOT IS DONE TO
                                ;EACH MODE. THE LOCATION WRITTEN INTO WHEN THE STACK IS PUSHED
                                ;SHOWS WHICH SPACE WAS USED BY THAT STACK
013066  104400                  TEST34: SCOPE
013070  012737  000034  177570          MOV     #34,@#SR                ;DISPLAY TEST NUMBER
013076  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
013102  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013106  004767  003150                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
013112  026727  166714  000034          CMP     TESTCT,#34              ;IS THIS TEST BEING EXECUTED IN THE
013120  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
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013122  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

013124  004767  003144                  JSR     %7,CLRALL               ;INITIALIZE ALL KT11-C REGISTERS
013130  012706  000500                  MOV     #500,SP                 ;SET THE KERNEL STACK TO VIRTUAL ADDRESS 500
013134  012737  040000  177776          MOV     #40000,@#PS
013142  012706  000100                  MOV     #100,SP                 ;SET THE SUPERVISOR STACK TO VIRTUAL ADDRESS 100
013146  012737  140000  177776          MOV     #140000,@#PS
013154  012706  000100                  MOV     #100,SP                 ;SET THE USER STACK TO VA 100
013160  005037  177776                  CLR     @#PS
013164  012777  077406  166462          MOV     #77406,@KIPDR0          ;MAP KERNEL, SUPERVISOR, AND USER PAGE 0
013172  012777  077406  166354          MOV     #77406,@SIPDR0          ;I-SPACES TO BANK 0, 4K, RW
013200  012777  077406  166246          MOV     #77406,@UIPDR0
013206  012777  002006  166460          MOV     #2006,@KDPDR0           ;MAP KERNEL, SUPERVISOR, AND USER
013214  012777  000006  166352          MOV     #6,@SDPDR0              ;D SPACES TO BANK 0 (BUT OFFSET
013222  012777  000006  166244          MOV     #6,@UDPDR0              ;FROM PHYSICAL ADDRESS 0), RW
013230  012777  000007  166476          MOV     #7,@KDPAR0              ;KERNEL D SPACE STARTS AT 700
013236  012777  000007  166370          MOV     #7,@SDPAR0              ;SUPERVISOR D SPACE STARTS AT 700
013244  012777  000003  166262          MOV     #3,@UDPAR0              ;USER D SPACE STARTS AT 300
013252  012737  013352  000720          MOV     #KRET34,@#720           ;TEST USING IOT TRAP (THRU KERNEL D SPACE)
013260  005037  000722                  CLR     @#722                   ;SETUP TO RETURN FROM TRAP IN KERNEL MODE
013264  016701  166144                  MOV     SR0,R1                  ;LOAD R1 TO REFERENCE SR0
013270  012777  000007  166152          MOV     #7,@SR3                 ;TURN ON ALL D-SPACE ENABLES
013276  012777  077406  166406          MOV     #77406, @KDPDR7         ;MAP KERNEL D SPACE PAGE 7
013304  012777  007600  166440          MOV     #7600,@KDPAR7           ;TO THE EXTERNAL BANK, RW
013312  012777  077406  166272          MOV     #77406,@SDPDR7          ;MAP SUPERVISOR D-SPACE PAGE 7
013320  012777  007600  166324          MOV     #7600,@SDPAR7           ;TO THE EXTERNAL BANK, RW
013326  012777  077406  166156          MOV     #77406,@UDPDR7          ;MAP USER D-SPACE PAGE 7
013334  012777  007600  166210          MOV     #7600,@UDPAR7           ;TO THE EXTERNAL BANK, RW
013342  005277  166066                  INC     @SR0                    ;TURN ON KT11-C
013346  000004                  KTRP34: IOT                             ;IOT TRAP SHOULD USE STACK IN KERNEL D-SPACE
013350  000240                          NOP                             ;SINCE STATUS IN IOT VECTOR IS SET TO KERNEL
013352  005011                  KRET34: CLR     @R1                     ;TURN OFF KT11-C
013354  012737  013400  000720          MOV     #SRET34,@#720           ;SETUP FOR IOT TO SUPERVISOR STACK
013362  012737  040000  000722          MOV     #40000,@#722
013370  005277  166040                  INC     @SR0                    ;TURN ON KT11-C
013374  000004                  STRP34: IOT                             ;IOT TRAP SHOULD USE STACK IN SUPERVISOR D-SPACE
013376  000240                          NOP                             ;SINCE STATUS IN IOT VECTOR IS SET TO SUPERVISOR
013400  005011                  SRET34: CLR     @R1                     ;TURN OFF KT11-C
013402  012737  013426  000720          MOV     #URET34,@#720           ;SETUP FOR IOT TO USER
013410  012737  140000  000722          MOV     #140000,@#722
013416  005277  166012                  INC     @SR0                    ;TURN ON KT11-C
013422  000004                  UTRP34: IOT                             ;IOT TRAP SHOULD USE STACK IN USER D-SPACE
013424  000240                          NOP                             ;SINCE STATUS IN IOT VECTOR IS SET TO USER
013426  005011                  URET34: CLR     @R1                     ;TURN OFF KT11-C
013430  022737  013350  001374          CMP     #KRET34-2,@#1374        ;CHECK TO SEE IF IOT TRAP TO KERNEL PUSHED
013436  001401                          BEQ     .+4                     ;VALUE IN KERNEL D-SPACE
013440  104006                          HLT                             ;KERNEL STACK CONTENTS WRONG, STACK NOT
013442  022737  000000  001376          CMP     #0,@#1376               ;IN KERNEL D-SPACE
013450  001401                          BEQ     .+4
013452  104006                          HLT                             ;KERNEL STACK CONTENTS WRONG-TRAP STATUS NOT
013454  022737  013376  000774          CMP     #SRET34-2,@#774         ;WHERE IT SHOULD HAVE BEEN PUSHED
013462  001401                          BEQ     .+4                     ;OR VALUE WRONG
013464  104006                          HLT                             ;SUPERVISOR STACK CONTENTS WRONG-STACK
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013466  022737  000000  000776          CMP     #0,@#776                ;NOT IN SUPERVISOR D-SPACE
013474  001401                          BEQ     .+4
013476  104006                          HLT                             ;SUPERVISOR STACK WRONG-TRAP STATUS
013500  022737  013424  000374          CMP     #URET34-2,@#374         ;NOT WHERE IT SHOULD HAVE BEEN PUSHED
013506  001401                          BEQ     .+4                     ;OR VALUE WRONG
013510  104006                          HLT                             ;USER STACK CONTENTS WRONG-STACK
013512  022737  040000  000376          CMP     #40000,@#376            ;NOT IN USER D-SPACE
013520  001401                          BEQ     .+4
013522  104006                          HLT                             ;USER STACK WRONG-TRAP STATUS
                                                                        ;NOT WHERE IT SHOULD HAVE BEEN
                                                                        ;PUSHED OR VALUE WRONG
013524  005037  000374                  CLR     @#374                   ;REINITIALIZE LOCATIONS CHECKED
013530  005037  000376                  CLR     @#376
013534  005037  000720                  CLR     @#720
013540  005037  000722                  CLR     @#722
013544  005037  000774                  CLR     @#774
013550  005037  000776                  CLR     @#776
013554  005037  001374                  CLR     @#1374
013560  005037  001376                  CLR     @#1376
013564  012706  001400                  MOV     #KSTACK,SP              ;RESTORE KERNEL STACK POINTER

                                ;SHOW THAT TRAP,EMT, IOT, AND INTERRUPTS TAKE VECTORS FROM KERNEL
                                ;D-SPACE IRREGARDLESS OF THE MODE AT THE TIME OF THE TRAP SEQUENCE
                                ;ALSO SHOW THAT ODD-ADDRESS TRAP (AN "INTERNAL" TRAP) TAKES
                                ;ITS VECTOR FROM KERNEL D-SPACE
                                ;NOTE THAT IF DUAL ADDRESSING OCCURS, THE ERROR
                                ;ADDRESS WILL BE USED (THE 0 OVERRIDES THE 1)
013570  104400                  TEST35: SCOPE
013572  012737  000035  177570          MOV     #35,@#SR                ;DISPLAY TEST NUMBER
013600  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
013604  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013610  004767  002446                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
013614  026727  166212  000035          CMP     TESTCT,#35              ;IS THIS TEST BEING EXECUTED IN THE
013622  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
013624  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

013626  004767  002472                  JSR     %7,RWALL                ;MAP ALL PAGES RW, 4K, BANK 0
013632  012777  000001  166074          MOV     #1,@KDPAR0              ;OFFSET KERNEL 0 D-SPACE 1 PAGE
013640  012777  007600  166104          MOV     #7600,@KDPAR7           ;MAP KERNEL 7 TO THE EXTERNAL BANK
013646  012777  007600  165776          MOV     #7600,@SDPAR7           ;MAP SUPERVISOR 7 TO THE EXTERNAL BANK
013654  012777  007600  165670          MOV     #7600,@UDPAR7           ;MAP USER 7 TO THE EXTERNAL BANK
013662  016701  165546                  MOV     SR0,R1                  ;SETUP R1 TO REFERENCE SR0
013666  012737  040000  177776          MOV     #40000,@#PS             ;SETUP SUPERVISOR STACK
013674  012706  001000                  MOV     #SSTACK,SP
013700  012737  140000  177776          MOV     #140000,@#PS            ;SETUP USER STACK
013706  012706  000400                  MOV     #USTACK,SP
013712  005037  177776                  CLR     @#PS
013716  012706  001300                  MOV     #KSTACK-100,SP          ;LOWER THE KERNEL STACK POINTER TO
                                                                        ;KEEP IT OUT OF CODE WHEN RELOCATED
013722  012777  000007  165520          MOV     #7,@SR3                 ;SET ALL D-SPACE ENABLES
013730  012737  014004  000134          MOV     #OK35A,@#134            ;IF SUCCESSFUL, WILL PICK UP VECTOR
013736  012737  040000  000136          MOV     #40000,@#136            ;RETURN IN PHYSICAL ADDRESS 134
013744  012737  013774  000034          MOV     #NG35A,@#34             ;IF NO GOOD, WILL PICK UP VECTOR RETURN
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013752  012737  040000  000036          MOV     #40000,@#36             ;IN PHYSICAL ADDRESS 34
013760  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
013766  005277  165442                  INC     @SR0                    ;TURN ON KT11-C
013772  104400                  TRP35:  TRAP                            ;SHOULD PICK UP RETURN ADDRESS FROM
                                                                        ;KERNEL D-SPACE
013774  022626                  NG35A:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
013776  005011                          CLR     @R1                     ;TURN OFF KT11-C
014000  104006                          HLT                             ;TRAP VECTOR WASN'T FROM KERNEL
                                                                        ;D-SPACE
014002  000402                          BR      EMT35                   ;GO TO NEXT SUBTEST
014004  022626                  OK35A:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014006  005011                          CLR     @R1                     ;TURN OFF KT11-C
014010  012737  016552  000034  EMT35:  MOV     #SCOPEC,@#34            ;RESTORE TRAP VECTOR CONTENTS
014016  005037  000036                  CLR     @#36
014022  012737  000136  000134          MOV     #136,@#134
014030  005037  000136                  CLR     @#136
014034  012737  014124  000130          MOV     #OK35B,@#130            ;SETUP SUCCESS RETURN
014042  012737  014100  000030          MOV     #NG35B,@#30             ;SETUP FAILURE RETURN
014050  012737  140000  000132          MOV     #140000,@#132
014056  012737  140000  000032          MOV     #140000,@#32
014064  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
014072  005277  165336                  INC     @SR0                    ;TURN ON KT11-C
014076  104000                          EMT                             ;SHOULD PICK UP RETURN ADDRESS FROM
                                                                        ;KERNEL D-SPACE
014100  022626                  NG35B:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014102  005011                          CLR     @R1                     ;TURN OFF KT11-C
014104  012737  017324  000030          MOV     #EMTSRV,@#30            ;RESTORE EMT SERVICE POINTER
014112  012737  000340  000032          MOV     #340,@#32
014120  104006                          HLT                             ;EMT VECTOR WASN'T TAKEN FROM KERNEL
014122  000410                          BR      IOT35                   ;D-SPACE
014124  022626                  OK35B:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014126  005011                          CLR     @R1                     ;TURN OFF KT11-C
014130  012737  017324  000030          MOV     #EMTSRV,@#30            ;RESTORE EMT SERVICE POINTER
014136  012737  000340  000032          MOV     #340,@#32
014144  012737  000132  000130  IOT35:  MOV     #132,@#130
014152  005037  000132                  CLR     @#132
014156  012737  014224  000120          MOV     #OK35C,@#120            ;SETUP IOT SUCCESS RETURN
014164  012737  014214  000020          MOV     #NG35C,@#20             ;SETUP IOT FAILURE RETURN
014172  005037  000122                  CLR     @#122
014176  005037  000022                  CLR     @#22
014202  005037  177776                  CLR     @#PS                    ;SET MODE TO KERNEL
014206  005277  165222                  INC     @SR0                    ;TURN ON KT11-C
014212  000004                          IOT                             ;SHOULD PICK UP RETURN ADDRESS FROM
                                                                        ;KERNEL D - SPACE
014214  022626                  NG35C:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014216  005011                          CLR     @R1                     ;TURN OFF KT11-C
014220  104006                          HLT                             ;IOT VECTOR WASN'T TAKEN FROM KERNEL
014222  000402                          BR      INT35                   ;D-SPACE
014224  022626                  OK35C:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014226  005011                          CLR     @R1                     ;TURN OFF KT11-C
014230  012737  000022  000020  INT35:  MOV     #22,@#20                ;RESTORE VECTOR LOCATIONS
014236  012737  000122  000120          MOV     #122,@#120
014244  012737  014346  000164          MOV     #OK35D,@#164            ;SETUP TTY SUCCESS RETURN
014252  012737  014332  000064          MOV     #NG35D,@#64             ;SETUP TTY FAILURE RETURN
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014260  012737  140000  000166          MOV     #140000,@#166
014266  012737  140000  000066          MOV     #140000,@#66
014274  012737  040000  177776          MOV     #40000,@#PS             ;SET MODE TO SUPERVISOR
014302  005277  165126                  INC     @SR0                    ;TURN ON KT11-C
014306  012777  000100  165106          MOV     #100,@TCSR              ;SET TTY INTERRUPT ENABLE-SHOULD
014314  000240                          NOP                             ;INTERRUPT IMMEDIATELY
014316  000240                          NOP
014320  005011                          CLR     @R1                     ;TURN OFF KT11-C
014322  005077  165074                  CLR     @TCSR                   ;CLEAR TTY IE
014326  104006                          HLT                             ;TTY FAILED TO INTERRUPT
014330  000412                          BR      ODDAD
014332  022626                  NG35D:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014334  005011                          CLR     @R1                     ;TURN OFF KT11-C
014336  005077  165060                  CLR     @TCSR                   ;CLEAR TTY IE
014342  104006                          HLT                             ;TTY INTERRUPT WASN'T TAKEN FROM
014344  000404                          BR      ODDAD                   ;KERNEL D-SPACE
014346  022626                  OK35D:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014350  005011                          CLR     @R1                     ;TURN OFF KT11-C
014352  005077  165044                  CLR     @TCSR                   ;CLEAR TTY IE
014356  012737  000062  000060  ODDAD:  MOV     #62,@#60                ;RESTORE TTY VECTOR RETURN TO CAUSE
014364  005037  000062                  CLR     @#62                    ;A HALT ON A FALSE INTERRUPT
014370  012737  000162  000160          MOV     #162,@#160
014376  005037  000162                  CLR     @#162
014402  005037  177776                  CLR     @#PS                    ;RESTORE STATUS TO KERNEL
014406  012737  014460  000104          MOV     #OK35E,@#104            ;SETUP INTERNAL TRAP SUCCESS RETURN
014414  005037  000106                  CLR     @#106
014420  012737  014450  000004          MOV     #NG35E,@#4              ;SETUP INTERNAL TRAP FAILURE RETURN
014426  005037  000006                  CLR     @#6
014432  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
014440  005277  164770                  INC     @SR0                    ;TURN ON KT11-C
014444  005737  000001                  TST     @#1                     ;ODD ADDRESS REFERENCE - AN "INTERNAL
                                                                        ;TRAP" SHOULD OCCUR
014450  022626                  NG35E:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014452  005011                          CLR     @R1                     ;TURN OFF KT11-C
014454  104006                          HLT                             ;ODD ADDRESS TRAP DIDN'T TAKE
                                                                        ;VECTOR FROM KERNEL D-SPACE
014456  000402                          BR      END35
014460  022626                  OK35E:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
014462  005011                          CLR     @R1                     ;TURN OFF KT11-C
014464  012737  000006  000004  END35:  MOV     #6,@#4                  ;RESTORE TRAP CATCHER
014472  012737  000106  000104          MOV     #106,@#104
014500  005037  177776                  CLR     @#PS                    ;REINITIALIZE PROCESSOR STATUS


                                ;SHOW THAT THE ABORT LOGIC "LOCKS" SR0, SR1, AND SR2 AFTER A
                                ;NON-RESIDENT ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0,
                                ;WHEN THEY RESUME TRACKING, A NON-RESIDENT ERROR SHOULD STILL ABORT
                                ;TO 250 EVEN WHEN BIT 15 (SR0) IS ALREADY SET
014504  104400                  TEST36: SCOPE
014506  012737  000036  177570          MOV     #36,@#SR                ;DISPLAY TEST NUMBER
014514  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
014520  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014524  004767  001532                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
014530  026727  165276  000036          CMP     TESTCT,#36              ;IS THIS TEST BEING EXECUTED IN THE
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014536  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
014540  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

014542  004767  001526                  JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
014546  012777  077406  165136          MOV     #77406,@KDPDR7          ;MAP KERNEL 7 D-SPACE RW,4K,
014554  012777  007600  165170          MOV     #7600,@KDPAR7           ;EXTERNAL BANK
014562  012777  077406  165064          MOV     #77406,@KIPDR0          ;MAP KERNEL 0 I AND D-SPACES
014570  012777  077406  165076          MOV     #77406,@KDPDR0          ;RW,4K, BANK0
014576  012777  077400  165072          MOV     #77400,@KDPDR1          ;MAP KERNEL 1 D-SPACE NR
                                                                        ;4K, BANK 0
014604  012777  000007  164636          MOV     #7,@SR3                 ;ENABLE ALL D-SPACES
014612  012777  014646  165174          MOV     #INT36,@KTVEC           ;SETUP ABORT RETURN VECTOR
014620  005077  165172                  CLR     @KTSTA
014624  005277  164604                  INC     @SR0                    ;TURN ON KT11-C
014630  013737  037776  037776  ADR36:  MOV     @#37776,@#37776         ;REFERENCE KERNEL 1 D-SPACE
                                                                        ;SHOULD CAUSE NON-RESIDENT ABORT
014636  005077  164572                  CLR     @SR0                    ;TURN OFF KT11-C
014642  104006                          HLT                             ;REFERENCE TO KERNEL 1 D-SPACE
014644  000526                          BR      DONE36                  ;DIDN'T CAUSE NON-RESIDENT ABORT
014646  042777  000001  164560  INT36:  BIC     #1,@SR0                 ;TURN OFF KT11-C
014654  022777  100022  164552          CMP     #100022,@SR0            ;CHECK SR0
014662  001401                          BEQ     .+4
014664  104006                          HLT                             ;SR0 INCORRECT AFTER NON-RESIDENT ABORT
014666  012777  014722  165120          MOV     #INT36A,@KTVEC          ;SETUP NEW RETURN VECTOR
014674  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
014676  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
014702  052777  000001  164524          BIS     #1,@SR0                 ;TURN ON KT11-C
014710  012242                          MOV     (R2)+,-(R2)             ;REFERENCE KERNEL 1 D-SPACE
                                                                        ;SHOULD CAUSE A SECOND NON-RESIDENT ABORT
014712  005077  164516          ADR36A: CLR     @SR0                    ;TURN OFF KT11-C
014716  104006                          HLT                             ;2ND REFERENCE TO KERNEL 1 D-SPACE
014720  000500                          BR      DONE36                  ;DIDN'T ABORT - PREVIOUS ERROR FLAG
                                                                        ;NOT YET CLEARED BUT ABORT SHOULD
                                                                        ;STILL HAVE OCCURRED
014722  042777  000001  164504  INT36A: BIC     #1,@SR0                 ;TURN OFF KT11-C
014730  022777  100022  164476          CMP     #100022,@SR0            ;CHECK SR0
014736  001401                          BEQ     .+4
014740  104006                          HLT                             ;SR0 INCORRECT AFTER 2ND NON-RESIDENT ABORT
014742  022777  000027  164470          CMP     #27,@SR1                ;CHECK SR1 - SHOULD CONTAIN VALUE
014750  001401                          BEQ     .+4                     ;FROM 1ST ABORT
014752  104006                          HLT                             ;SR1 DOESN'T CONTAIN VALUE FROM 1ST ABORT
014754  022777  014630  164462          CMP     #ADR36,@SR2             ;CHECK SR2
014762  001401                          BEQ     .+4
014764  104006                          HLT                             ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
014766  021627  014712                  CMP     (R6),#ADR36A            ;CHECK ADDRESS PUSHED ON STACK
014772  001401                          BEQ     .+4
014774  104006                          HLT                             ;INCORRECT ADDRESS ON STACK - SHOULD BE
                                                                        ;PC AT TIME SECOND ABORT OCCURRED
014776  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015000  012777  015044  165006          MOV     #INT36B,@KTVEC          ;CHANGE RETURN ADDRESS
015006  005077  164422                  CLR     @SR0                    ;CLEAR NON-RESIDENT ERROR BIT-SHOULD
                                                                        ;"UNLOCK" ERROR TRACKING
015012  105777  164420                  TSTB    @SR0H                   ;CHECK TO SEE THAT ERROR BIT CLEARED
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```
015016  001401                          BEQ     .+4
015020  104006                          HLT                             ;SR0 HIGH BYTE INCORRECT
015022  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
015026  005277  164402                  INC     @SR0                    ;TURN ON KT11-C
015032  012242                  ADR36B: MOV     (R2)+,-(R2)             ;3RD ABORT REFERENCE, ERROR BIT WAS CLEARED
015034  005077  164374          ADR36C: CLR     @SR0                    ;TURN OFF KT11-C
015040  104006                          HLT                             ;3RD REFERENCE TO KERNEL 1 D-SPACE
015042  000427                          BR      DONE36                  ;DIDN'T CAUSE NON-RESIDENT ABORT
015044  042777  000001  164362  INT36B: BIC     #1,@SR0                 ;TURN OFF KT11-C
015052  022777  100022  164354          CMP     #100022,@SR0            ;CHECK SR0
015060  001401                          BEQ     .+4
015062  104006                          HLT                             ;SR0 INCORRECT AFTER NON-RESIDENT ABORT
015064  022777  000022  164346          CMP     #22,@SR1                ;CHECK SR1
015072  001401                          BEQ     .+4
015074  104006                          HLT                             ;SR1 INCORRECT - SHOULD HAVE RECORDED
                                                                        ;CHANGES MADE DURING 3RD ABORTED REFERENCE
015076  022777  015032  164340          CMP     #ADR36B,@SR2            ;CHECK SR2
015104  001401                          BEQ     .+4
015106  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
                                                                        ;LAST FETCH ADDRESS BEFORE ABORT
015110  022716  015034                  CMP     #ADR36C,(SP)            ;CHECK STACK
015114  001401                          BEQ     .+4
015116  104006                          HLT                             ;PC ON STACK INCORRECT
015120  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015122  005077  164306          DONE36: CLR     @SR0                    ;CLEAR ERROR BIT
015126  005077  164664                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
015132  016777  164660  164654          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT

                                ;SHOW THAT THE ABORT LOGIC "LOCKS" SR0, SR1, AND SR2 AFTER A
                                ;PAGE LENGTH ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0,
                                ;WHEN THEY RESUME TRACKING. A PAGE LENGTH ERROR SHOULD STILL ABORT
                                ;TO 250 EVEN WHEN BIT 14 (SR0) IS ALREADY SET
015140  104400                  TEST37: SCOPE
015142  012737  000037  177570          MOV     #37,@#SR                ;DISPLAY TEST NUMBER
015150  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
015154  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
015160  004767  001076                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
015164  026727  164642  000037          CMP     TESTCT,#37              ;IS THIS TEST BEING EXECUTED IN THE
015172  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
015174  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

015176  004767  001072                  JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
015202  012777  077406  164502          MOV     #77406,@KDPDR7          ;MAP KERNEL 7 D-SPACE RW,4K,
015210  012777  007600  164534          MOV     #7600,@KDPAR7           ;EXTERNAL BANK
015216  012777  077406  164430          MOV     #77406,@KIPDR0          ;MAP KERNEL 0 I AND D-SPACES
015224  012777  077406  164442          MOV     #77406,@KDPDR0          ;RW,4K, BANK0
015232  012777  017406  164436          MOV     #17406,@KDPDR1          ;MAP KERNEL 1 D-SPACE RW
                                                                        ;1K, BANK 0
015240  012777  000007  164202          MOV     #7,@SR3                 ;ENABLE ALL D-SPACES
015246  012777  015302  164540          MOV     #INT37,@KTVEC           ;SETUP ABORT RETURN VECTOR
015254  005077  164536                  CLR     @KTSTA
015260  005277  164150                  INC     @SR0                    ;TURN ON KT11-C
015264  013737  037776  037776  ADR37:  MOV     @#37776,@#37776         ;REFERENCE KERNEL 1 D-SPACE
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                                                                        ;SHOULD CAUSE PAGE LENGTH ABORT
015272  005077  164136                  CLR     @SR0                    ;TURN OFF KT11-C
015276  104006                          HLT                             ;REFERENCE TO KERNEL 1 D-SPACE
015300  000526                          BR      DONE37                  ;DIDN'T CAUSE PAGE LENGTH ABORT
015302  042777  000001  164124  INT37:  BIC     #1,@SR0                 ;TURN OFF KT11-C
015310  022777  040022  164116          CMP     #40022,@SR0             ;CHECK SR0
015316  001401                          BEQ     .+4
015320  104006                          HLT                             ;SR0 INCORRECT AFTER PAGE LENGTH ABORT
015322  012777  015356  164464          MOV     #INT37A,@KTVEC          ;SETUP NEW RETURN VECTOR
015330  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015332  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
015336  052777  000001  164070          BIS     #1,@SR0                 ;TURN ON KT11-C
015344  012242                          MOV     (R2)+,-(R2)             ;REFERENCE KERNEL 1 D-SPACE
                                                                        ;SHOULD CAUSE A SECOND PAGE LENGTH ABORT
015346  005077  164062          ADR37A: CLR     @SR0                    ;TURN OFF KT11-C
015352  104006                          HLT                             ;2ND REFERENCE TO KERNEL 1 D-SPACE
015354  000500                          BR      DONE37                  ;DIDN'T ABORT - PREVIOUS ERROR FLAG
                                                                        ;NOT YET CLEARED BUT ABORT SHOULD
                                                                        ;STILL HAVE OCCURRED
015356  042777  000001  164050  INT37A: BIC     #1,@SR0                 ;TURN OFF KT11-C
015364  022777  040022  164042          CMP     #40022,@SR0             ;CHECK SR0
015372  001401                          BEQ     .+4
015374  104006                          HLT                             ;SR0 INCORRECT AFTER 2ND PAGE LENGTH ABORT
015376  022777  000027  164034          CMP     #27,@SR1                ;CHECK SR1 - SHOULD CONTAIN VALUE
015404  001401                          BEQ     .+4                     ;FROM 1ST ABORT
015406  104006                          HLT                             ;SR1 DOESN'T CONTAIN VALUE FROM 1ST ABORT
015410  022777  015264  164026          CMP     #ADR37,@SR2             ;CHECK SR2
015416  001401                          BEQ     .+4
015420  104006                          HLT                             ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
015422  021627  015346                  CMP     (R6),#ADR37A            ;CHECK ADDRESS PUSHED ON STACK
015426  001401                          BEQ     .+4
015430  104006                          HLT                             ;INCORRECT ADDRESS ON STACK - SHOULD BE
                                                                        ;PC AT TIME SECOND ABORT OCCURRED
015432  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015434  012777  015500  164352          MOV     #INT37B,@KTVEC          ;CHANGE RETURN ADDRESS
015442  005077  163766                  CLR     @SR0                    ;CLEAR PAGE LENGTH ERROR BIT-SHOULD
                                                                        ;"UNLOCK" ERROR TRACKING
015446  105777  163764                  TSTB    @SR0H                   ;CHECK TO SEE THAT ERROR BIT CLEARED
015452  001401                          BEQ     .+4
015454  104006                          HLT                             ;SR0 HIGH BYTE INCORRECT
015456  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
015462  005277  163746                  INC     @SR0                    ;TURN ON KT11-C
015466  012242                  ADR37B: MOV     (R2)+,-(R2)             ;3RD ABORT REFERENCE, ERROR BIT WAS CLEARED
015470  005077  163740          ADR37C: CLR     @SR0                    ;TURN OFF KT11-C
015474  104006                          HLT                             ;3RD REFERENCE TO KERNEL 1 D-SPACE
015476  000427                          BR      DONE37                  ;DIDN'T CAUSE PAGE LENGTH ABORT
015500  042777  000001  163726  INT37B: BIC     #1,@SR0                 ;TURN OFF KT11-C
015506  022777  040022  163720          CMP     #40022,@SR0             ;CHECK SR0
015514  001401                          BEQ     .+4
015516  104006                          HLT                             ;SR0 INCORRECT AFTER PAGE LENGTH ABORT
015520  022777  000022  163712          CMP     #22,@SR1                ;CHECK SR1
015526  001401                          BEQ     .+4
015530  104006                          HLT                             ;SR1 INCORRECT - SHOULD HAVE RECORDED
                                                                        ;CHANGES MADE DURING 3RD ABORTED REFERENCE
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015532  022777  015466  163704          CMP     #ADR37B,@SR2            ;CHECK SR2
015540  001401                          BEQ     .+4
015542  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
                                                                        ;LAST FETCH ADDRESS BEFORE ABORT
015544  022716  015470                  CMP     #ADR37C,(SP)            ;CHECK STACK
015550  001401                          BEQ     .+4
015552  104006                          HLT                             ;PC ON STACK INCORRECT
015554  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015556  005077  163652          DONE37: CLR     @SR0                    ;CLEAR ERROR BIT
015562  005077  164230                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
015566  016777  164224  164220          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT

                                ;SHOW THAT THE ABORT LOGIC "LOCKS" SR0, SR1, AND SR2 AFTER A
                                ;ACCESS VIOLATION ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0,
                                ;WHEN THEY RESUME TRACKING, A ACCESS VIOLATION ERROR SHOULD STILL ABORT
                                ;TO 250 EVEN WHEN BIT 13 (SR0) IS ALREADY SET
015574  104400                  TEST40: SCOPE
015576  012737  000040  177570          MOV     #40,@#SR                ;DISPLAY TEST NUMBER
015604  005037  177776                  CLR     @#PS                    ;INITIALIZE PROCESSOR STATUS
015610  012706  001400                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
015614  004767  000442                  JSR     %7,SETUP                ;INITIALIZE SR0,SR3
015620  026727  164206  000040          CMP     TESTCT,#40              ;IS THIS TEST BEING EXECUTED IN THE
015626  001401                          BEQ     .+4                     ;CORRECT SEQUENCE?- BRANCH IF YES
015630  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE- TESTCT
                                                                        ;CONTAINS NUMBER OF PREVIOUS TEST PLUS ONE

015632  004767  000436                  JSR     %7,CLRALL               ;CLEAR ALL KT11-C REGISTERS
015636  012777  077406  164046          MOV     #77406,@KDPDR7          ;MAP KERNEL 7 D-SPACE RW,4K,
015644  012777  007600  164100          MOV     #7600,@KDPAR7           ;EXTERNAL BANK
015652  012777  077406  163774          MOV     #77406,@KIPDR0          ;MAP KERNEL 0 I AND D-SPACES
015660  012777  077406  164006          MOV     #77406,@KDPDR0          ;RW,4K, BANK0
015666  012777  077402  164002          MOV     #77402,@KDPDR1          ;MAP KERNEL 1 D-SPACE RRO
                                                                        ;4K, BANK 0
015674  012777  000007  163546          MOV     #7,@SR3                 ;ENABLE ALL D-SPACES
015702  012777  015736  164104          MOV     #INT40,@KTVEC           ;SETUP ABORT RETURN VECTOR
015710  005077  164102                  CLR     @KTSTA
015714  005277  163514                  INC     @SR0                    ;TURN ON KT11-C
015720  013737  037776  037776  ADR40:  MOV     @#37776,@#37776         ;REFERENCE KERNEL 1 D-SPACE
                                                                        ;SHOULD CAUSE ACCESS VIOLATION ABORT
015726  005077  163502                  CLR     @SR0                    ;TURN OFF KT11-C
015732  104006                          HLT                             ;REFERENCE TO KERNEL 1 D-SPACE
015734  000526                          BR      DONE40                  ;DIDN'T CAUSE ACCESS VIOLATION ABORT
015736  042777  000001  163470  INT40:  BIC     #1,@SR0                 ;TURN OFF KT11-C
015744  022777  020022  163462          CMP     #20022,@SR0             ;CHECK SR0
015752  001401                          BEQ     .+4
015754  104006                          HLT                             ;SR0 INCORRECT AFTER ACCESS VIOLATION ABORT
015756  012777  016012  164030          MOV     #INT40A,@KTVEC          ;SETUP NEW RETURN VECTOR
015764  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
015766  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
015772  052777  000001  163434          BIS     #1,@SR0                 ;TURN ON KT11-C
016000  012242                          MOV     (R2)+,-(R2)             ;REFERENCE KERNEL 1 D-SPACE
                                                                        ;SHOULD CAUSE A SECOND ACCESS VIOLATION ABORT
016002  005077  163426          ADR40A: CLR     @SR0                    ;TURN OFF KT11-C
016006  104006                          HLT                             ;2ND REFERENCE TO KERNEL 1 D-SPACE
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016010  000500                          BR      DONE40                  ;DIDN'T ABORT - PREVIOUS ERROR FLAG
                                                                        ;NOT YET CLEARED BUT ABORT SHOULD
                                                                        ;STILL HAVE OCCURRED
016012  042777  000001  163414  INT40A: BIC     #1,@SR0                 ;TURN OFF KT11-C
016020  022777  020022  163406          CMP     #20022,@SR0             ;CHECK SR0
016026  001401                          BEQ     .+4
016030  104006                          HLT                             ;SR0 INCORRECT AFTER 2ND ACCESS VIOLATION ABORT
016032  022777  013427  163400          CMP     #13427,@SR1             ;CHECK SR1 - SHOULD CONTAIN VALUE
016040  001401                          BEQ     .+4                     ;FROM 1ST ABORT
016042  104006                          HLT                             ;SR1 DOESN'T CONTAIN VALUE FROM 1ST ABORT
016044  022777  015720  163372          CMP     #ADR40,@SR2             ;CHECK SR2
016052  001401                          BEQ     .+4
016054  104006                          HLT                             ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
016056  021627  016002                  CMP     (R6),#ADR40A            ;CHECK ADDRESS PUSHED ON STACK
016062  001401                          BEQ     .+4
016064  104006                          HLT                             ;INCORRECT ADDRESS ON STACK - SHOULD BE
                                                                        ;PC AT TIME SECOND ABORT OCCURRED
016066  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
016070  012777  016134  163716          MOV     #INT40B,@KTVEC          ;CHANGE RETURN ADDRESS
016076  005077  163332                  CLR     @SR0                    ;CLEAR ACCESS VIOLATION ERROR BIT-SHOULD
                                                                        ;"UNLOCK" ERROR TRACKING
016102  105777  163330                  TSTB    @SR0H                   ;CHECK TO SEE THAT ERROR BIT CLEARED
016106  001401                          BEQ     .+4
016110  104006                          HLT                             ;SR0 HIGH BYTE INCORRECT
016112  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
016116  005277  163312                  INC     @SR0                    ;TURN ON KT11-C
016122  012242                  ADR40B: MOV     (R2)+,-(R2)             ;3RD ABORT REFERENCE, ERROR BIT WAS CLEARED
016124  005077  163304          ADR40C: CLR     @SR0                    ;TURN OFF KT11-C
016130  104006                          HLT                             ;3RD REFERENCE TO KERNEL 1 D-SPACE
016132  000427                          BR      DONE40                  ;DIDN'T CAUSE ACCESS VIOLATION ABORT
016134  042777  000001  163272  INT40B: BIC     #1,@SR0                 ;TURN OFF KT11-C
016142  022777  020022  163264          CMP     #20022,@SR0             ;CHECK SR0
016150  001401                          BEQ     .+4
016152  104006                          HLT                             ;SR0 INCORRECT AFTER ACCESS VIOLATION ABORT
016154  022777  171022  163256          CMP     #171022,@SR1            ;CHECK SR1
016162  001401                          BEQ     .+4
016164  104006                          HLT                             ;SR1 INCORRECT - SHOULD HAVE RECORDED
                                                                        ;CHANGES MADE DURING 3RD ABORTED REFERENCE
016166  022777  016122  163250          CMP     #ADR40B,@SR2            ;CHECK SR2
016174  001401                          BEQ     .+4
016176  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
                                                                        ;LAST FETCH ADDRESS BEFORE ABORT
016200  022716  016124                  CMP     #ADR40C,(SP)            ;CHECK STACK
016204  001401                          BEQ     .+4
016206  104006                          HLT                             ;PC ON STACK INCORRECT
016210  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
016212  005077  163216          DONE40: CLR     @SR0                    ;CLEAR ERROR BIT
016216  005077  163574                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
016222  016777  163570  163564          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT


016230  104400                          SCOPE
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016232  004767  001144                  JSR     %7,BELL

016236  013701  000042                  MOV     @#42,R1                         ;MONITOR HOOK
016242  001405                          BEQ     END
016244  000005                          RESET
016246  004711                  LOGIC:  JSR     %7,@R1
016250  000240                          NOP
016252  000240                          NOP
016254  000240                          NOP

016256  000167  163554          END:    JMP     START

016262  005077  163146          SETUP:  CLR     @SR0
016266  005077  163156                  CLR     @SR3
016272  000207                          RTS     %7

                                ;SUBROUTINE TO CLEAR ALL KT11-C REGISTERS (EXCEPT SR1,SR2)
016274  005077  163134          CLRALL: CLR     @SR0
016300  005077  163144                  CLR     @SR3
016304  005000                          CLR     R0
016306  012701  000140                  MOV     #96.,R1                         ;COUNT OF REGISTERS TO BE CLEARED
016312  005070  001454          CLRLP:  CLR     @ADRTAB(R0)                     ;CLEAR REGISTERS THRU ADDRESS TABLE
016316  005720                          TST     (R0)+                           ;MOVE POINTER
016320  077104                          SOB     R1,CLRLP                        ;LOOP TILL DONE
016322  000207                          RTS     %7

                                ;SUBROUTINE TO MAKE ALL PAGES RW, BANK 0, 4K, UP
016324  005077  163104          RWALL:  CLR     @SR0
016330  012701  001454                  MOV     #ADRTAB,R1                      ;LOAD R1 TO POINT TO ADDRESS OF 1ST PDR
016334  012700  000020          RWL1:   MOV     #20,R0                          ;SETUP R0 AS COUNTER
016340  005071  000040          RWL2:   CLR     @40(R1)                         ;CLEAR PAR
016344  012731  077406                  MOV     #77406,@(R1)+                   ;SET PDR RW,4K
016350  077005                          SOB     R0,RWL2
016352  062701  000040                  ADD     #40,R1                          ;AT END OF GROUP, MOVE POINTER
016356  020127  001752                  CMP     R1,#ADREND                      ;CHECK FOR DONE
016362  002764                          BLT     RWL1                            ;CONTINUE UNTIL DONE
016364  000207                          RTS     %7
                                ;SUBROUTINE TO MAKE ALL I SPACE PAGES RW, BANK 0,4K,UP
016366  005077  163042          RWISP:  CLR     @SR0
016372  012701  001454                  MOV     #ADRTAB,R1                      ;R1 POINTS TO ADDRESS TABLE
016376  012700  000010          RWI1:   MOV     #10,R0                          ;USE R0 AS COUNTER
016402  005071  000040          RWI2:   CLR     @40(R1)                         ;CLEAR PAR
016406  012731  077406                  MOV     #77406,@(R1)+                   ;MAP PDR RW, 4K
016412  077005                          SOB     R0,RWI2
016414  062701  000060                  ADD     #60,R1                          ;AT END OF GROUP, MOVE POINTER
016420  020127  001752                  CMP     R1,#ADREND                      ;CHECK FOR DONE
016424  002764                          BLT     RWI1                            ;CONTINUE UNTIL DONE
016426  000207                          RTS     %7

                                ;SUBROUTINE TO MAKE ALL D-SPACE PAGES RW, BANK 0, 4K, UP
016430  005077  163000          RWDSP:  CLR     @SR0
016434  012701  001474                  MOV     #ADRTAB+20,R1                   ;R1 POINTS TO ADDRESS TABLE
016440  012700  000010          RWD1:   MOV     #10,R0                          ;USE R0 AS A COUNTER
016444  005071  000040          RWD2:   CLR     @40(R1)                         ;CLEAR PAR
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016450  012731  077406                  MOV     #77406,@(R1)+                   ;SET PDR RW, 4K.
016454  077005                          SOB     R0,RWD2
016456  062701  000060                  ADD     #60,R1                          ;AT END OF GROUP, MOVE POINTER
016462  020127  001752                  CMP     R1,#ADREND                      ;CHECK FOR DONE
016466  002764                          BLT     RWD1                            ;BRANCH IF NOT DONE
016470  000207                          RTS     %7

                                ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST
                                ;LOAD THE STARTING ADDRESS OF THE TEST
                                ;YOU WISH TO RUN (THE ADDRESS OF THE TESTXX
                                ;TAG) AT THE 1ST HALT, SET SWITCH REGISTER
                                ;OPTIONS AT THE 2ND HALT.
                                ;NOTE THAT SW11 MUST BE DOWN AFTER THE 2ND HALT
016472  005037  177776          TESTX:  CLR     @#PS
016476  012706  001400                  MOV     #KSTACK,SP
016502  000000                          HALT                                    ;WAIT FOR STARTING ADDRESS
016504  016767  161060  000036          MOV     SR,RETRNX                       ;LOAD STARTING ADDRESS IN RETRNX
016512  062767  000002  000030          ADD     #2,RETRNX                       ;ADD 2 TO POINT TO INSTRUCTION AFTER
016520  000000                          HALT                                    ;SET SR OPTIONS
016522  005067  000154                  CLR     SCOPEF                          ;KEEP COUNT AT ZERO
016526  012767  016540  000150          MOV     #XLOOP,RETURN                   ;LOAD SCOPE LOOP RETURN POINTER
016534  000177  000010                  JMP     @RETRNX                         ;JUMP TO TEST
016540  005067  000136          XLOOP:  CLR     SCOPEF                          ;KEEP COUNT AT ZERO
016544  000177  000000                  JMP     @RETRNX                         ;JUMP TO TEST
016550  000000                  RETRNX: 0


                                ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST
016552  032737  040000  177570  SCOPEC: BIT     #40000,@#SR                     ;TEST SR FOR SCOPE
016560  001015                          BNE     SCOPEB                          ;YES,SCOPE
016562  032737  004000  177570          BIT     #4000,@#SR                      ;NO-TEST FOR ITERATION
016570  001025                          BNE     SCOPEG                          ;INHIBIT ITERATION
016572  026767  000104  000100          CMP     SCOPEF, ICOUNT                  ;COMPARE CURRENT COUNT TO MAX NUMBER
016600  100021                          BPL     SCOPEG                          ;EXIT-DONE
016602  005267  000074                  INC     SCOPEF                          ;INCREMENT COUNT
016606  012737  000340  177776          MOV     #340,@#PS                       ;PREVENT TRAPPING WHILE MOVING STACK
016614  022606                  SCOPEB: CMP     (6)+,%6                         ;REPOSITION STACK
016616  012637  177776                  MOV     (6)+,@#PS                       ;RESTORE PREVIOUS PROCESSOR STATUS
016622  032737  000400  177570          BIT     #400,@#SR                       ;LOAD MICROBREAK REGISTER?
016630  001403                          BEQ     .+10                            ;NO-BRANCH
016632  113777  177570  163160          MOVB    @#SR,@UBRK                      ;YES-LOAD FROM SR
016640  000177  000040                  JMP     @RETURN                         ;REPEAT TEST
016644  005067  000032          SCOPEG: CLR     SCOPEF                          ;CLEAR COUNT
016650  005267  163156                  INC     TESTCT                          ;STEP TEST COUNTER TO ALLOW CHECKING
                                                                                ;ORDER OF EXECUTION.
016654  011667  000024                  MOV     @%6,RETURN                      ;SAVE SCOPE RETURN POINTER
016660  032737  000400  177570          BIT     #400,@#SR                       ;LOAD MICROBREAK REGISTER?
016666  001403                          BEQ     .+10                            ;NO-BRANCH
016670  113777  177570  163122          MOVB    @#SR,@UBRK                      ;YES-LOAD FROM SR
016676  000002                          RTI                                     ;RETURN INLINE-NEXT TEST
016700  002000                  ICOUNT:2000                                     ;ITERATION COUNT
016702  000000                  SCOPEF: 0                                       ;COUNT LOCATION FOR ITERATION LOOP
016704  000000                  RETURN: 0                                       ;ADDRESS OF LAST TEST
```

```
                                ;ENTERED WITH SYSTEM TRAP CALL (HLT)
                                ;PRINT OUT THE ERROR PC+2 AND STATUS REGISTER
016706  012767  000340  161062  PRINT:  MOV     #340,PS                 ;SET PRIORITY TO 7
016714  036727  160650  020000          BIT     SR,#20000               ;TEST FOR INHIBIT PRINT OUT
016722  001401                          BEQ     .+4                     ;BRANCH TO PRINT
016724  000432                          BR      CK                      ;INHIBIT, CHECK FOR HALT
016726  012667  000072                  MOV     (6)+,SAVPC              ;PC OF FAILING ROUTINE
016732  012667  000070                  MOV     (6)+,SAVPSR             ;PSR OF ERROR CONDITION
016736  024646                          CMP     -(6),-(6)               ;RESTORE STACK
016740  012767  000200  161030          MOV     #200,PS
016746  004767  000470                  JSR     %7,CRLF                 ;OUTPUT CARRIAGE RETURN AND LINE FEED
016752  016767  000046  000336          MOV     SAVPC,PTEMP1            ;LOAD WITH FAILING PC+2
016760  004767  000076                  JSR     %7,PROCT                ;PRINT FAILING PC+2
016764  105777  162432                  TSTB    @TCSR                   ;WAIT FOR TTY READY
016770  100375                          BPL     .-4
016772  012777  000240  162424          MOV     #240,@TDBR              ;OUTPUT A SPACE
017000  016767  000022  000310          MOV     SAVPSR,PTEMP1           ;LOAD PROCESSOR STATUS
017006  004767  000050                  JSR     %7,PROCT                ;PRINT PROCESSOR STATUS
017012  005767  160552          CK:     TST     SR                      ;CHECK SR FOR HALT SWITCH
017016  100001                          BPL     .+4                     ;BRANCH IF NOT SET
017020  000000                          HALT                            ;HALT ON ERROR UP
017022  000002                          RTI                             ;RETURN TO MAIN LINE
017024  000000                  SAVPC:  0
017026  000000                  SAVPSR: 0

                                ;SUBROUTINE TO PRINT OUT OCTAL NUMBER
                                ;PRSHRT DELETES LEADING ZEROS
                                ;PROCT PRINTS OUT 6 OCTAL DIGITS
017030  012767  000001  000254  PRSHRT: MOV     #1,PRSFLG               ;SET FLAG TO INDICATE SHORT PRINTOUT
017036  005767  000254                  TST     PTEMP1                  ;CHECK FOR ZERO
017042  001011                          BNE     PROCT+4                 ;BRANCH IF NOT ZERO
017044  105777  162352                  TSTB    @TCSR                   ;WAIT FOR TTY READY
017050  100375                          BPL     .-4
017052  012777  000260  162344          MOV     #260,@TDBR              ;OUTPUT A SINGLE ZERO
017060  000207                          RTS     %7                      ;RETURN
017062  005067  000224          PROCT:  CLR     PRSFLG                  ;CLEAR FLAG TO INDICATE FULL PRINTOUT
017066  005067  000230                  CLR     PTEMP3                  ;CLEAR R4 FOR COUNTING CHARACTERS OUTPUT
017072  005067  000216                  CLR     PRFLG                   ;INITIALIZE CARRY FLAG FOR ROTATES
017076  012767  000260  000214          MOV     #260,PTEMP2             ;SETUP R3
017104  005767  000206                  TST     PTEMP1                  ;CHECK BIT 15 OF NUMBER
017110  100002                          BPL     .+6                     ;BRANCH IF ZERO
017112  005267  000202                  INC     PTEMP2                  ;INCREMENT R3 IF ONE
017116  006167  000174                  ROL     PTEMP1                  ;ROTATE LEFT MOST OCTAL TO RIGHT END
017122  006167  000170                  ROL     PTEMP1
017126  005567  000162                  ADC     PRFLG                   ;STORE CARRY
017132  005767  000154          P.CK:   TST     PRSFLG                  ;CHECK FOR SHORT PRINTOUT
017136  001404                          BEQ     P.WAIT                  ;BRANCH IF NOT SET
017140  026727  000154  000260          CMP     PTEMP2,#260             ;CHECK FOR ZERO IF SET
017146  001421                          BEQ     P.CONT                  ;IF SET, GO TO NEXT CHARACTER
017150  105777  162246          P.WAIT: TSTB    @TCSR                   ;WAIT FOR TTY READY
017154  100375                          BPL     P.WAIT
017156  016777  000136  162240          MOV     PTEMP2,@TDBR            ;OUTPUT NEXT CHARACTER
017164  105777  162232                  TSTB    @TCSR                   ;READY FOR NEXT CHARACTER?
```



```
017170  100375                          BPL     .-4
017172  012777  000377  162224          MOV     #377,@TDBR              ;NO - WAIT
                                                                        ;ISSUE A 'DELETE' CODE
017200  105777  162216                  TSTB    @TCSR                   ;TO BUY TIME!
017204  100375                          BPL     .-4                     ;ALL DONE?
017206  005067  000100                  CLR     PRSFLG                  ;NO - HANG IN THERE!
017212  005267  000104          P.CONT: INC     PTEMP3                  ;PRINT REST OF NUMBER AFTER A NON-ZERO DIGIT
017216  026727  000100  000006          CMP     PTEMP3,#6               ;COUNT
017224  001001                          BNE     P.CNT1                  ;CHECK FOR DONE
017226  000207                          RTS     %7                      ;BRANCH IF NOT DONE
017230  000241                  P.CNT1: CLC
017232  005767  000056                  TST     PRFLG                   ;CLEAR CARRY
017236  001403                          BEQ     .+10                    ;CHECK FOR PREVIOUS CARRY
017240  005067  000050                  CLR     PRFLG                   ;BRANCH IF PREVIOUSLY ZERO
017244  000261                          SEC                             ;INITIALIZE FLAG
017246  006167  000044                  ROL     PTEMP1                  ;SET CARRY
                                                                        ;ROTATE NEXT CHARACTER INTO RIGHT END
017252  006167  000040                  ROL     PTEMP1                  ;OF REGISTER
017256  006167  000034                  ROL     PTEMP1
017262  005567  000026                  ADC     PRFLG                   ;STORE CARRY
017266  016767  000024  000024          MOV     PTEMP1,PTEMP2           ;LOAD DATA INTO R3
017274  042767  177770  000016          BIC     #177770,PTEMP2          ;CLEAR ALL BUT LOWEST OCTAL DIGIT
017302  052767  000260  000010          BIS     #260,PTEMP2             ;SET TO ASCII EQUIVALENT
017310  000710                          BR      P.CK                    ;LOOP
017312  000000                  PRSFLG: 0
017314  000000                  PRFLG:  0
017316  000000                  PTEMP1: 0
017320  000000                  PTEMP2: 0                               ;CONTAINS VALUE TO BE OUTPUT
017322  000000                  PTEMP3: 0                               ;SCRATCH
                                                                        ;USED TO COUNT CHARACTERS OUTPUT

                                ;EMT HANDLER
                                ;FIRST 3 CALLS LEFT OPEN IN TABLE FOR EASY PATCHES
017324  011667  000032          EMTSRV: MOV     @SP,EPC                 ;GET CALL
017330  162767  000002  000024          SUB     #2,EPC
017336  017767  000020  000016          MOV     @EPC,EPC
017344  105067  000013                  CLRB    EPC+1                   ;SAVE OFFSET ONLY
017350  062767  017364  000004          ADD     #EMTAB,EPC              ;POINT TO TABLE OF ADDRESSES
017356  017707  000000                  MOV     @EPC,PC                 ;JUMP TO DESIRED ROUTINE
017362  000000                  EPC:    0
        104000                          PATCH1=EMT+0
        104002                          PATCH2=EMT+2
        104004                          PATCH3=EMT+4
017364  104000                  EMTAB:  PATCH1
017366  104002                          PATCH2
017370  104004                          PATCH3
017372  016706                          PRINT
017374  017376                          KTOFFS

                                ;ROUTINE TO TURN OFF KT11-C VIA RESET
017376  000005                  KTOFFS: RESET
017400  000006                          RTT

                                ;BELL ON PASS COMPLETE
017402  105777  162014          BELL:   TSTB    @TCSR
```

```
017406  100375                          BPL     .-4
017410  012777  000207  162006          MOV     #207,@TDBR
017416  105777  162000                  TSTB    @TCSR                   ;READY FOR NEXT CHARACTER?
017422  100375                          BPL     .-4                     ;NO - WAIT
017424  012777  000377  161772          MOV     #377,@TDBR              ;ISSUE A 'DELETE' CODE
                                                                        ;TO BUY TIME!
017432  105777  161764                  TSTB    @TCSR                   ;ALL DONE?
017436  100375                          BPL     .-4                     ;NO - HANG IN THERE!
017440  000207                          RTS     %7

                                ;SUBROUTINE TO OUTPUT CARRIAGE RETURN AND LINEFEED
017442  105777  161754          CRLF:   TSTB    @TCSR                   ;WAIT FOR TTY READY
017446  100375                          BPL     .-4
017450  012777  000215  161746          MOV     #215,@TDBR              ;OUTPUT CARRIAGE RETURN
017456  105777  161740                  TSTB    @TCSR                   ;WAIT FOR TTY READY
017462  100375                          BPL     .-4
017464  012777  000212  161732          MOV     #212,@TDBR              ;OUTPUT LINEFEED
017472  000207                          RTS     %7                      ;RETURN
        017712                          .=17712

017712  125252                  DESTAD: 125252
        000001                          .END
```

```
CRLF     017442          2832    2940#
DATA16   004754          1006    1013    1015    1025#   1044    1064    1083    1853    1873    1894
DESTAD   017712          1304*   1402*   1420    2949#
DONE25   007700          1499    1533#
DONE33   013054          2206    2212#
DONE36   015122          2462    2475    2504    2521#
DONE37   015556          2554    2567    2596    2613#
DONE40   016212          2646    2659    2688    2705#
DONE5    002702           618     623#
DSPACE = 000001          2015#   2029    2054    2100#   2114    2139
DST21A   006202          1212    1215*   1232*   1237    1251*   1253#
DST21B   006204          1213    1216*   1241    1250*   1254#   1256
DST21C   006206          1214    1217*   1235*   1245    1249*   1255#
EMTAB    017364          2911    2917#
EMTSRV   017324           277    2361    2367    2907#
EMT35    014010          2344    2347#
END      016256          2716    2723#
ENDPAG   011774          1998    2001#
END20    005662          1183    1186#
END22E   006732          1377    1381#
END35    014464          2425    2428#
EPC      017362          2907*   2908*   2909*   2910*   2911*   2912    2913#
ERR22A   006362          1289    1296#
ERR22B   006446          1307    1314#
ERR22C   006534          1327    1334#
ERR22D   006630          1348    1355#
ERR22E   006724          1371    1378#
EXPMSK   002026           438#    495
E26A     010204          1586    1593#
E26B     010242          1608    1615#
E26C     010300          1630    1637#
E26D     010344          1653    1656#
E26E     010410          1672    1679#
E26F     010454          1695    1702#
E26G     010520          1720    1727#
E26H     010564          1741    1744#
E26I     010630          1760    1767#
E26J     010674          1785    1792#
E26K     010740          1808    1815#
E26L     011004          1829    1832#
HLT    = 104006           267#    465     473     476     488     499     516     529     553     567     587     607     634
                          647     653     667     679     685     699     721     747     768     791     801     812     819
                          824     832     843     853     860     872     885     908     914     926     933     937     941
                          948     953     958     971    1000    1036    1056    1116    1202    1223    1229    1239    1243
                         1247    1274    1294    1297    1312    1315    1332    1335    1353    1356    1376    1379    1393
                         1414    1440    1458    1484    1504    1508    1512    1517    1520    1524    1527    1532    1545
                         1589    1611    1633    1650    1675    1698    1723    1738    1763    1788    1811    1826    1846
                         1930    2024    2043    2061    2073    2089    2109    2128    2147    2159    2175    2195    2209
                         2227    2274    2277    2280    2283    2286    2289    2315    2342    2363    2381    2398    2403
                         2423    2444    2461    2466    2474    2481    2484    2487    2490    2498    2503    2508    2511
                         2515    2519    2536    2553    2558    2566    2573    2576    2579    2582    2590    2595    2600
                         2603    2607    2611    2628    2645    2650    2658    2665    2668    2671    2674    2682    2687
                         2692    2695    2699    2703
ICOUNT   016700           452*    477*    519*    623*    637*    702*    794*    929*   1133*   1205*   1396*   1443*   1549*
```



```
                         1849*   1946*   2027*   2112*   2799    2817#
INT25    007542          1491    1500#
INT35    014230          2382    2385#
INT36    014646          2455    2463#
INT36A   014722          2467    2478#
INT36B   015044          2493    2505#
INT37    015302          2547    2555#
INT37A   015356          2559    2570#
INT37B   015500          2585    2597#
INT40    015736          2639    2647#
INT40A   016012          2651    2662#
INT40B   016134          2677    2689#
IOT35    014144          2364    2369#
KDPAR0   001734           405#   1851*   2243*   2319*
KDPAR1   001736           406#
KDPAR2   001740           407#
KDPAR3   001742           408#
KDPAR4   001744           409#
KDPAR5   001746           410#
KDPAR6   001750           411#
KDPAR7   001752           412#   1566*   1854*   2114*   2251*   2320*   2449*   2541*   2633*
KDPDR0   001674           389#   1551*   1852*   2240*   2451*   2543*   2635*
KDPDR1   001676           390#   2452*   2544*   2636*
KDPDR2   001700           391#
KDPDR3   001702           392#
KDPDR4   001704           393#
KDPDR5   001706           394#
KDPDR6   001710           395#
KDPDR7   001712           396#   1560*   1855*   2250*   2448*   2540*   2632*
KIPAR0   001714           397#   1004*   1040*   1207*   1398*   1446*
KIPAR1   001716           398#   1285*   1303*   1321*   1341*   1363*
KIPAR2   001720           399#
KIPAR3   001722           400#
KIPAR4   001724           401#
KIPAR5   001726           402#
KIPAR6   001730           403#
KIPAR7   001732           404#   1045*   1209*   1281*   1400*   1448*   1489*   1563*   2029*   2200*
KIPDR0   001654           381#    422     977*   1005*   1042*   1208*   1278*   1399*   1447*   1490*   1518    1550*   2237*
                         2450*   2542*   2634*
KIPDR1   001656           382#   1279*   1522    1556*   2199*
KIPDR2   001660           383#
KIPDR3   001662           384#
KIPDR4   001664           385#
KIPDR5   001666           386#
KIPDR6   001670           387#
KIPDR7   001672           388#   1046*   1210*   1280*   1401*   1449*   1488*   1557*
KNR      001420           299#    816     837
KRET34   013352          2246   2259#   2272
KSTACK   001400           293#    446     461     484     512     549     583     630     663     695     743     787     904
                          922     967     996    1032    1112    1198    1270    1389    1436    1480    1541    1842    1926
                         2020    2105    2191    2223    2300    2311    2329    2440    2532    2624    2781
KTOFF  = 104010           268#   1583    1587    1605    1609    1627    1631    1648    1654    1669    1673    1692    1696
                         1717    1721    1736    1742    1757    1761    1782    1786    1805    1809    1824    1830
KTOFFS   017376          2921   2924#
```

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KTRP34   013346          2257#
KTSTA    002016           434#  1492*  1533*  1534   1569*  1834   1835*  2202*  2213   2456*  2522*  2523   2548*
                         2614*  2615   2640*  2706*  2707
KTVEC    002014           433#  1491*  1534*  1575*  1597*  1619*  1644*  1661*  1684*  1709*  1732*  1749*  1774*
                         1797*  1820*  1834*  2201*  2213*  2455*  2467*  2493*  2523*  2547*  2559*  2585*  2615*
                         2639*  2651*  2677*  2707*
K123     001414           297#  1126   1940
K134     001416           298#  1127   1941
K200     001412           296#   806    827    847
LOGIC    016246          2718#
LOOP10   003252           707#   711
LOOP11   003430           754#   758
LOOP12   003600           796#   895
LOOP2    002260           492#   502
LOOP3    002400           523#   538
LOOP3A   002406           525#   537
LOOP3B   002412           526#   534
LOOP4    002510           558#   576
LOOP4A   002516           561#   574
LOOP4B   002522           562#   571
LOOP6    002770           641#   657
LOOP6A   002776           643#   656
LOOP7    003114           673#   689
LOOP7A   003122           675#   688
LOP10A   003260           709#   710
LOP10B   003306           717#   727
LOP10C   003314           719#   726
LOP11A   003436           756#   757
LOP11B   003464           764#   772
LOP11C   003472           766#   771
LOP31A   012162          2039#  2050
LOP31B   012166          2041#  2046
LOP31C   012220          2052#  2096
LOP31D   012232          2056#  2094
LOP31E   012262          2067#  2084
LOP31F   012266          2068#  2080
LOP32A   012524          2124#  2135
LOP32B   012530          2126#  2131
LOP32C   012562          2137#  2182
LOP32D   012600          2142#  2180
LOP32E   012630          2153#  2170
LOP32F   012634          2154#  2166
LOP5A    002626           594#   621
LOP5B    002644           601#   613
MSKB     002022           436#
NG35A    013774          2334   2340#
NG35B    014100          2352   2359#
NG35C    014214          2372   2379#
NG35D    014332          2388   2400#
NG35E    014450          2415   2421#
NOP    = 000240           253#
ODDAD    014356          2399   2404   2408#
OK35A    014004          2332   2345#
OK35B    014124          2351   2365#
```



```
OK35C    014224          2371   2383#
OK35D    014346          2387   2405#
OK35E    014460          2413   2426#
PAGEL    011652          1972#  2000
PAGES    002006           430#  1151*  1159   1182*  1965*  1974   1997*
PAG20    005540          1156#  1185
PARTAB   001762           418#   521    639    705    715
PATCH1 = 104000          2914#  2917
PATCH2 = 104002          2915#  2918
PATCH3 = 104004          2916#  2919
PC     =%000007           263#  2912*
PDREND   001760           417#   575
PDRMSK   002030           439#   563
PDRTAB   001754           415#   557    671    752    762
PRFLG    017314          2859*  2866*  2886   2888*  2894*  2900#
PRINT    016706          2824#  2920
PROCT    017062          2834   2839   2852   2857#
PRSFLG   017312          2850*  2857*  2867   2880*  2899#
PRSHRT   017030          2850#
PS     = 177776           265#   266    445*   447*   449*   451*   460*   483*   511*   548*   582*   629*   662*
                          694*   742*   786*   864*   869*   877*   882*   894*   903*   921*   966*   995*  1031*
                         1068*  1076*  1087*  1094*  1111*  1134*  1136*  1138*  1149*  1188*  1197*  1269*  1286*
                         1292   1299*  1388*  1435*  1479*  1540*  1576*  1598*  1620*  1645*  1662*  1685*  1710*
                         1733*  1750*  1775*  1798*  1821*  1841*  1866*  1877*  1887*  1898*  1908*  1925*  1947*
                         1949*  1951*  1962*  2003*  2019*  2033*  2035*  2037*  2055*  2104*  2118*  2120*  2122*
                         2141*  2190*  2222*  2232*  2234*  2236*  2310*  2324*  2326*  2328*  2336*  2355*  2375*
                         2391*  2412*  2417*  2430*  2439*  2531*  2623*  2780*  2802*  2804*  2824*  2831*
PTEMP1   017316          2833*  2838*  2851   2861   2864*  2865*  2890*  2892*  2893*  2895   2901#
PTEMP2   017320          2860*  2863*  2869   2873   2895*  2896*  2897*  2902#
PTEMP3   017322          2858*  2881*  2882   2903#
P.CK     017132          2867#  2898
P.CNT1   017230          2883   2885#
P.CONT   017212          2870   2881#
P.WAIT   017150          2868   2871#  2872
RETRNX   016550          2783*  2784*  2788   2790   2791#
RETURN   016704           453*  2787*  2808   2812*  2819#
RET33    013042          2201   2207#
RT26A    010200          1575   1587#
RT26B    010236          1597   1609#
RT26C    010274          1619   1631#
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RT26K    010734          1797   1809#
RT26L    011002          1820   1830#
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RWD2     016444          2766#  2768
RWISP    016366          1120   2751#
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RWI2      016402          2754#  2756
RWL1      016334          2742#  2748
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                           689*   706*   711*   716*   727*   753*   758*   763*   772*   847*   850    1145*  1146*
                          1152*  1157*  1162*  1176*  1181*  1184   1958*  1959*  1966*  1973*  1977*  1991*  1996*
                          1999   2051*  2052   2055   2095   2136*  2137   2141   2181   2732*  2734*  2735   2742*
                          2745*  2753*  2756*  2765*  2768*
R1        =%000001         255#   492*   493    494*   496    523*   526*   527    535*   536    558*   564*   565
                           572*   573    592*   598*   601    616    619*   641*   643*   644*   645    649*   650*
                           651    655    673*   675*   676*   677    681*   682*   683    687    707*   709*   717*
                           719    725    754*   756*   764*   766    770    806*   809    911*   912    1006*  1008
                          1013*  1017   1044*  1050   1064*  1071   1083*  1090   1154*  1165   1177*  1211*  1236*
                          1500*  1502   1853*  1860   1873*  1881   1894*  1902   1969*  1980   1992*  2052*  2059
                          2068   2086*  2087   2092   2137*  2139*  2145   2154   2172*  2173   2178   2248*  2259*
                          2265*  2271*  2323*  2341*  2346*  2360*  2366*  2380*  2384*  2396*  2401*  2406*  2422*
                          2427*  2715*  2718   2733*  2736*  2741*  2743*  2744*  2746*  2747   2752*  2754*  2755*
                          2757*  2758   2764*  2766*  2767*  2769*  2770
R2        =%000002         256#   493*   495*   497    524*   537*   559*   574*   594*   601    603    611*   612
                           642*   656*   674*   688*   708*   710*   718*   726*   755*   757*   765*   771*   807*
                           808*   809*  1015*  1017   1047*  1049*  1067*  1070*  1086*  1089*  1155*  1170   1178*
                          1857*  1859*  1878*  1880*  1899*  1901*  1971*  1985   1993*  2054*  2057*  2093*  2140*
                          2143*  2179*  2469*  2471*  2499*  2501*  2561*  2563*  2591*  2593*  2653*  2655*  2683*
                          2685*
R3        =%000003         257#   521*   523    557*   558    575    597*   613*   639*   641    671*   673    705*
                           707    715*   717    752*   754    762*   764    796*   797    798*   838*   839*   1126*
                          1165   1940*  1980   2066*  2068   2071   2079   2081*  2083   2152*  2154   2157   2165
                          2167*  2169
R4        =%000004         258#   525*   526    527    532*   533    704*   709    719    731*   751*   756    766
                           776*   827*   829    1127*  1170   1493*  1496   1941*  1985   2038*  2041   2047*  2048
                          2067*  2080*  2123*  2126   2132*  2133   2153*  2166*
R5        =%000005         259#   562*   563*   565    828*   829*   848*   849*   850*   1153*  1163*  1175*  1967*
                          1978*  1990*  2039*  2046*  2124*  2131*
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                          1832   2034*  2036*  2119*  2121*  2468   2488   2492   2520   2560   2580   2584   2612
                          2652   2672   2676   2704
R7        =%000007         261#
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SAVEB     002012          432#   1123*  1191   1936*  2006
SAVPC     017024         2828*  2833   2844#
SAVPSR    017026         2829*  2838   2845#
SCOPE   = 104400           252#   458    481    509    546    580    627    660    692    740    784    901    919
                           964    993   1029   1109   1195   1267   1386   1433   1477   1538   1839   1923   2017
                          2102   2188   2220   2308   2437   2529   2621   2711
SCOPEB    016614          2796   2803#
SCOPEC    016552           280   2347   2795#
SCOPEF    016702         2786*  2789*  2799   2801*  2809*  2818#
SCOPEG    016644         2798   2800   2809#
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SDPAR1    001636          373#
SDPAR2    001640          374#
SDPAR3    001642          375#
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SDPAR5    001646          377#
SDPAR6    001650          378#
SDPAR7    001652          379#   1567*  1874*  2115*  2253*  2321*
SDPDR0    001574          356#   1872*  2241*
SDPDR1    001576          357#
SDPDR2    001600          358#
SDPDR3    001602          359#
SDPDR4    001604          360#
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SDPDR6    001610          362#
SDPDR7    001612          363#   1561*  1875*  2252*
SETMSK    002024          437#   494
SETUP     016262          462    485    513    550    584    631    664    696    744    788    905    923    968
                           997   1033   1113   1199   1271   1390   1437   1481   1542   1843   1927   2021   2106
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SIPAR2    001620          366#
SIPAR3    001622          367#
SIPAR4    001624          368#
SIPAR5    001626          369#
SIPAR6    001630          370#
SIPAR7    001632          371#   1065*  1564*  2030*
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SIPDR1    001556          349#   1555*
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SIPDR6    001570          354#
SIPDR7    001572          355#   1066*  1558*
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                          1926*  1948*  1950*  2020*  2105*  2191*  2223*  2231*  2233*  2235*  2300*  2311*  2325*
                          2327*  2329*  2340   2345   2359   2365   2379   2383   2400   2405   2421   2426   2440*
                          2517   2532*  2609   2624*  2701   2781*  2907
SR      = 177570          264#   459*   482*   510*   547*   581*   628*   661*   693*   741*   785*   902*   920*
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                          2103*  2189*  2221*  2309*  2438*  2530*  2622*  2783   2795   2797   2805   2807   2813
                          2815   2825   2840
SRET34    013400         2260   2265#  2278
SR0       001434          305#   471    496*   497    503*   796    805*   815*   816*   826*   835*   838    846*
                           863*   866    876*   879    889*   979*   983    989*  1007*  1016*  1047   1048*  1054
                          1067   1069*  1086   1088*  1153   1164*  1189*  1211   1218*  1287*  1291*  1296*  1305*
                          1309*  1314*  1324*  1329*  1334*  1344*  1350*  1355*  1367*  1373*  1378*  1404*  1411
                          1417*  1450*  1456   1463*  1495*  1498*  1500   1501*  1529*  1530   1577*  1599*  1621*
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                          1899   1900*  1967   1979*  2004*  2056*  2058*  2098*  2142*  2144*  2184*  2203*  2207
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                          2552*  2555*  2556   2562*  2565*  2570*  2571   2586*  2592*  2594*  2597*  2598   2613*
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SR1H	001442	308#												
SR2	001444	309#	911	1510	1514*	1515	2485	2513	2577	2605	2669	2697		
SR2H	001446	310#												
SR3	001450	311#	930*	931	934*	935	938*	939	942*	946	949*	950*	951	954*
		956	1641*	1658*	1681*	1706*	1729*	1746*	1771*	1794*	1817*	1833*	1856*	1865*
		1876*	1886*	1897*	1907*	1939*	2032*	2097*	2117*	2183*	2249*	2331*	2454*	2546*
		2638*	2726*	2731*										
SR3H	001452	312#	955*											
SSTACK	001000	291#	448	1135	1948	2034	2119	2325						
STAEND	002002	427#	1186	2001	2095	2181								
STAPNT	002004	429#	1139*	1145	1147*	1149	1150*	1186	1952*	1958	1960*	1962	1963*	2001
START	002036	285	445#	2723										
STATAB	001770	422#	1139	1952	2051	2136								
STATEL	011572	1958#	2002											
STATUS =	177776	266#												
STAT20	005460	1145#	1187											
STRP34	013374	2263#												
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		2878	2928	2931	2935	2940	2943							
TDBR	001424	301#	2837*	2855*	2873*	2876*	2930*	2933*	2942*	2945*				
TEMPX	001426	302#	836*	840	865*	868	878*	881						
TEMP1	001430	303#	795*	890	893*									
TEMP2	001432	304#												
TESTCT	002032	440#	454*	463	486	514	551	585	632	665	697	745	789	906
		924	969	998	1034	1114	1200	1272	1391	1438	1482	1543	1844	1928
		2022	2107	2193	2225	2313	2442	2534	2626	2810*				
TESTN =	000041	443#	459#	482#	510#	547#	581#	628#	661#	693#	741#	785#	902#	920#
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TEST10	003166	692#												
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TEST12	003530	774	784#											
TEST13	004234	891	901#											
TEST14	004306	919#												
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TEST16	004624	993#												
TEST17	004756	1024	1029#											
TEST2	002216	481#												
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TEST23	006736	1386#												
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TEST33	012736	2188#						
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TEST37	015140	2529#						
TEST4	002442	546#						
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TEST5	002560	580#						
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UDPAR2	001540	341#						
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                        698     713     720     746     760     767     790     800     811     818     823     831     842
                        852     859     871     884     907     913     925     932     936     940     944     947     952
                        957     970     984     999     1009    1018    1035    1051    1055    1072    1073    1091    1092
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NOTRP   1536#   1573    1595    1617    1659    1682    1707    1747    1772    1795
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        1030    1110    1196    1268    1387    1434    1478    1539    1840    1924    2018    2103    2189    2221    2309
        2438    2530    2622
TRP     1536#   1642    1730    1818
WCK     2014#   2015    2100
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        2167  2179  2746  2757  2769  2784  2911
ASL      501   532   570
BCC      502   571  2094  2180
BEQ      464   472   475   487   498   515   528   552   566   586   602   606   618   633   646
         652   666   678   684   698   720   746   767   790   800   811   818   823   831   842
         852   859   871   884   907   913   925   932   936   940   947   952   957   970   984
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        1507  1511  1516  1519  1523  1526  1531  1544  1845  1861  1882  1903  1929  1981  1986
        1998  2023  2042  2069  2072  2088  2108  2127  2155  2158  2174  2194  2208  2226  2273
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BGT     2049  2134
BIC      494   495   563   869   882  1163  1463  1978  2463  2478  2505  2555  2570  2597  2647
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BIS     2470  2562  2654  2897
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BLT     2084  2096  2170  2182  2748  2759  2771
BMI      891
BNE      534   729   774  1009  1161  1180  1289  1307  1327  1348  1371  1976  1995  2060  2146
        2796  2798  2852  2883
BPL      469   713   760   944  2800  2836  2841  2854  2862  2872  2875  2879  2929  2932  2936
        2941  2944
BR       455   621   732   777   854  1024  1073  1092  1185  1252  1295  1313  1333  1354  1377
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        2462  2475  2504  2554  2567  2596  2646  2659  2688  2827  2898
CLC     2885
CLR      445   451   460   483   503   511   535   548   572   582   611   619   629   662   694
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         921   966   989   995  1031  1049  1070  1076  1089  1094  1111  1138  1154  1175  1181
        1188  1189  1197  1215  1233  1236  1269  1290  1291  1296  1299  1303  1308  1309  1314
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        2144  2183  2184  2190  2202  2212  2222  2236  2247  2259  2265  2271  2292  2293  2294
        2295  2296  2297  2298  2299  2310  2328  2341  2346  2348  2350  2360  2366  2370  2373
        2374  2375  2380  2384  2396  2397  2401  2402  2406  2407  2409  2411  2412  2414  2416
        2422  2427  2430  2439  2456  2460  2473  2494  2502  2521  2522  2531  2548  2552  2565
        2586  2594  2613  2614  2623  2640  2644  2657  2678  2686  2705  2706  2725  2726  2730
        2731  2732  2734  2740  2743  2751  2754  2763  2766  2780  2786  2789  2809  2857  2858
        2859  2880  2888
CLRB     644   650   676   682   950   955  1235  2910
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