KT11-C

BASIC LOGIC TEST #1

MD-11-DCKTA-B

EP-DCKTA-B-DL-A

OCT 1976

FICHE 1 OF 1

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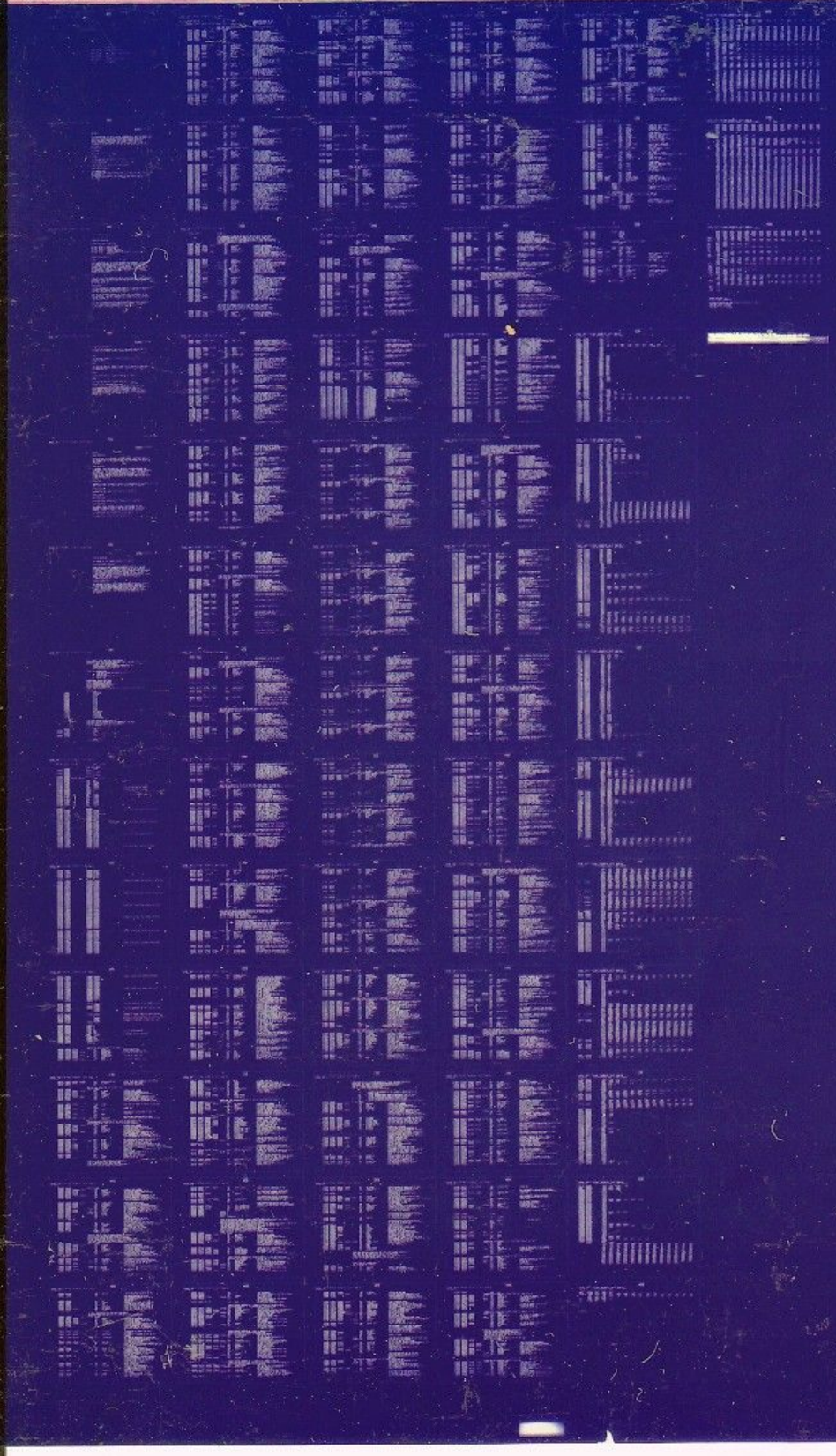

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                                                IDENTIFICATION

                                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
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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

                                ;LOAD STARTING AREA
000200                                  .=200
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        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
        001530  177654                  UIPAR6: 177654
        001532  177656                  UIPAR7: 177656
        001534  177660                  UDPAR0: 177660                  ;USER D-SPACE PAGE ADDRESS REGISTERS
        001536  177662                  UDPAR1: 177662
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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
001700  172324                  KDPDR2: 172324
001702  172326                  KDPDR3: 172326
001704  172330                  KDPDR4: 172330
001706  172332                  KDPDR5: 172332
001710  172334                  KDPDR6: 172334
001712  172336                  KDPDR7: 172336
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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
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
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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
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
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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
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
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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
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
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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
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
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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
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
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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
                                                                ;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
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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
                                                                    ;TRY TO WRITE SR1 - SHOULD BE READ-ONLY
003700  012777  177777  175532          MOV     #-1,@SR1
003706  005777  175526                  TST     @SR1
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)
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004006  005077  175422                  CLR     @SR0
004012  012700  001413                  MOV     #K200+1,R0
004016  016705  175414                  MOV     SR0H,R5
004022  005205                          INC     R5
004024  114045                          MOVB    -(R0),-(R5)
004026  022777  176770  175404          CMP     #176770,@SR1
004034  001402                          BEQ     .+6
004036  104006                          HLT
004040  000407                          BR      CONT12

004042  005077  175372                  CLR     @SR1
004046  022777  176770  175364          CMP     #176770,@SR1
004054  001401                          BEQ     .+4
004056  104006                          HLT

004060  005077  175350          CONT12: CLR     @SR0
004064  012737  040000  177776          MOV     #40000,@#PS
004072  010667  175330                  MOV     R6,TEMPX
004076  016706  175332                  MOV     SR0,R6
004102  012726  100000                  MOV     #100000,(R6)+
004106  016706  175314                  MOV     TEMPX,R6
004112  042737  140000  177776          BIC     #140000,@#PS
004120  022777  013027  175312          CMP     #13027,@SR1
004126  001401                          BEQ     .+4
004130  104006                          HLT

004132  005077  175276                  CLR     @SR0
004136  012737  140000  177776          MOV     #140000,@#PS
004144  010667  175256                  MOV     R6,TEMPX
004150  016706  175260                  MOV     SR0,R6
004154  012726  100000                  MOV     #100000,(R6)+
004160  016706  175242                  MOV     TEMPX,R6
004164  042737  140000  177776          BIC     #140000,@#PS
004172  022777  013027  175240          CMP     #13027,@SR1
004200  001401                          BEQ     .+4
004202  104006                          HLT

004204  005077  175224                  CLR     @SR0
004210  005767  175214                  TST     TEMP1
004214  100407                          BMI     TEST13

004216  005167  175206                  COM     TEMP1
004222  012737  004000  177776          MOV     #4000,@#PS
004230  000167  177344                  JMP     LOOP12
```

```
;AND OF R3 BY +2 (HIGH BYTE)
;CLEAR NR ERROR BIT TO RESUME TRACKING
;SETUP R0 TO SET NR ERROR BIT
;SETUP R5 TO REFERENCE SR0 (HIGH BYTE)

;SET NR ERROR BIT
;CHECK SR1

;SR1 INCORRECT - SHOULD HAVE
;TRACKED CHANGE OF R0 BY -1
;(LOW BYTE) AND OF R5 BY -1 (HIGH
;BYTE)
;SHOW THAT SR1 IS READ-ONLY
;CHECK SR1

;SR1 NOT READ-ONLY - ALTERRED BY A CLEAR
;INSTRUCTION WHILE AN ERROR BIT (NR)
;WAS STILL SET IN SR0
;CLEAR NR ERROR BIT TO RESUME TRACKING
;SET MODE TO SUPERVISOR
;SAVE SUPERVISOR STACK POINTER
;SET SUPERVISOR R6 TO REFERENCE SR0
;SET NR BIT
;RESTORE SUPERVISOR STACK POINTER
;RETURN TO KERNEL
;CHECK SR1

;SR1 INCORRECT WHILE TRACKING IN
;SUPERVISOR MODE-SHOULD SHOW
;CHANGE OF R7 BY +2 (LOW BYTE)
;AND CHANGE OF R6 BY +2 (HIGH BYTE)
;CLEAR NR ERROR BIT TO RESUME TRACKING
;SET MODE TO USER
;SAVE USER STACK POINTER
;SET USER R6 TO REFERENCE SR0
;SET NR ERROR BIT
;RESTORE USER STACK POINTER
;RETURN TO KERNEL
;CHECK SR1

;SR1 INCORRECT WHILE TRACKING IN
;USER MODE-SHOULD SHOW CHANGE OF
;R7 BY +2 (LOW BYTE) AND CHANGE
;OF R6 BY +2 (HIGH BYTE)
;CLEAR NR BIT TO RESUME TRACKING
;CHECK FLAG TO SEE IF REGISTER SET 1 WAS TESTED
;BRANCH IF SET-BOTH REGISTER SETS
;ALREADY CHECKED
;OTHERWISE SET FLAG
;SET REGISTER SET BIT
;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
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
```

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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
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
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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

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
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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
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,MAPISP               ;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
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005376  012737  134567  017776          MOV     #134567,@#17776
005404  012703  001414                  MOV     #K123,R3
005410  012704  001416                  MOV     #K134,R4
                                                ;LOAD R3 AND R4 WITH ADDRESSES OF
                                                ;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
005422  012737  040000  177776          MOV     #40000,@#PS
005430  012706  001000                  MOV     #SSTACK,SP
005434  012737  140000  177776          MOV     #140000,@#PS
005442  012706  000400                  MOV     #USTACK,SP
005446  005037  177776                  CLR     @#PS
005452  012767  001770  174324          MOV     #STATAB,STAPNT
                                                ;CHANGE ITERATION COUNT
                                                ;CHANGE TO SUPERVISOR
                                                ;SET UP SUPERVISOR STACK POINTER
                                                ;CHANGE TO USER
                                                ;SET UP USER STACK POINTER
                                                ;RETURN TO KERNEL
                                                ;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
005464  062700  000040                  ADD     #40,R0
005470  062767  000002  174306          ADD     #2,STAPNT
                                                ;PICK UP ADDRESS OF START OF
                                                ;ADDRESS TABLE FOR NEW MODE
                                                ;MOVE POINTER TO ADDRESS VALUE TO
                                                ;LOAD IN PROCESSOR STATUS
005476  017737  174302  177776          MOV     @STAPNT,@#PS
005504  062767  000002  174272          ADD     #2,STAPNT
005512  012767  000010  174266          MOV     #8.,PAGES
005520  012770  007600  000016          MOV     #7600,@16(R0)
005526  016705  173702                  MOV     SR0,R5
005532  005001                          CLR     R1
005534  012702  000076                  MOV     #76,R2
                                                ;SET PROCESSOR STATUS TO NEW MODE
                                                ;MOVE POINTER TO ADDRESS VALUES FOR NEXT MODE
                                                ;SET UP COUNTER OF PAGES LEFT TO TEST
                                                ;SET UP RELOCATED REFERENCE TO SR0,
                                                ;USED TO TURN DESTINATION ONLY RELOCATION OFF
                                                ;INITIALIZE R1 TO CONTAIN VA OF START OF PAGE
                                                ;INITIALIZE R2 TO VA OF END OF PAGE
005540  012767  000200  174266  PAG20:  MOV     #128.,BLOCKS
005546  012770  000177  000000          MOV     #177,@(R0)
                                                ;SET UP BLOCK COUNT
                                                ;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
005564  012770  007600  177776          MOV     #7600,@-2(R0)
005572  042705  020000                  BIC     #20000,R5
005576  012777  000400  173630  BLK20:  MOV     #400,@SR0
005604  021311                          CMP     @R3,@R1
005606  001401                          BEQ     .+4
005610  000000                          HALT
                                                ;IF NOT, BRANCH
                                                ;YES, SET UP PAGE 6 FOR REFERENCES TO SR0
                                                ;CHANGE R5 TO POINT TO SR0 THRU PAGE 6
                                                ;TURN ON DESTINATION ONLY RELOCATION
                                                ;CK BOTTOM PAGE BOUNDARY

                                                ;DESTINATION ONLY RELOCATION FAILED
                                                ;VA CONTAINED IN R1 FAILED TO RELOCATE
                                                ;TO TOP BLOCK OF BANK ZERO

005612  021412                          CMP     @R4,@R2
005614  001401                          BEQ     .+4
005616  000000                          HALT
                                                ;CK UPPER PAGE BOUNDARY

                                                ;DESTINATION ONLY RELOCATION FAILED
                                                ;VA CONTAINED IN R2 FAILED TO RELOCATE
                                                ;TO TOP BLOCK OF BANK ZERO

005620  005015                          CLR     @R5
005622  005370  000000                  DEC     @(R0)
005626  062701  000100                  ADD     #100,R1
005632  062702  000100                  ADD     #100,R2
005636  005367  174172                  DEC     BLOCKS
005642  001355                          BNE     BLK20
                                                ;TURN OFF KT11-C
                                                ;MAP I-SPACE PAR 1 BLOCK LOWER
                                                ;SET UP R1 AND R2 TO REFERENCE
                                                ;NEXT VIRTUAL BLOCK
                                                ;DECREMENT COUNT OF BLOCKS LEFT
                                                ;BRANCH IF NOT DONE WITH THIS PAGE
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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, REINITIALIZE
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
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
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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
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
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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
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
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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
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
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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, SR0
007100  104006                                  HLT                     ;KT11-C IS NOT RELOCATING THE FETCH BUT
                                                                        ;SR0<0> STILL SET
                                                                        ;AFTER AN INIT
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
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                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
                                ;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
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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
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 I-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
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                                        ;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
                                                                        ;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
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                                                                        ;RESET
010272  000403                        BR      E26C+2
010274  104010              RT26C:    KTOFF                           ;TURN OFF KT11-C VIA TRAPPING
                                                                        ;TO KERNEL AND EXECUTING A RESET
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
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010426  012737  140000  177776          MOV     #140000,@#PS                    ;SET MODE TO USER
010434  005277  170774                  INC     @SR0                    ;TURN ON KT11-C
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
                        ;SHOW THAT A REFERENCE TO SUPERVISOR D-SPACE WITH USER D-SPACE ENABLE
                        ;SET WILL NOT ACTUALLY REFERENCE SUPERVISOR D-SPACE
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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

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
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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
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
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                                        ;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
                                                                            ;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
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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
                        ;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
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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
                                ;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
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                                                                        ;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
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
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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 (CORRESPONDING 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
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
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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
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
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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
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
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                                        ;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
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
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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
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
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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
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
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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
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
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                                        ;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
                                                                      ;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
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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
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 RR0
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015674  012777  000007  163546          MOV     #7,@SR3         ;4K, BANK 0
015702  012777  015736  164104          MOV     #INT40,@KTVEC   ;ENABLE ALL D-SPACES
015710  005077  164102                  CLR     @KTSTA          ;SETUP ABORT RETURN VECTOR
015714  005277  163514                  INC     @SR0
015720  013737  037776  037776  ADR40:  MOV     @#37776,@#37776 ;TURN ON KT11-C
                                                                ;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
015756  012777  016012  164030          MOV     #INT40A,@KTVEC  ;SR0 INCORRECT AFTER ACCESS VIOLATION ABORT
015764  022626                          CMP     (R6)+,(R6)+     ;SETUP NEW RETURN VECTOR
015766  012702  037776                  MOV     #37776,R2       ;RESTORE STACK POINTER
015772  052777  000001  163434          BIS     #1,@SR0         ;SETUP R2 TO REFERENCE KERNEL 1
016000  012242                          MOV     (R2)+,-(R2)     ;TURN ON KT11-C
                                                                ;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
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
016032  022777  013427  163400          CMP     #13427,@SR1     ;SR0 INCORRECT AFTER 2ND ACCESS VIOLATION ABORT
016040  001401                          BEQ     .+4             ;CHECK SR1 - SHOULD CONTAIN VALUE
016042  104006                          HLT                     ;FROM 1ST ABORT
016044  022777  015720  163372          CMP     #ADR40,@SR2     ;SR1 DOESN'T CONTAIN VALUE FROM 1ST ABORT
016052  001401                          BEQ     .+4             ;CHECK SR2
016054  104006                          HLT
016056  021627  016002                  CMP     (R6),#ADR40A    ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
016062  001401                          BEQ     .+4             ;CHECK ADDRESS PUSHED ON STACK
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
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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

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
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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
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             ;NO - WAIT
017172  012777  000377  162224          MOV     #377,@TDBR      ;ISSUE A 'DELETE' CODE
                                                                ;TO BUY TIME!
017200  105777  162216                  TSTB    @TCSR           ;ALL DONE?
017204  100375                          BPL     .-4             ;NO - HANG IN THERE!
017206  005067  000100                  CLR     PRSFLG          ;PRINT REST OF NUMBER AFTER A NON-ZERO DIGIT
017212  005267  000104          P.CONT: INC     PTEMP3          ;COUNT
017216  026727  000100  000006          CMP     PTEMP3,#6       ;CHECK FOR DONE
017224  001001                          BNE     P.CNT1          ;BRANCH IF NOT DONE
017226  000207                          RTS     %7
017230  000241          P.CNT1: CLC                             ;CLEAR CARRY
017232  005767  000056                  TST     PRFLG           ;CHECK FOR PREVIOUS CARRY
017236  001403                          BEQ     .+10            ;BRANCH IF PREVIOUSLY ZERO
017240  005067  000050                  CLR     PRFLG           ;INITIALIZE FLAG
017244  000261                          SEC                     ;SET CARRY
017246  006167  000044                  ROL     PTEMP1          ;ROTATE NEXT CHARACTER INTO RIGHT END
                                                                ;OF REGISTER
017252  006167  000040                  ROL     PTEMP1
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                               ;CONTAINS VALUE TO BE OUTPUT
017320  000000          PTEMP2: 0                               ;SCRATCH
017322  000000          PTEMP3: 0                               ;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
```

```
AD023   007054            1405#   1419
AD023A  007154            1420#
AD024   007306            1451#   1462
AD024A  007406            1463#
ADREND= 001752             413#    616    2048    2083    2133    2169    2747    2758    2770
ADRTAB  001454             314#    592     594    2038    2066    2123    2152   2734*    2741    2752    2764
ADR22A  006326            1288#
ADR22B  006414            1306#
ADR22C  006476            1325#
ADR22D  006572            1345#
ADR22E  006672            1368#
ADR25   007530            1496#   1510    1515
ADR25A  007532            1497#   1525
ADR36   014630            2458#   2485
ADR36A  014712            2473#   2488
ADR36B  015032            2501#   2513
ADR36C  015034            2502#   2517
ADR37   015264            2550#   2577
ADR37A  015346            2565#   2580
ADR37B  015466            2593#   2605
ADR37C  015470            2594#   2609
ADR40   015720            2642#   2669
ADR40A  016002            2657#   2672
ADR40B  016122            2685#   2697
ADR40C  016124            2686#   2701
AD13    004272             911#    912
AD21A = 006066            1219   1220#
AD21B = 006100            1226   1227#
AD21C   006210            1233*  1256#
AD22A   006336            1290#
AD22B   006424            1308#
AD22C   006506            1328#
AD22D   006602            1349#
AD22E   006702            1372#
BELL    017402            2713   2928#
BLKL    011710            1976   1979#   1995
BLK20   005576            1161   1164#   1180
BLOCKS  002034             441#  1156*   1179*   1972*   1994*
CK      017012            2827   2840#
CLRALL  016274             520    556     590     638     670     974    1003    1039    1061    1080    1119    1206    1277
                          1397   1445    1487    1548    1850    1870    1891    1933    2230    2447    2539    2631   2730#
CLRLP   016312            2734#  2736
CNT22B  006374            1295   1303#
CNT22C  006454            1313   1321#
CNT22D  006550            1333   1341#
CNT22E  006644            1354   1363#
CNT31A  012214            2049   2051#
CNT31B  012304            2069   2079#
CNT31C  012342            2092#
CNT32A  012556            2134   2136#
CNT32B  012652            2155   2165#
CNT32C  012710            2178#
CONT12  004060             854    863#
CONT5   002664             602    606     612#
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#
```

DCKTAB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
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#
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    2673    2895*   2896*   2897*   2902#
PTEMP3  017322           2858*   2881*   2882    2903#
P.CK    017132           2867#   2898
P.CNT1  017230           2883    2685#
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#
RT26D   010342           1644    1654#
RT26E   010404           1661    1673#
RT26F   010450           1684    1696#
RT26G   010514           1709    1721#
RT26H   010562           1732    1742#
RT26I   010624           1749    1761#
RT26J   010670           1774    1786#
RT26K   010734           1797    1809#
RT26L   011002           1820    1830#
RWALL   016324           2028    2113    2198    2318    2740#
RWDSP   016430           1934    2763#
RWD1    016440           2765#   2771
RWD2    016444           2766#   2768
RWISP   016366           1120    2751#
RWI1    016376           2753#   2759
RWI2    016402           2754#   2756
RWL1    016334           2742#   2748
RWL2    016340           2743#   2745
R0     =%000000            254#    491*    492     501*    522*    538*    561*    562     564     570*    640*    657*    672*
                           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
```

JO5


```
                    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*
R6     =%000006     260#   836   837*  839   840*  865   866*  867*  868*  878   879*  880*  881*
                   1525   1528  1593  1615  1637  1656  1679  1702  1727  1744  1767  1792  1815
                   1832   2034* 2036* 2119* 2121* 2468  2488  2492  2520  2560  2580  2584  2612
                   2652   2672  2676  2704
R7     =%000007     261#
SAVEA   002010      431#   1122*  1190   1935*  2005
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#
SDPAR0  001634      372#   1871*  2244*
SDPAR1  001636      373#
SDPAR2  001640      374#
SDPAR3  001642      375#
SDPAR4  001644      376#
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#
SDPDR5  001606      361#
SDPDR6  001610      362#
SDPDR7  001612      363#   1561*  1875*  2252*
```

DCKTAB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
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
                         2192   2224   2312   2441   2533   2625   2725#
SIPAR0  001614            364#  1062*
SIPAR1  001616            365#
SIPAR2  001620            366#
SIPAR3  001622            367#
SIPAR4  001624            368#
SIPAR5  001626            369#
SIPAR6  001630            370#
SIPAR7  001632            371#  1065*  1564*  2030*
SIPDR0  001554            348#   424   1063*  1552*  2238*
SIPDR1  001556            349#  1555*
SIPDR2  001560            350#
SIPDR3  001562            351#
SIPDR4  001564            352#
SIPDR5  001566            353#
SIPDR6  001570            354#
SIPDR7  001572            355#  1066*  1558*
SP     =%000006           262#   446*   448*   450*   461*   484*   512*   549*   583*   630*   663*   695*   743*
                          787*   904*   922*   967*   996*  1032*  1112*  1135*  1137*  1198*  1212*  1213*  1214*
                         1249   1250   1251   1270*  1364*  1381   1389*  1403*  1436*  1444*  1480*  1541*  1842*
                         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*
                          965*   994*  1030*  1110*  1196*  1268*  1387*  1434*  1478*  1539*  1840*  1924*  2018*
                         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*
                         1646*  1663*  1686*  1711*  1734*  1751*  1776*  1799*  1822*  1857   1858*  1878   1879*
                         1899   1900*  1967   1979*  2004*  2056*  2058*  2098*  2142*  2144*  2184*  2203*  2207
                         2212*  2248   2256*  2262*  2268*  2323   2337*  2356*  2376*  2392*  2418*  2457*  2460*
                         2463*  2464   2470*  2473*  2478*  2479   2494*  2500*  2502*  2505*  2506   2521*  2549*
                         2552*  2555*  2556   2562*  2565*  2570*  2571   2586*  2592*  2594*  2597*  2598   2613*
                         2641*  2644*  2647*  2648   2654*  2657*  2662*  2663   2678*  2684*  2686*  2689*  2690
                         2705*  2725*  2730*  2740*  2751*  2763*
SR0H    001436            306#   807    828    848   2496   2588   2680
SR1     001440            307#   474    799    810    817    821*   822    830    841    851    857*   858    870
                          883   1506   2482   2509   2574   2601   2666   2693
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#
TCSR    001422          300#    468    712    759    943   2393*  2397*  2402*  2407*  2835   2853   2871   2874
                       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#
                        965#    994#  1030#  1110#  1196#  1268#  1387#  1434#  1478#  1539#  1840#  1924#  2018#
                       2103#  2189#  2221#  2309#  2438#  2530#  2622#
TESTX   016472         2780#
TEST1   002122          453     458#
TEST10  003166          692#
TEST11  003352          729     740#
TEST12  003530          774     784#
TEST13  004234          891     901#
TEST14  004306          919#
TEST15  004526          964#
TEST16  004624          993#
TEST17  004756         1024    1029#
TEST2   002216          481#
TEST20  005306         1109#
TEST21  005716         1195#
TEST22  006212         1252    1267#
TEST23  006736         1386#
TEST24  007174         1418    1433#
TEST25  007422         1460    1477#
TEST26  007712         1538#
TEST27  011024         1839#
TEST3   002320          509#
TEST30  011412         1923#
TEST31  012030         2017#
TEST32  012370         2102#
TEST33  012736         2188#
TEST34  013066         2220#
TEST35  013570         2308#
TEST36  014504         2437#
TEST37  015140         2529#
TEST4   002442          546#
TEST40  015574         2621#
TEST5   002560          580#
TEST6   002710          627#
TEST7   003042          660#
TRP35   013772         2338#
TST10   003242          705#    732
TST10F  003350          703*    728    730*   733#
TST11   003420          752#    777
```

```
TST11F  003526            750*   773    775*   778#
UBRK    002020            435#  2807*  2815*
UDPAR0  001534            339#  1892*  2245*
UDPAR1  001536            340#
UDPAR2  001540            341#
UDPAR3  001542            342#
UDPAR4  001544            343#
UDPAR5  001546            344#
UDPAR6  001550            345#
UDPAR7  001552            346#  1568*  1895*  2116*  2255*  2322*
UDPDR0  001474            323#  1893*  2242*
UDPDR1  001476            324#
UDPDR2  001500            325#
UDPDR3  001502            326#
UDPDR4  001504            327#
UDPDR5  001506            328#
UDPDR6  001510            329#
UDPDR7  001512            330#  1562*  1896*  2254*
UIPAR0  001514            331#  1081*
UIPAR1  001516            332#
UIPAR2  001520            333#
UIPAR3  001522            334#
UIPAR4  001524            335#
UIPAR5  001526            336#
UIPAR6  001530            337#
UIPAR7  001532            338#  1084*  1565*  2031*
UIPDR0  001454            315#   426   1082*  1553*  2239*
UIPDR1  001456            316#  1554*
UIPDR2  001460            317#
UIPDR3  001462            318#
UIPDR4  001464            319#
UIPDR5  001466            320#
UIPDR6  001470            321#
UIPDR7  001472            322#  1085*  1559*
URET34  013426           2266   2271#  2284
USTACK  000400            289#   450   1137   1950   2036   2121   2327
UTRP34  013422           2269#
XLOOP   016540           2787   2789#
.     = 017714            274#   276#   279#   284#   288#   290#   292#   413   455   464   469   472   475
                          487    498    515    528    552    566    586   633   646   652   666   678   684
                          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
                         1115   1166   1171   1201   1220   1222   1227  1228  1238  1242  1246  1273  1293
                         1311   1331   1352   1375   1392   1413   1419# 1423  1429  1439  1457  1462# 1468
                         1483   1503   1507   1511   1513   1516   1519  1523  1526  1531  1544  1845  1861
                         1882   1884   1903   1905   1929   1981   1986  2023  2042  2060  2072  2088  2108
                         2127   2146   2158   2174   2194   2208   2226  2273  2276  2279  2282  2285  2288
                         2314   2443   2465   2480   2483   2486   2489  2497  2507  2510  2514  2518  2535
                         2557   2572   2575   2578   2581   2589   2599  2602  2606  2610  2627  2649  2664
                         2667   2670   2673   2681   2691   2694   2698  2702  2806  2814  2826  2836  2841
                         2854   2862   2875   2879   2887   2929   2932  2936  2941  2944  2947#
```

DCKTAB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
ADC     2866  2894
ADD     1146  1147  1150  1177  1178  1959  1960  1963  1992  1993  2047  2081  2093  2132  2139
        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
         999  1018  1035  1051  1055  1072  1091  1115  1166  1171  1183  1201  1222  1228  1238
        1242  1246  1273  1293  1311  1331  1352  1375  1392  1413  1423  1439  1457  1483  1503
        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
        2276  2279  2282  2285  2288  2314  2443  2465  2480  2483  2486  2489  2497  2507  2510
        2514  2518  2535  2557  2572  2575  2578  2581  2589  2599  2602  2606  2610  2627  2649
        2664  2667  2670  2673  2681  2691  2694  2698  2702  2716  2806  2814  2826  2868  2870
        2887
BGT     2049  2134
BIC      494   495   563   869   882  1163  1463  1978  2463  2478  2505  2555  2570  2597  2647
        2662  2689  2896
BIS     2470  2562  2654  2897
BIT      983  1054  1292  1411  1456  1530  2059  2071  2087  2145  2157  2173  2795  2797  2805
        2813  2825
BLE      576  1187  2002
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
        1418  1429  1460  1468  1499  1513  1586  1608  1630  1653  1672  1695  1720  1741  1760
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CLR      445   451   460   483   503   511   535   548   572   582   611   619   629   662   694
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        1345  1351  1368  1391  1420  1438  1482  1502  1506  1510  1515  1518  1525  1528  1543
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COM      893
DEC     1176  1179  1182  1991  1994  1997
EMT     2357  2914  2915  2916
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         752   753   754   755   756   762   763   764   765   776   785   787   794   796   798
         806   807   816   821   827   828   836   837   838   839   840   847   848   864   865
         866   867   868   877   878   879   880   881   894   902   904   911   920   922   929
         930   934   938   942   949   954   965   967   977   979   994   996  1004  1005  1006
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D06

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DCKTAB.P11      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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MOVB         809     829     850    2807    2815
NOP         1454    1455    2258    2264    2270    2394    2395    2719    2720    2721
RESET        470     714     761     945     980    1012    1023    1057    1075    1093    1427    1467    1864    1885    1906
            2717    2924
ROL         2864    2865    2890    2892    2893
RTI         2816    2843
RTS         2727    2737    2749    2760    2772    2856    2884    2937    2946
RTT         2925
SEC         2889
SOB          537     538     574     613     656     657     688     689     710     711     726     727     757     758     771
             772    2046    2080    2131    2166    2736    2745    2756    2768
SUB         1403    1444    2908
TRAP         252    2338
TST          471     474     536     573     603     612     655     687     725     728     770     773     797     817     822
             890     946     951    1184    1241    1310    1374    1496    1522    1578    1600    1622    1647    1664    1687
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            2851    2861    2867    2886
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.MACR        443    1536    2014    2432
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.REM           1
.REPT        274
.TITLE         1
.WORD        294


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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 RUN-TIME RATIO: 167/40=4.1
 CORE USED:  11K  (21 PAGES)
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Spooler runtime 11 Seconds, 51 KCS, 310 disk reads, 3 disk writes, 69 pages