KT11-D

LOGIC TEST

MD-11-DBKTA-D

EP-DBKTA-D-DL-B

FICHE 1 OF 1

DEC 1976

digital

MADE IN USA

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DBKTA-D-D

PRODUCT NAME: KT11-D BASIC LOGIC TEST

DATE REVISED: DECEMBER 1976

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: ROBERT WHITTON/STAN HARACKIEWICZ

1.0 ABSTRACT

THIS PROGRAM INCREMENTALLY TESTS THE BASIC LOGIC
FUNCTIONS OF THE KT11-D MEMORY MANAGEMENT OPTION FOR THE PDP-11/40.
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-11/40 WITH KT11-D 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 12=1 OR UP -- INHIBIT BELL AT END OF PASS, TYPE ASTERICK
SW 12=0 OR DOWN -- RING BELL AT END OF EACH PASS
SW 11=1 OR UP -- INHIBIT ITERATIONS
SW 10=1 OR UP-- HALT AT END OF CURRENT TEST
WITH NEXT TEST NUMBER IN DATA LIGHTS

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-D, 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.

5.3 PROGRAM AND/OR OPERATOR ACTION

THE PROGRAM FIRST CHECKS THOSE PROPERTIES OF THE KT11-D 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-D'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-D 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 1000. HOWEVER, IN CERTAIN TESTS IT MAY BE INITIALIZED TO A LOWER ADDRESS (VIRTUAL) TO MAKE UP FOR RELOCATION OF THE BANK.

THE USER STACK POINTER IS INITIALIZED TO 400.

8.4 EXECUTION ORDER CHECKING

SINCE THE KT11-D 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-D 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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                        ;BASIC LOGIC TEST OF THE KT11-D
                        ;COPYRIGHT 1972, 1973, 1974,1975,1976 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        ;THIS PROGRAM WAS REVISED ON SEPTEMBER 30, 1974 TO CHECK FOR THE
                        ;IMPLEMENTATION OF ECO #M-7236-00005.  THE ECO WAS NEEDED TO ALLOW THE
                        ;RELOCATED REFERENCE TO THE USER PAGE ADDRESS AND PAGE DESCRIPTOR REGISTERS
                        ;WITH BIT SIX OF THE VIRTUAL ADDRESS EQUAL TO A ONE.  THE REVISION
                        ;WAS ACCOMPLISHED BY ADDING TEST NUMBER 61.

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

                        ;SW15=1 CAUSES HALT ON ERROR
                        ;SW14=1 CAUSES SCOPE LOOPING
                        ;SW13=1 INHIBITS ERROR PRINTOUT
                        ;SW11=1 INHIBITS ITERATIONS
                        ;SW10=1 HALT AT END OF CURRENT TEST WITH TEST NUMBER IN DATA LIGHTS OF NEXT
                        ;               TEST. PRESS CONTINUE TO ADVANCE TO NEXT TEST. (WITH SW11=1)
                        ;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
000001                          BIT0=1
000002                          BIT1=2
000004                          BIT2=4
000010                          BIT3=10
000020                          BIT4=20
000040                          BIT5=40
000100                          BIT6=100
000200                          BIT7=200
000400                          BIT8=400
001000                          BIT9=1000
002000                          BIT10=2000
004000                          BIT11=4000
010000                          BIT12=10000
020000                          BIT13=20000
040000                          BIT14=40000
100000                          BIT15=100000
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                                ;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      016246                      EMTSRV
000032      000340                      340
            000034                      .=34
000034      015456                      SCOPEC
000036      000000                      0
            000046                      .=46
000046      015156                      LOGIC

                                ;LOAD STARTING AREA
            000200                      .=200
000200      000167  000774              JMP     START
            000210                      .=210
000210      000167  015144              JMP     TESTX
                                ;LOAD DATA AREA
            000400                      .=400
000400      000000              USTACK: 0
            001000                      .=.+376
001000      000000              KSTACK: 0
001002      000000  000000  000000      .WORD 0,0,0,0
001010      000000
001012      123456              K123:   123456
001014      134567              K134:   134567
001016      177564              TCSR:   177564
001020      177566              TDBR:   177566
001022      000000              TEMP:   0
                                .
001024      177572              SR0:    177572          ;KT11-D STATUS REGISTER ADDRESSES
001026      177573              SR0H:   177573
001030      177574              SR1:    177574
001032      177576              SR2:    177576

                                .
001034                          ADRTAB:
001034      177600              UPDR0:  177600          ;USER PAGE DESCRIPTOR REGISTERS
001036      177602              UPDR1:  177602
001040      177604              UPDR2:  177604
001042      177606              UPDR3:  177606
001044      177610              UPDR4:  177610
001046      177612              UPDR5:  177612
001050      177614              UPDR6:  177614
001052      177616              UPDR7:  177616
                                .
001054      177640              UPAR0:  177640          ;USER PAGE ADDRESS REGISTERS
001056      177642              UPAR1:  177642
001060      177644              UPAR2:  177644
001062      177646              UPAR3:  177646
001064      177650              UPAR4:  177650
001066      177652              UPAR5:  177652
001070      177654              UPAR6:  177654
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001072  177656                  UPAR7:  177656
                                .
001074  172300                  KPDR0:  172300          ;KERNEL PAGE DESCRIPTOR REGISTERS
001076  172302                  KPDR1:  172302
001100  172304                  KPDR2:  172304
001102  172306                  KPDR3:  172306
001104  172310                  KPDR4:  172310
001106  172312                  KPDR5:  172312
001110  172314                  KPDR6:  172314
001112  172316                  KPDR7:  172316
                                .
001114  172340                  KPAR0:  172340          ;KERNEL PAGE ADDRESS REGISTERS
001116  172342                  KPAR1:  172342
001120  172344                  KPAR2:  172344
001122  172346                  KPAR3:  172346
001124  172350                  KPAR4:  172350
001126  172352                  KPAR5:  172352
001130  172354                  KPAR6:  172354
001132  172356                  KPAR7:  172356
        001132                  ADREND= .-2
                                .
001134  177600                  PDRTAB: 177600          ;STARTING ADDRESSES OF PDR'S FOR EACH MODE
001136  172300                  PDREND: 172300
001140  177640                  PARTAB: 177640          ;STARTING ADDRESSES OF PAR'S FOR EACH MODE
001142  172340                          172340

001144  001074                  STATAB: KPDR0           ;ADDRESS OF KERNEL TABLE OF PDR'S AND PAR'S
001146  000000                          0
001150  001034                          UPDR0           ;ADDRESS OF USER TABLE OF PDR'S AND PAR'S
001152  140000                  STAEND: 140000


001154  000000                  STAPNT: 0
001156  000000                  PAGES:  0
001160  000000                  SAVEA:  0
001162  000000                  SAVEB:  0
001164  000250                  KTVEC:  250
001166  000252                  KTSTA:  252
001170  100361                  PDRM2:  100361
001172  000000                  FTITLE: 0
001174  000000                  TESTCT: 0
001176  000000                  BLOCKS: 0


                                ;SET UP FOR START OF BASIC LOGIC TESTS
001200  005037  177776          START:  CLR     @#PS                    ;INITIALIZE STATUS
001204  012706  001000                  MOV     #KSTACK,SP              ;SETUP KERNEL STACK
001210  012767  002000  014352          MOV     #2000,ICOUNT            ;INITIALIZE ITERATION COUNT
001216  012767  001256  014350          MOV     #TEST1+2,RETURN         ;SETUP SCOPE AND ITERATION LOOP RETURN
001224  012767  000001  177742          MOV     #1,TESTCT               ;INITIALIZE TEST COUNT
001232  005767  177734                  TST     FTITLE                  ;DID TITLE PRINT
001236  001007                          BNE     TEST1+2                 ;YES. START TEST
001240  004767  014450                  JSR     PC,TYPE                 ;NO, PRINT TITLE
001244  015172                          MTIT
001246  005267  177720                  INC     FTITLE
001252  000401                          BR      .+4                     ;SKP SCOPE INSTRUCTION
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                                ;SR0 AND SR1 SHOULD BE INITIALIZED TO 0
001254  104400                  TEST1:  SCOPE
001256  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
001262  004767  015030                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
001266  000001                          1                               ;TEST NUMBER
001270  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
001272  000005                          RESET                           ;ISSUE INIT
001274  005777  177524                  TST     @SR0                    ;CHECK SR0
001300  001401                          BEQ     .+4
001302  104006                          HLT                             ;SR0 WAS NOT INITIALIZED TO ZERO
001304  005777  177520                  TST     @SR1                    ;CHECK SR1
001310  001401                          BEQ     .+4
001312  104006                          HLT                             ;SR1 WAS NOT INITIALIZED TO ZERO
001314  012767  000010  014246          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
001322  104400                  TEST2:  SCOPE
001324  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
001330  004767  014762                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
001334  000002                          2                               ;TEST NUMBER
001336  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
001340  005777  177460                  TST     @SR0                    ;CHECK SR0 INITIALLY
001344  001402                          BEQ     .+6
001346  104006                          HLT                             ;SR0 NOT ZERO AT START OF TEST
001350  000422                          BR      EXIT2
001352  012700  000001                  MOV     #1,R0                   ;R0 CONTAINS BIT INDICATING POSITION BEING TESTE
001356  010001                LOOP2:    MOV     R0,R1
001360  010102                          MOV     R1,R2
001362  042701  000401                  BIC     #401,R1         ;DON'T SET THE BIT IN SR0 IF IT'S BIT 0 OR BIT 8
001366  042702  017777                  BIC     #17777,R2               ;CLEAR THE BIT IN R2 IF IT SHOULDN'T SET IN SR0
001372  010177  177426                  MOV     R1,@SR0
001376  020277  177422                  CMP     R2,@SR0                 ;CHECK SR0
001402  001401                          BEQ     .+4
001404  104006                          HLT                             ;SR0 INCORRECT WHEN VALUE IN R1
                                                                        ;WAS LOADED INTO IT
001406  006300                          ASL     R0
001410  103362                          BCC     LOOP2
001412  005077  177406                  CLR     @SR0
001416                          EXIT2:

                                ;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
001416  104400                  TEST3:  SCOPE
001420  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
001424  004767  014666                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
001430  000003                          3                               ;TEST NUMBER
001432  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
001434  012767  002000  014126          MOV     #2000,ICOUNT            ;RESTORE ICOUNT
001442  004767  013624                  JSR     %7,CLRALL               ;INITIALIZE KT11-D REGISTERS
001446  012703  001140                  MOV     #PARTAB,R3              ;R3 POINTS TO TABLE OF PAR ADDRESSES
001452  012700  000002                  MOV     #2,R0                   ;R0 IS COUNTER OF STATES LEFT TO TEST
001456  012301                LOOP3:    MOV     (R3)+,R1                ;PUT ADDRESS OF 1ST PAR IN SET IN R1
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001460  012702  000010                MOV     #10,R2          ;R2 IS COUNTER OF PAR'S LEFT TO TEST IN SET
001464  012704  000001        LOOP3A: MOV     #1,R4           ;R4 IS BIT OF PAR BEING TESTED
001470  010411                LOOP3B: MOV     R4,@R1          ;SET BIT IN PAR
001472  020411                        CMP     R4,@R1          ;CHECK PAR
001474  001401                        BEQ     .+4             ;BRANCH IF OK
001476  104006                        HLT                     ;PAR WHOSE ADDRESS IS IN R1
                                                                ;FAILED WHEN THE VALUE IN R4
                                                                ;WAS LOADED INTO IT
001500  006304                        ASL     R4
001502  020427  010000                CMP     R4,#10000
001506  001370                        BNE     LOOP3B
001510  005011                        CLR     @R1
001512  005721                        TST     (R1)+           ;MOVE POINTER
001514  077215                        SOB     R2,LOOP3A       ;TEST ALL PAR'S IN SET
001516  077021                        SOB     R0,LOOP3        ;TEST ALL 3 REGISTER SETS

                        ;BITS 1-3, 8-14 OF ALL PDR'S SHOULD BE READ/WRITE
                        ;BITS 0,4,5,7 AND 15 SHOULD ALWAYS BE ZERO
                        ;BIT 6  SHOULD BE ZERO IF PDR IS WRITTEN
                        ;ACTUAL CLEARING AND SETTING OF 6 TESTED LATER
                        ;ALSO SHOWS THAT OUTPUT PATHS FROM PDR'S ARE OK
                        ;AND THAT EVERY PDR ADDRESS IS RESPONDED TO
001520  104400          TEST4:  SCOPE
001522  012706  001000          MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
001526  004767  014564          JSR     PC,ORDER        ;CHECK TEST SEQUENCE + INIT SR0
001532  000004                  4                       ;TEST NUMBER
001534  104006                  HLT                     ;TEST EXECUTED OUT OF SEQUENCE
001536  004767  013530          JSR     %7,CLRALL       ;INITIALIZE KT11-D REGISTERS
001542  012703  001134          MOV     #PDRTAB,R3
001546  012301          LOOP4:  MOV     (R3)+,R1        ;LOAD ADDRESS OF 1ST PDR IN STATE
001550  012702  000010          MOV     #10,R2          ;USE R2 AS A COUNTER OF PDR'S
                                                        ;LEFT TO TEST
001554  012700  000001  LOOP4A: MOV     #1,R0           ;SETUP R0 TO ROTATE A BIT THRU
001560  010005          LOOP4B: MOV     R0,R5
001562  046705  177402          BIC     PDRM2,R5        ;R5 CONTAINS EXPECTED RESULTING CONTENTS OF PDR
001566  010011                  MOV     R0,@R1          ;LOAD PDR
001570  021105                  CMP     @R1,R5          ;CHECK RESULTING CONTENTS OF PDR
001572  001401                  BEQ     .+4
001574  104006                  HLT                     ;PDR WHOSE ADDRESS IS IN R1
                                                        ;WAS INCORRECT AFTER VALUE IN R0
                                                        ;WAS LOADED INTO IT
001576  006300                  ASL     R0              ;ROTATE BIT
001600  103367                  BCC     LOOP4B          ;BRANCH IF NOT DONE WITH THIS PDR
001602  005011                  CLR     @R1             ;IF DONE WITH THIS PDR, CLEAR IT
001604  005721                  TST     (R1)+           ;MOVE POINTER TO ADDRESS NEXT PDR
001606  077216                  SOB     R2,LOOP4A       ;TEST ALL PDR'S IN THIS GROUP
001610  020327  001136          CMP     R3,#PDREND      ;TEST ALL 2 GROUPS OF PDRS-USER, KERNEL
001614  003754                  BLE     LOOP4

                        ;NO DUAL ADDRESSING TEST FOR PAR'S AND PDR'S
001616  104400          TEST5:  SCOPE
001620  012706  001000          MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
001624  004767  014466          JSR     PC,ORDER        ;CHECK TEST SEQUENCE + INIT SR0
001630  000005                  5                       ;TEST NUMBER
001632  104006                  HLT                     ;TEST EXECUTED OUT OF SEQUENCE
001634  004767  013432          JSR     %7,CLRALL       ;CLEAR ALL PAR'S AND PDR'S
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001640  012701  001034                MOV     #ADRTAB,R1      ;R1 POINTS TO ADDRESS OF LOCATION
                                                                ;LOADED WITH 1 BIT SET IN EACH 4 BITS
001644  012702  001034        LOP5AA: MOV     #ADRTAB,R2      ;R2 USED AS A POINTER TO CYCLE THRU
                                                                ;ALL OTHER ADDRESSES OF PAR/PDR PAIR'S TO
                                                                ;CHECK FOR DUAL ADDRESSING
001650  012703  000040                MOV     #32.,R3         ;R3 USED AS A COUNTER
001654  012771  010421  000000        MOV     #10421,@(R1)    ;LOAD A PAR OR PDR - SET ONE BIT
                                                                ;IN EACH CHIP (4 BITS PER CHIP) IF R/W
001662  020201                LOP5B:  CMP     R2,R1           ;SKIP CHECKING THIS ADDRESS TO SEE IF
001664  001406                        BEQ     CONT5           ;IT'S A DUAL, SINCE IT WAS THE ONE LOADED
001666  005772  000000                TST     @(R2)           ;OTHERWISE, CHECK TO SEE IF THIS
                                                                ;REGISTER RESPONDED TO THE ADDRESS
                                                                ;OF THE ONE LOADED AS A DUAL
001672  001403                        BEQ     CONT5           ;BRANCH IF OK
001674  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)
001676  005072  000000                CLR     @(R2)           ;REINITIALIZE FAULTY LOCATION
001702  005722                CONT5:  TST     (R2)+           ;MOVE POINTER R2
001704  077312                        SOB     R3,LOP5B        ;CHECK ALL PAR'S AND PDR'S
                                                                ;TO SEE IF THEY RESPONDED TO THE
                                                                ;ADDRESS POINTED TO BY R1
001706  022701  001132                CMP     #ADREND,R1      ;HAVE ALL ADDRESSES BEEN CHECKED
                                                                ;FOR DUALS?
001712  001402                        BEQ     DONE5A          ;YES - GO TO NEXT TEST
001714  005031                        CLR     @(R1)+          ;NO - MOVE POINTER R1
001716  000752                        BR      LOP5AA          ;CHECK TO SEE IF ANY OTHER ADDRESS
                                                                ;ALSO RESPONDS TO THE ADDRESS POINTED
                                                                ;TO BY R1
001720  012767  000100  013642 DONE5A: MOV     #100,ICOUNT     ;DROP ITERATION COUNT

                              ;SHOW THAT BYTE ADDRESSING OF PAR'S WORKS FOR HIGH AND LOW BYTES
001726  104400                TEST6:  SCOPE
001730  012706  001000                MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
001734  004767  014356                JSR     PC,ORDER        ;CHECK TEST SEQUENCE + INIT SR0
001740  000006                        6                       ;TEST NUMBER
001742  104006                        HLT                     ;TEST EXECUTED OUT OF SEQUENCE
001744  012767  002000  013616        MOV     #2000,ICOUNT    ;RESTORE ITERATION COUNT
001752  004767  013314                JSR     %7,CLRALL       ;INITIALIZE KT11-D REGISTERS
001756  012703  001140                MOV     #PARTAB,R3      ;R3 POINTS TO TABLE OF PAR ADDRESSES
001762  012700  000002                MOV     #2,R0           ;R0 IS COUNTER OF STATES LEFT TO TEST
001766  012301                LOOP6:  MOV     (R3)+,R1        ;PUT ADDRESS OF 1ST PAR IN SET IN R1
001770  012702  000010                MOV     #10,R2          ;R2 IS COUNTER OF PAR'S LEFT TO TEST IN SET
001774  012711  177777        LOOP6A: MOV     #-1,@R1         ;SET UP PAR BEING TESTED
002000  105011                        CLRB    @R1             ;CLEAR LOW BYTE OF PAR
002002  022711  007400                CMP     #7400,@R1       ;CHECK PAR
002006  001401                        BEQ     .+4             ;BRANCH IF OK
002010  104006                        HLT                     ;DATOB TO PAR WHOSE ADDRESS IS IN
                                                                ;R1 FAILED
002012  012711  177777                MOV     #-1,@R1         ;SET UP PAR TO TEST HIGH BYTE
002016  105061  000001                CLRB    1(R1)           ;CLEAR HIGH BYTE
002022  022711  000377                CMP     #377,@R1        ;CHECK PAR
002026  001401                        BEQ     .+4
002030  104006                        HLT                     ;DATOB TO HIGH BYTE OF PAR WHOSE
                                                                ;ADDRESS IS IN R1 FAILED
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002032  005721                          TST     (R1)+                   ;MOVE POINTER
002034  077221                          SOB     R2,LOOP6A               ;TEST ALL PAR'S IN SET
002036  077025                          SOB     R0,LOOP6                ;TEST ALL 2 REGISTER SETS

                                ;SHOW THAT BYTE ADDRESSING OF PDR'S WORKS FOR HIGH AND LOW BYTES
002040  104400                  TEST7:  SCOPE
002042  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002046  004767  014244                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
002052  000007                          7                               ;TEST NUMBER
002054  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
002056  004767  013210                  JSR     %7,S.RALL               ;INITIALIZE KT11-D REGISTERS
002062  012703  001134                  MOV     #PDRTAB,R3              ;R3 POINTS TO TABLE OF PDR ADDRESSES
002066  012700  000002                  MOV     #2,R0                   ;R0 IS COUNTER OF STATES LEFT TO TEST
002072  012301                  LOOP7:  MOV     (R3)+,R1                ;PUT ADDRESS OF 1ST PDR IN SET INTO R1
002074  012702  000010                  MOV     #10,R2                  ;R2 IS COUNTER OF PDR'S LEFT TO TEST IN SET
002100  012711  177777          LOOP7A: MOV     #-1,@R1                 ;SET UP PDR BEING TESTED
002104  105011                          CLRB    @R1                     ;CLEAR LOW BYTE OF PDR
002106  022711  077400                  CMP     #77400,@R1              ;CHECK PDR
002112  001401                          BEQ     .+4                     ;BRANCH IF OK
002114  104006                          HLT                             ;DATOB TO PDR WHOSE ADDRESS IS
                                                                        ;IN R1 FAILED
002116  012711  177777                  MOV     #-1,@R1                 ;SET UP PDR TO TEST HIGH BYTE
002122  105061  000001                  CLRB    1(R1)                   ;CLEAR HIGH BYTE
002126  022711  000016                  CMP     #16,@R1                 ;CHECK PDR
002132  001401                          BEQ     .+4
002134  104006                          HLT                             ;DATOB TO HIGH BYTE OF PDR WHOSE
                                                                        ;ADDRESS IS IN R1 FAILED
002136  005721                          TST     (R1)+                   ;MOVE POINTER
002140  077221                          SOB     R2,LOOP7A               ;TEST ALL PDR'S IN SET
002142  077025                          SOB     R0,LOOP7                ;TEST ALL 2 REGISTER SETS

                                ;INIT SHOULD HAVE NO EFFECT ON PAR'S
002144  104400                  TEST10: SCOPE
002146  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002152  004767  014140                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
002156  000010                          10                              ;TEST NUMBER
002160  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
002162  012767  000010  013400          MOV     #10,ICOUNT              ;DROP ITERATION COUNT
002170  005067  000104                  CLR     TST10F
002174  012704  005252                  MOV     #5252,R4
002200  012703  001140          TST10:  MOV     #PARTAB,R3
002204  012700  000002                  MOV     #2,R0
002210  012301                  LOOP10: MOV     (R3)+,R1
002212  012702  000010                  MOV     #10,R2                  ;COUNTER TO LOAD PAR'S
002216  010421                  LOP10A: MOV     R4,(R1)+                ;LOAD PAR WITH PATTERN
002220  077202                          SOB     R2,LOP10A               ;LOAD ALL 16 IN THIS SET
002222  077006                          SOB     R0,LOOP10               ;INITIALIZE ALL 2 SETS
002224  000005                          RESET                           ;ISSUE INIT
002226  012703  001140                  MOV     #PARTAB,R3
002232  012700  000002                  MOV     #2,R0
002236  012301                  LOP10B: MOV     (R3)+,R1
002240  012702  000010                  MOV     #10,R2                  ;COUNTER TO CHECK PAR'S
002244  020411                  LOP10C: CMP     R4,@R1                  ;CHECK DATA
002246  001401                          BEQ     .+4
002250  104006                          HLT                             ;PAR WHOSE ADDRESS IS IN R1
                                                                        ;WAS INCORRECT AFTER INIT
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002252  005721                          TST     (R1)+                   ;MOVE POINTER
002254  077205                          SOB     R2,LOP10C               ;TEST ALL 8 PAR'S IN THIS SET
002256  077011                          SOB     R0,LOP10B               ;TEST ALL 2 REGISTER SETS
002260  005767  000014                  TST     TST10F                  ;CHECK FOR BOTH PATTERNS USED
002264  001006                          BNE     EXIT10                  ;IF DONE, GO TO NEXT TEST
002266  005267  000006                  INC     TST10F                  ;IF NOT, SET FLAG
002272  012704  002525                  MOV     #2525,R4                ;LOAD OTHER PATTERN
002276  000740                          BR      TST10                   ;REPEAT TEST WITH 2ND PATTERN
002300  000000              TST10F: 0
002302                      EXIT10:

                            ;INIT SHOULDN'T CLEAR OR SET ANY OF THE R/W BITS IN THE PDR'S
002302  104400              TEST11: SCOPE
002304  012706  001000              MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002310  004767  014002              JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
002314  000011                      11                              ;TEST NUMBER
002316  104006                      HLT                             ;TEST EXECUTED OUT OF SEQUENCE
002320  005067  000104              CLR     TST11F
002324  012704  025012              MOV     #25012,R4               ;LOAD PATTERN IN R4
002330  012703  001134      TST11:  MOV     #PDRTAB,R3
002334  012700  000002              MOV     #2,R0
002340  012301              LOOP11: MOV     (R3)+,R1
002342  012702  000010              MOV     #10,R2                  ;COUNTER TO LOAD PDR'S
002346  010421              LOP11A: MOV     R4,(R1)+                ;LOAD PDR WITH PATTERN
002350  077202                      SOB     R2,LOP11A               ;LOAD ALL 8 IN THIS SET
002352  077006                      SOB     R0,LOOP11               ;INITIALIZE ALL 2 SETS
002354  000005                      RESET                           ;ISSUE INIT
002356  012703  001134              MOV     #PDRTAB,R3
002362  012700  000002              MOV     #2,R0
002366  012301              LOP11B: MOV     (R3)+,R1
002370  012702  000010              MOV     #10,R2                  ;COUNTER TO CHECK PDR'S
002374  020411              LOP11C: CMP     R4,@R1                  ;CHECK DATA
002376  001401                      BEQ     .+4
002400  104006                      HLT                             ;PDR WHOSE ADDRESS IS IN R1
                                                                    ;WAS INCORRECT AFTER INIT
002402  005721                      TST     (R1)+                   ;MOVE POINTER
002404  077205                      SOB     R2,LOP11C               ;TEST ALL 8 PDR'S IN THIS SET
002406  077011                      SOB     R0,LOP11B               ;TEST ALL 2 REGISTER SETS
002410  005767  000014              TST     TST11F                  ;CHECK FOR BOTH PATTERNS USED
002414  001006                      BNE     EXIT11                  ;IF DONE, GO TO NEXT TEST
002416  005267  000006              INC     TST11F                  ;IF NOT, SET FLAG
002422  012704  052404              MOV     #52404,R4               ;LOAD 2ND PATTERN
002426  000740                      BR      TST11
002430  000000              TST11F: 0
002432  000240              EXIT11: NOP

                            ;SHOW THAT SR1 IS ONLY = 0 AND CANNOT BE LOADED
002434  104400              TEST12: SCOPE
002436  012706  001000              MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
002442  004767  013650              JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
002446  000012                      12                              ;TEST NUMBER
002450  104006                      HLT                             ;TEST EXECUTED OUT OF SEQUENCE
002452  012767  002000  013110      MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
002460  012777  177777  176342      MOV     #-1,@SR1                ;TRY TO LOAD SR1
002466  005777  176336              TST     @SR1
002472  001401                      BEQ     .+4
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002474  104006                      HLT                         ;SR1 INCORRECT - SHOULD HAVE TRACKED
                    ;SR2 SHOULD CONTAIN ADDRESS OF LAST FETCH WITH KT11-D TURNED OFF
                    ;CHECK THAT ABORT FREEZES SR2
002476  104400              TEST13: SCOPE
002500  012706  001000              MOV     #KSTACK,SP          ;INITIALIZE KERNEL STACK POINTER
002504  004767  013606              JSR     PC,ORDER            ;CHECK TEST SEQUENCE + INIT SR0
002510  000013                      13                          ;TEST NUMBER
002512  104006                      HLT                         ;TEST EXECUTED OUT OF SEQUENCE
002514  017701  176312      AD13:   MOV     @SR2,R1             ;PICK UP SR2 - SHOULD CONTAIN ADDRESS
002520  022701  002514              CMP     #AD13,R1            ;OF THIS INSTRUCTION
002524  001401                      BEQ     .+4
002526  104006                      HLT                         ;SR2 DID NOT CONTAIN FETCH ADDRESS
002530  052777  100000  176266 AD13A: BIS   #BIT15,@SR0         ;SET NR ABORT
002536  000240                      NOP
002540  022777  002530  176264      CMP     #AD13A,@SR2         ;CHECK IF SR2 FROZE
002546  001401                      BEQ     .+4
002550  104006                      HLT                         ;SR2 NOT BEING DISABLED BY NR ABORT
002552  042777  100000  176244      BIC     #BIT15,@SR0         ;CLEAR NR ABORT
002560  052777  040000  176236 AD13B: BIS   #BIT14,@SR0         ;SET PL ABORT
002566  000240                      NOP
002570  022777  002560  176234      CMP     #AD13B,@SR2         ;DID SR2 FREEZE
002576  001401                      BEQ     .+4
002600  104006                      HLT                         ;SR2 NOT BEING DISABLED BY PL ABORT
002602  042777  040000  176214      BIC     #BIT14,@SR0         ;CLEAR PL ABORT
002610  052777  020000  176206 AD13C: BIS   #BIT13,@SR0         ;SET RO ABORT
002616  000240                      NOP
002620  022777  002610  176204      CMP     #AD13C,@SR2         ;DID SR2 FREEZE
002626  001401                      BEQ     .+4
002630  104006                      HLT                         ;SR2 NOT BEING DISABLED BY RO ABORT

                    ;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
002632  104400              TEST14: SCOPE
002634  012706  001000              MOV     #KSTACK,SP          ;INITIALIZE KERNEL STACK POINTER
002640  004767  013452              JSR     PC,ORDER            ;CHECK TEST SEQUENCE + INIT SR0
002644  000014                      14                          ;TEST NUMBER
002646  104006                      HLT                         ;TEST EXECUTED OUT OF SEQUENCE
002650  004767  012416              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
002654  012777  001006  176212      MOV     #1006,@KPDR0        ;3 BLOCKS OF KERNEL PDR0 MUST BE MAPPED
                                                                ;TO ALLOW TRAPS AND ABORTS
002662  012767  000010  012700      MOV     #10,ICOUNT          ;DROP THE ITERATION COUNT
002670  012777  000400  176126      MOV     #400,@SR0           ;TURN ON DESTINATION ONLY RELOCATION
002676  000005                      RESET                       ;SHOULD CLEAR DEST ONLY  BIT, AND A
                                                                ;SOLID PLACE TO START
                                                                ;IF THE FETCH IS RELOCATED
                                                                ;THIS WILL GIVE A PL ABORT
002700  032777  000400  176116      BIT     #400,@SR0           ;IF KT11-D STILL ON, THIS SHOULD CAUSE
002706  001401                      BEQ     .+4                 ;PL AND NR ERRORS
002710  000000                      HALT                        ;IF KT11-D IS OFF, BIT 8 OF SR0 READS
                                                                ;AS STILL SET OR ANOTHER BIT IS INCORRECT
                                                                ;IF KT11-D IS ON, NO NR OR SL ABORT
                                                                ;OCCURRED AND RESET FAILED TO TURN KT11-D OFF
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D02


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002712  005077  176106              CLR     @SRO

                                ;SHOW THAT DESTINATION ONLY RELOCATION DOESN'T RELOCATE THE SOURCE
                                ;ADDRESS AND DOES RELOCATE THE DESTINATION
002716  104400                  TEST15: SCOPE
002720  012706  001000              MOV     #KSTACK,SP          ;INITIALIZE KERNEL STACK POINTER
002724  004767  013366              JSR     PC,ORDER            ;CHECK TEST SEQUENCE + INIT SRO
002730  000015                      15                          ;TEST NUMBER
002732  104006                      HLT                         ;TEST EXECUTED OUT OF SEQUENCE
002734  012767  000010  012626      MOV     #10,ICOUNT          ;KEEP THE NUMBER OF LOOPS DOWN
002742  004767  012324              JSR     %7,CLRALL
002746  012777  000001  176140      MOV     #1,@KPAR0           ;OFFSET KERNEL PAR/PDR PAIR 0 ONE BLOCK FROM BAN
002754  012777  077406  176112      MOV     #77406,@KPDR0
002762  012701  003034              MOV     #DATA16,R1          ;LOAD A BANK 0 ADDRESS
002766  012777  000400  176030      MOV     #400,@SRO           ;TURN ON DESTINATION ONLY RELOCATION
002774  021111                      CMP     @R1,@R1             ;THIS TEST WILL FAIL IF BOTH ARE
002776  001001                      BNE     .+4                 ;RELOCATED OR BOTH ARE NOT RELOCATED
003000  000000                      HALT                        ;SOURCE AND DESTINATION BOTH ADDRESSED SAME LOCA
003002  000005                      RESET                       ;TURN OFF DESTINATION-ONLY RELOCATION
003004  012701  002734              MOV     #DATA16-100,R1      ;LOAD DESTINATION ADDRESS MINUS RELOCATION FACTO
003010  012702  003034              MOV     #DATA16,R2          ;LOAD SOURCE ADDRESS
003014  012777  000400  176002      MOV     #400,@SRO           ;TURN ON DESTINATION-ONLY RELOCATION
003022  021211                      CMP     @R2,@R1             ;USE SAME INSTRUCTION AND ADDRESS
003024  001401                      BEQ     .+4                 ;MODES AS BEFORE
003026  000000                      HALT                        ;DESTINATION NOT RELOCATED OR INCORRECTLY
                                                                ;RELOCATED OR SOURCE RELOCATED
003030  000005                      RESET                       ;TURN OFF RELOCATION
003032  000401                      BR      .+4
003034  132465                  DATA16: 132465
                                ;SHOW THAT A DATO OF 0 TO BIT 8, SRO THRU KERNEL PAGE 7 WILL
                                ;CLEAR THE DESTINATION ONLY RELOCATION BIT AND TURN OFF DESTINATION ONLY RELOCATION
003036  104400                  TEST16: SCOPE
003040  012706  001000              MOV     #KSTACK,SP          ;INITIALIZE KERNEL STACK POINTER
003044  004767  013246              JSR     PC,ORDER            ;CHECK TEST SEQUENCE + INIT SRO
003050  000016                      16                          ;TEST NUMBER
003052  104006                      HLT                         ;TEST EXECUTED OUT OF SEQUENCE
003054  004767  012212              JSR     %7,CLRALL           ;INITIALIZE
003060  012777  000001  176026      MOV     #1,@KPAR0           ;MAP KERNEL PAR/PDR PAIR 0
                                                                ;TO BANK 0 OFFSET BY 1 PAGE
003066  012777  077406  176000      MOV     #77406,@KPDR0       ;USED TO PROVE KT11-D IS
                                                                ;TURNED OFF AFTER CLEARING BIT 8, SRO
003074  012701  003034              MOV     #DATA16,R1          ;SETUP R1 TO REFERENCE KERNEL PAR/PDR PAIR 0
003100  004767  013276              JSR     PC,KERN7            ;MAP KERNEL PAR/PDR 7 TO EXT BANK
003104  016702  175714              MOV     SRO,R2              ;SETUP R2 TO ADDRESS SRO
003110  012777  000400  175706      MOV     #400,@SRO           ;TURN ON DESTINATION ONLY RELOCATION
003116  005012                      CLR     @R2                 ;CLEAR SRO THRU KERNEL PAR/PDR PAIR7
003120  021111                      CMP     @R1,@R1             ;SHOW THAT KT11-D IS OFF
003122  001401                      BEQ     .+4
003124  000000                      HALT                        ;KT11-D STILL ON
003126  032777  000400  175670      BIT     #400,@SRO           ;SHOW THAT BIT 8, SRO IS NOW ZERO
003134  001402                      BEQ     .+6
003136  104006                      HLT                         ;DESTINATION ONLY RELOCATION BIT IS STILL ON
003140  000005                      RESET                       ;MAKE SURE THAT KT11-D IS OFF
                                ;SHOW THAT A DATO OF 0 TO BIT 8, SRO THRU USER PAGE 7
                                ;WILL TURN OFF DESTINATION - ONLY PAGING
003142  004767  012124              JSR     %7,CLRALL           ;INITIALLY CLEAR ALL PAR/PDR PAIRS
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003146  012777  000001  175700          MOV     #1,@UPAR0               ;MAP USER 0 TO
003154  012777  077406  175652          MOV     #77406,@UPDR0           ;BANK 0 OFFSET BY 1 PAGE, RW
003162  012701  003034                  MOV     #DATA16,R1              ;SETUP R1 TO REFERENCE USER 0
003166  012777  007600  175676          MOV     #7600,@UPAR7            ;MAP USER 7 TO THE
003174  012777  077406  175650          MOV     #77406,@UPDR7           ;EXTERNAL BANK
003202  016702  175616                  MOV     SR0,R2                  ;SETUP R2 TO ADDRESS SR0
003206  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
003214  012777  000400  175602          MOV     #400,@SR0               ;TURN ON DESTINATION - ONLY PAGING
003222  005012                          CLR     @R2                     ;CLEAR SR0 THRU USER ASR7
003224  021111                          CMP     @R1,@R1                 ;SHOW THAT KT11-D IS OFF
003226  001401                          BEQ     .+4
003230  000777                          BR      .                       ;RELOCATION STILL ON

                                ;SHOW THAT ALL PAGE BOUNDARY REFERENCES REFERENCE THE CORRECT PAR
                                ;AND RELOCATE CORRECTLY
                                ;USE DESTINATION - ONLY PAGING
                                ;MAP ALL PAR/PDR PAIR'S RESIDENT READ WRITE

                                ;       R0      - POINTS TO THE ADDRESS OF THE CURRENT PAR IN THE ADDRESS TABLE
                                ;       R1      - CONTAINS VIRTUAL ADDRESS BEING USED TO REFERENCE START OF PAGE
                                ;       R2      - CONTAINS VIRTUAL ADDRESS BEING USED TO REFERENCE END OF PAGE
                                ;       R3
                                ;       R4
                                ;       R5      - USED TO REFERENCE SR0 TO TURN OFF DESTINATION ONLY PAGING
003232  104400                  TEST17: SCOPE
003234  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003240  004767  013052                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
003244  000017                          17                              ;TEST NUMBER
003246  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
003250  004767  012016                  JSR     %7,CLRALL               ;INITIALIZE
003254  004767  012036                  JSR     %7,RWALL                ;MAKE ALL  PAR/PDR PAIR'S RW, BANK 0,4K
003260  013767  017700  175672          MOV     @#17700,SAVEA           ;SAVE CONTENTS OF LOCATIONS TO BE USED
003266  013767  017776  175666          MOV     @#17776,SAVEB
003274  012737  123456  017700          MOV     #123456,@#17700         ;SET UP LOCATIONS TO BE REFERENCED
003302  012737  134567  017776          MOV     #134567,@#17776
003310  012703  001012                  MOV     #K123,R3
003314  012704  001014                  MOV     #K134,R4
003320  012767  000100  012242          MOV     #100,ICOUNT             ;CHANGE ITERATION COUNT
003326  012737  140000  177776          MOV     #140000,@#PS            ;CHANGE TO USER
003334  012706  000400                  MOV     #USTACK,SP              ;SET UP USER STACK POINTER
003340  005037  177776                  CLR     @#PS                    ;RETURN TO KERNEL
003344  012767  001144  175602          MOV     #STATAB,STAPNT          ;SET UP TO REFERENCE STATE TABLE
003352  017700  175576          STA20:  MOV     @STAPNT,R0              ;PICK UP ADDRESS OF START OF
003356  062700  000020                  ADD     #20,R0                  ;ADDRESS TABLE FOR NEW STATE
003362  062767  000002  175564          ADD     #2,STAPNT
003370  017737  175560  177776          MOV     @STAPNT,@#PS            ;SET UP NEW STATE
003376  062767  000002  175550          ADD     #2,STAPNT
003404  012767  000010  175544          MOV     #8.,PAGES               ;SET UP COUNTER OF ASR'S LEFT TO TEST
003412  012770  007600  000016          MOV     #7600,@16(R0)           ;SET UP SEGMENTED REFERENCE TO SR0,
003420  016705  175400                  MOV     SR0,R5                  ;USED TO TURN DESTINATION - ONLY PAGING OFF
003424  005001                          CLR     R1
003426  012702  000076                  MOV     #76,R2
003432  012767  000200  175536  PAG20:  MOV     #128.,BLOCKS            ;SET UP BLOCK COUNT
003440  012770  000177  000000          MOV     #177,@(R0)              ;SET UP PAR
003446  022767  000001  175502          CMP     #1,PAGES                ;IS THIS PAGE 77 ,WAS USED
                                                                        ;FOR REFERENCE TO SR0.
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003454  001005                          BNE     BLK20                   ;IF NOT, BRANCH
003456  012770  007600  177776          MOV     #7600,@-2(R0)           ;YES, SET UP PAGE 6 FOR REFERENCES TO SPC
003464  042705  020000                  BIC     #20000,R5               ;CHANGE R5 TO POINT TO SPC THRU PAR/PDR PAIR6
003470  012777  000400  175326  BLK20:  MOV     #400,@SPC               ;TURN ON DESTINATION ONLY PAGING
003476  021311                          CMP     @R3,@R1                 ;CK BOTTOM PAGE BOUNDARY
003500  001401                          BEQ     .+4
003502  000000                          HALT                            ;RELOCATION FAILED
003504  021412                          CMP     @R4,@R2                 ;CK UPPER PAGE BOUNDARY
003506  001401                          BEQ     .+4
003510  000000                          HALT                            ;RELOCATION FAILED
003512  005015                          CLR     @R5                     ;TURN OFF KT11-D
003514  005370  000000                  DEC     @(R0)                   ;MAP PAR 1 PAGE LOWER
003520  062701  000100                  ADD     #100,R1                 ;SET UP R1 AND R2 TO REFERENCE
003524  062702  000100                  ADD     #100,R2                 ;NEXT VIRTUAL PAGE
003530  005367  175442                  DEC     BLOCKS                  ;DECREMENT COUNT OF PAGES LEFT
003534  001355                          BNE     BLK20                   ;BRANCH IF NOT DONE WITH THIS PAR/PDR PAIR
003536  005070  000000                  CLR     @(R0)
003542  005367  175410                  DEC     PAGES                   ;DECREMENT COUNT OF PAR/PDR PAIR'S LEFT
003546  001402                          BEQ     END20                   ;BRANCH IF ALL PAR/PDR PAIR'S IN THIS STATE DONE
003550  005720                          TST     (R0)+                   ;MOVE ADDRESS TABLE POINTER
003552  000727                          BR      PAG20
003554  026727  175374  001152  END20:  CMP     STAPNT,#STAEND          ;CHECK FOR ALL STATES TESTED
003562  003673                          BLE     STAT20                  ;IF NOT, BRANCH
003564  005037  177776                  CLR     @#PS                    ;IF DONE, REINTIALIZE
003570  005077  175230                  CLR     @SR0
003574  016727  175360  017700          MOV     SAVEA,#17700
003602  016727  175354  017776          MOV     SAVEB,#17776
003610  016777  175352  175346          MOV     KTSTA,@KTVEC
003616  005077  175344                  CLR     @KTSTA

                                ;SHOW THAT THE INSTRUCTIONS USED IN THE NEXT TEST RELOCATE CORRECTLY IN
                                ;DESTINATION ONLY RELOCATION
003622  104400                  TEST20: SCOPE
003624  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
003630  004767  012462                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
003634  000020                          20                              ;TEST NUMBER
003636  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
003640  012767  002000  011722          MOV     #2000,ICOUNT            ;RESTORE ITERATION COUNT
003646  004767  011420                  JSR     %7,CLRALL               ;CLEAR ALL KT11-D REGISTERS
003652  012777  000001  175234          MOV     #1,@KPAR0               ;OFFSET KERNEL I-SPACE PAGE 0
003660  012777  077406  175206          MOV     #77406,@KPDR0           ;BY 1 BLOCK FROM BANK 0
003666  004767  012510                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
003672  016701  175126                  MOV     SR0,R1                  ;SETUP R1 TO REFERENCE SR0
003676  016746  000054                  MOV     DST21A-100,-(SP)
003702  016746  000052                  MOV     DST21B-100,-(SP)
003706  016746  000050                  MOV     DST21C-100,-(SP)
003712  005067  000140                  CLR     DST21A                  ;INITIALIZE LOCATIONS TO BE
003716  012767  177777  000134          MOV     #-1,DST21B              ;WRITTEN INTO
003724  012767  177777  000130          MOV     #-1,DST21C
003732  012777  000400  175064          MOV     #400,@SR0               ;TURN ON DESTINATION - ONLY RELOCATION
003740  022737  176543  003642          CMP     #176543,@#AD21A-100     ;COMPARE THE CONTENTS OF AD21A
        003742                          AD21A=.-4                       ;WITH ITSELF, RELOCATED THRU KERNEL 0
003746  001401                          BEQ     .+4
003750  104006                          HLT                             ;DESTINATION - ONLY RELOCATION FAILED
                                                                        ;TO RELOCATE ONLY THE LAST CALCULATION
                                                                        ;OF THE CMP INSTRUCTION
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003752  122737  165432  003654          CMPB    #165432,@#AD21B-100     ;COMPARE THE CONTENTS OF AD21B
        003754                          AD21B=.-4                       ;WITH ITSELF, RELOCATED THRU KERNEL 0
003760  001401                          BEQ     .+4
003762  104006                          HLT

                                                                        ;DESTINATION - ONLY RELOCATION
                                                                        ;FAILED TO RELOCATE ONLY THE FINAL
                                                                        ;CALCULATION OF THE CMPB INSTRUCTION
003764  012737  077711  003756          MOV     #77711,@#DST21A-100     ;EXECUTE REMAINING INSTRUCTIONS
003772  005077  000066                  CLR     @AD21C
003776  105037  003762                  CLRB    @#DST21C-100
004002  005011                          CLR     @R1                     ;TURN OFF KT11-D
004004  022767  077711  000044          CMP     #77711,DST21A           ;CHECK LOCATION ADDRESSED BY MOV
004012  001401                          BEQ     .+4
004014  104006                          HLT

                                                                        ;MOV INSTRUCTION FAILED TO RELOCATE
                                                                        ;ONLY THE FINAL ADDRESS CALCULATION
004016  005767  000036                  TST     DST21B                  ;CHECK LOCATION ADDRESSED BY CLR
004022  001401                          BEQ     .+4
004024  104006                          HLT

                                                                        ;CLR INSTRUCTION FAILED TO RELOCATE
                                                                        ;CORRECTLY IN DESTINATION - ONLY RELOCATION
004026  022767  177400  000026          CMP     #177400,DST21C          ;CHECK LOCATION ADDRESSED BY CLRB
004034  001401                          BEQ     .+4
004036  104006                          HLT

                                                                        ;CLRB INSTRUCTION FAILED TO RELOCATE
                                                                        ;CORRECTLY IN DESTINATION - ONLY RELOCATION
004040  012667  177716                  MOV     (SP)+,DST21C-100        ;RESTORE LOCATIONS IN CASE OF ERROR
004044  012667  177702                  MOV     (SP)+,DST21B-100
004050  012667  177662                  MOV     (SP)+,DST21A-100
004054  000434                          BR      EXIT2!
004056  000000          DST21A: 0
004060  000000          DST21B: 0
004062  000000          DST21C: 0
004064  003762          AD21C:  DST21B-100
004066  000240          EXIT21: NOP

                                                                        ;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
                                                                        ;TEST BY USING THE NECESSARY VALUE IN KERNEL PAR 1, WITH THE SECOND
                                                                        ;NECESSARY VALUE BEING THE VIRTUAL ADDRESS REFERENCE TO KERNEL PAR 1
                                                                        ;CHECK THE RESULTING PHYSICAL ADDRESS BY READING THE CONTENTS OF THE LOCATION,
                                                                        ;AND WRITING INTO THE LOCATION
                                                                        ;NOTE THAT THIS INCLUDES CHECKS OF ADDRESS WRAP AROUND
004070  104400          TEST21: SCOPE
004072  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
004076  004767  012214          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
004102  000021                  21                              ;TEST NUMBER
004104  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
004106  004767  011160          JSR     %7,CLRALL               ;CLEAR ALL KT11-D REGISTERS
004112  012777  077406  174754  MOV     #77406,@KPDR0           ;MAP KERNEL 0 TO BANK 0, 4K, RW
004120  012777  077406  174750  MOV     #77406,@KPDR1           ;MAKE KERNEL 1 4K, RW
004126  004767  012250          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK

                                ;CHECK VIRTUAL ADDRESS OF 0 ADDED TO PAR OF -1 (FOR BIT POSITIONS
                                ;RELEVANT TO THE ADDERS ONLY)
004132  012777  007777  174756  MOV     #7777,@KPAR1            ;SET PAR TO -1
004140  012737  030000  177776  MOV     #30000,@#PS             ;SET UP LOCATION TO BE REFERENCED
004146  012777  000400  174650  MOV     #400,@SR0               ;TURN ON DESTINATION - ONLY PAGING
004154  122737  000060  020077  CMPB    #60,@#20077             ;CHECK HIGH BYTE OF RESULTING ADDRESS
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                                                           ; PS, - REFERENCED THRU PAR/PDR PAIR .
004162  001011                           BNE    ERR22A     ;BRANCH ON FAILURE
004164  105037  020077                   CLRB   @#20077    ;CLEAR PA 777777 THRU KERNEL 1
004170  005077  174630                   CLR    @SR0       ;TURN OFF KT11-D
004174  105737  177777                   TSTB   @#PS+1     ;CHECK TO SEE IF CORRECT LOCATION
004200  001401                           BEQ    .+4        ;WAS REFERENCED
004202  104006                           HLT               ;RELOCATION FAILED
004204  000405                           BR     CNT22B     ;GO TO NEXT CHECK
004206  005077  174612          ERR22A:  CLR    @SR0       ;TURN OFF KT11-D
004212  104006                           HLT               ;RELOCATION FAILED IN THE COMPARE
                                                           ;AT LOCATION ADR22A
004214  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). RESULT SHOULD BE PA 17712
004220  005077  174672          CNT22B:  CLR    @KPAR1     ;SET PAR TO 0
004224  012737  125252  017712           MOV    #125252,@#DESTAD  ;LOAD PHYSICAL LOCATION TO BE REFERENCED
                                                           ;ADDRESS 17712
004232  012777  000400  174564           MOV    #400,@SR0  ;TURN ON DESTINATION - ONLY PAGING
004240  022737  125252  037712           CMP    #125252,@#37712  ;RELOCATE THRU KERNEL PAR/PDR PAIR1
004246  001011                           BNE    ERR22B     ;BRANCH ON FAILURE
004250  005037  037712                   CLR    @#37712    ;CLEAR THRU KERNEL PAR/PDR PAIR1
004254  005077  174544                   CLR    @SR0       ;TURN OFF KT11-D
004260  005737  017712                   TST    @#17712    ;CHECK TO SEE IF CORRECT LOCATION
004264  001401                           BEQ    .+4        ;WAS CLEARED
004266  104006                           HLT               ;RELOCATION FAILED
004270  000403                           BR     CNT22C     ;GO TO NEXT CHECK
004272  005077  174526          ERR22B:  CLR    @SR0       ;TURN OFF KT11-D
004276  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
004300  012777  007777  174610  CNT22C:  MOV    #7777,@KPAR1  ;SET UP PAR TO -1
004306  012737  034343  000000           MOV    #34343,@#0    ;SET UP A VALUE IN LOCATION TO
                                                           ;BE REFERENCED (0)
004314  012777  000400  174502           MOV    #400,@SR0  ;TURN ON DESTINATION-ONLY PAGING
004322  022737  034343  020100           CMP    #34343,@#20100  ;EFFECTIVELY ADDS 1 TO PAR ADDRESS
                                                           ;TO GET PHYSICAL ADDRESS OF 0
004330  001013                           BNE    ERR22C     ;BRANCH ON FAILURE
004332  012737  000002  020100           MOV    #2,@#20100 ;WRITE SAME LOCATION
004340  005077  174460                   CLR    @SR0       ;TURN OFF KT11-D
004344  022737  000002  000000           CMP    #2,@#0     ;CHECK LOCATION WHICH SHOULD HAVE
004352  001401                           BEQ    .+4        ;BEEN REFERENCED
004354  104006                           HLT               ;RELOCATION FAILED WHEN WRITING PA 0
004356  000406                           BR     CNT22D     ;GO TO NEXT CHECK
004360  005077  174440          ERR22C:  CLR    @SR0       ;TURN OFF KT11-D
004364  104006                           HLT               ;RELOCATION FAILED IN THE COMPARE
004366  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
004374  012777  007601  174514  CNT22D:  MOV    #7601,@KPAR1  ;SET UP PAR TO 1, WITH HIGH BITS SET
004402  012737  043434  000000           MOV    #43434,@#0    ;SET UP A VALUE IN LOCATION TO
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                                                                        ;BE REFERENCED (0)
004410  012777  000400  174406            MOV     #400,@SR0             ;TURN ON DESTINATION-ONLY PAGING
004416  022737  043434  037700            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
004424  001013                          BNE     ERR22D                ;BRANCH ON FAILURE
004426  012737  000002  037700          MOV     #2,@#37700            ;WRITE SAME LOCATION
004434  005077  174364                  CLR     @SR0                  ;TURN OFF KT11-D
004440  022737  000002  000000          CMP     #2,@#0                ;CHECK LOCATION WHICH SHOULD HAVE
                                                                        ;BEEN REFERENCED
004446  001401                          BEQ     .+4
004450  104006                          HLT                           ;RELOCATION FAILED WHEN WRITING PA 0
004452  000406                          BR      CNT22E                ;GO TO NEXT CHECK
004454  005077  174344          ERR22D: CLR     @SR0                  ;TURN OFF KT11-D
004460  104006                          HLT                           ;RELOCATION FAILED IN THE COMPARE
                                                                        ;AT LOCATION ADR22D
004462  012737  000002  000000          MOV     #2,@#0                ;RESTORE LOCATION REFERENCED

                                        ;CHECK VIRTUAL ADDRESS -1 ADDED TO PAR OF -1
                                        ;SHOULD GIVE RESULTING PA 17677
                                        ;NOTE THAT THIS IS A CASE OF ADDRESS WRAP AROUND
004470  012777  007777  174420  CNT22E: MOV     #7777,@KPAR1          ;SET UP PAR TO -1
004476  013746  017676                  MOV     @#17676,-(SP)         ;SAVE CONTENTS OF LOCATION TO BE
                                                                        ;REFERENCED
004502  012737  076767  017676          MOV     #76767,@#17676        ;LOAD LOCATION TO BE REFERENCED
004510  012777  000400  174306          MOV     #400,@SR0             ;TURN ON DESTINATION-ONLY PAGING
004516  122737  000175  037777          CMPB    #175,@#37777          ;READ LOCATION (VA=-1, PAR=-1)
                                                                        ;SHOULD GIVE PA 17677 (THRU KERNEL PAR1
004524  001012                          BNE     ERR22E                ;BRANCH ON FAILURE
004526  105037  037777                  CLRB    @#37777               ;WRITE SAME LOCATION
004532  005077  174266                  CLR     @SR0                  ;TURN OFF KT11-D
004536  022737  000367  017676          CMP     #367,@#17676          ;CHECK TO SEE IF CORRECT LOCATION
004544  001401                          BEQ     .+4                   ;WAS CLEARED (HIGH BYTE)
004546  104006                          HLT                           ;RELOCATION FAILED WHEN CLEARING
                                                                        ;PHYSICAL ADDRESS 17667 (THRU
004550  000403                          BR      END22E                ;KERNEL PAR1)
004552  005077  174246          ERR22E: CLR     @SR0                  ;TURN OFF KT11-D
004556  104006                          HLT                           ;RELOCATION FAILED IN THE COMPARE AT
                                                                        ;LOCATION ADR22E
004560  012637  017676          END22E: MOV     (SP)+,@#17676         ;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
004564  104400                  TEST22: SCOPE
004566  012706  001000                  MOV     #KSTACK,SP            ;INITIALIZE KERNEL STACK POINTER
004572  004767  011520                  JSR     PC,ORDER              ;CHECK TEST SEQUENCE + INIT SR0
004576  000022                          22                            ;TEST NUMBER
004600  104006                          HLT                           ;TEST EXECUTED OUT OF SEQUENCE
004602  012767  000010  010760          MOV     #10,ICOUNT            ;DROP ITERATION COUNT
004610  004767  010456                  JSR     %7,CLRALL             ;INITIALLY CLEAR ALL KT11-D REGISTERS
004614  012777  000001  174272          MOV     #1,@KPAR0             ;MAP KERNEL PAGE 0 TO
004622  012777  077406  174244          MOV     #77406,@KPDR0         ;BANK 0 OFFSET BY 1 BLOCK
004630  004767  011546                  JSR     PC,KERN7              ;MAP KERNEL PAR/PDR 7 TO EXT BANK
004634  012767  052525  013050          MOV     #52525,DESTAD         ;INITIALIZE LOCATION  TO BE REFERENCED
004642  012777  000001  174154          MOV     #1,@SR0               ;TURN ON RELOCATION
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004650  000000                  ADD23:  HALT                    ;WITH RELOCATION ON, SHOULD FETCH
004652  000000                          HALT                    ;FROM 1 BLOCK ABOVE THIS
004654  000000                          HALT                    ;(ADD23A)
004656  000000                          HALT
004660  000000                          HALT
004662  000000                          HALT
004664  032777  000001  174132        BIT     #1,@SR0         ;WHEN KT11-D IS TURNED OFF, NEXT
                                                                ;FETCH SHOULD BE FROM HERE -
004672  001401                        BEQ     .+4             ;CHECK BIT 0, SR0
004674  104006                        HLT                     ;KT11-D OFF BUT SR0<0> STILL SET
                                                                ;AFTER AN INIT
004676  005077  174122                CLR     @SR0
004702  000432                        BR      EXIT23
        004750                          .=ADD23+100
004750  022737  052525  017612        CMP     #52525,@#DESTAD-100 ;WHEN KT11-D IS TURNED ON, NEXT
                                                                ;INSTRUCTION EXECUTED SHOULD
                                                                ;BE HERE - CK RELOCATION OF SOURCE
004756  001401                        BEQ     .+4             ;AND DESTINATION CALCULATIONS
004760  000000                        HALT                    ;RELOCATION FAILED IN A SOURCE OR
                                                                ;DESTINATION ADDRESS CALCULATION
                                                                ;WITH FULL RELOCATION ON (SR0<0>SET)
004762  000005                        RESET                   ;ISSUE INIT TO TURN OFF KT11-D
004764  000000                        HALT                    ;INIT DIDN'T TURN OFF KT11-D
004766  000777                        BR      .
004770  000240                  EXIT23: NOP

                                ;SHOW THAT A DATO OF 0 TO SR0<0> WILL CLEAR SR0<0> AND
                                ;TURN OFF RELOCATION
004772  104400                  TEST23: SCOPE
004774  012706  001000                MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
005000  004767  011312                JSR     PC,ORDER        ;CHECK TEST SEQUENCE + INIT SR0
005004  000023                        23                      ;TEST NUMBER
005006  104006                        HLT                     ;TEST EXECUTED OUT OF SEQUENCE
005010  012767  002000  010552        MOV     #2000,ICOUNT    ;RESTORE ITERATION COUNT
005016  004767  010250                JSR     %7,CLRALL       ;INITIALLY CLEAR ALL KT11-D REGISTERS
005022  012777  000001  174064        MOV     #1,@KPAR0       ;MAP KERNEL PAGE 0 TO
005030  012777  077406  174036        MOV     #77406,@KPDR0   ;BANK 0 OFFSET BY 1 BLOCK
005036  004767  011340                JSR     PC,KERN7        ;MAP KERNEL PAR/PDR 7 TO EXT BANK
005042  012777  000001  173754        MOV     #1,@SR0         ;TURN ON KT11-D
005050  000000                  ADD24:  HALT                    ;WHEN KT11-D IS TURNED ON, SHOULD
005052  000000                          HALT                    ;FETCH FROM THIS ADDRESS PLUS
005054  000000                          HALT                    ;ONE BLOCK (ADD24A)
005056  000240                          NOP
005060  000240                          NOP
005062  032777  000001  173734        BIT     #1,@SR0         ;AFTER KT11-D IS TURNED OFF, CHECK
005070  001401                        BEQ     .+4             ;SR0<0>
005072  104006                        HLT                     ;KT11-D OFF BUT SR0<0> STILL
                                                                ;SET AFTER A BIC #1,@SR0
005074  000433                        BR      EXIT24

        005150                          .=ADD24+100
005150  042777  000001  173646        BIC     #1,@SR0         ;WHEN KT11-D IS TURNED ON, SHOULD
                                                                ;RELOCATE FETCH TO HERE - TURN
                                                                ;OFF KT11-D VIA BIC OF SR0<0>
005156  000000                        HALT                    ;KT11-D STILL RELOCATING AFTER
005160  000005                        RESET                   ;BIC OF SR0<0>
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005162  000777                          BR      .
005164  000240                  EXIT24: NOP

                                ;SHOW THAT A REFERENCE TO A NON-RESIDENT PAGE
                                ;WILL ABORT TO THE KT11-D ABORT VECTOR ADDRESS (250)
                                ;WITH BIT 15 OF SR0 SET.  SR0 AND SR2 ARE CHECKED FOR
                                ;THE CORRECT VALUES, AS ARE KPDR0 AND KPDR1
                                ;SHOW THAT BIT 15 OF SR0 CAN BE CLEARED
                                ;SHOW THAT SR2 IS READ ONLY

005166  104400                  TEST24: SCOPE
005170  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005174  004767  011116                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
005200  000024                          24                              ;TEST NUMBER
005202  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
005204  004767  010062                  JSR     %7,CLRALL               ;CLEAR ALL KT11-D REGISTERS
005210  012777  077406  173656          MOV     #77406,@KPDR0           ;MAP KERNEL 0 TO BANK 0, RW, 4K
005216  004767  011160                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
005222  012777  005256  173734          MOV     #INT25,@KTVEC           ;SETUP RETURN VECTOR
005230  005077  173732                  CLR     @KTSTA
005234  012704  020000                  MOV     #20000,R4               ;USE R4 TO REFERENCE NR KERNEL 1
005240  005277  173560                  INC     @SR0                    ;TURN ON KT11-D
005244  005724                  ADR25:  TST     (R4)+                   ;REFERENCE NR KERNEL 1
005246  000000                  ADR25A: HALT                            ;SHOULD HAVE ABORTED ALREADY
005250  005077  173550                  CLR     @SR0                    ;TURN OFF KT11-D
005254  000442                          BR      DON25
005256  017701  173542          INT25:  MOV     @SR0,R1                 ;SAVE CONTENTS OF SR0
005262  005377  173536                  DEC     @SR0                    ;TURN OFF KT11-D
005266  022701  100003                  CMP     #100003,R1              ;CHECK SAVED CONTENTS OF SR0
005272  001401                          BEQ     .+4
005274  104006                          HLT                             ;SR0 INCORRECT AFTER NR ABORT
                                                                        ;(SEE SAVED CONTENTS IN R1)
005276  022777  005244  173526          CMP     #ADR25,@SR2             ;CK SR2
005304  001401                          BEQ     .+4
005306  104006                          HLT                             ;SR2 INCORRECT-SHOULD CONTAIN ADDRESS
                                                                        ;OF LAST FETCH BEFORE THE ABORT
005310  005077  173516                  CLR     @SR2                    ;TRY TO WRITE INTO SR2
005314  022777  005244  173510          CMP     #ADR25,@SR2             ;SR2 SHOULD BE READ ONLY
005322  001401                          BEQ     .+4
005324  104006                          HLT                             ;SR2 NOT READ ONLY
005326  022777  077506  173540          CMP     #77506,@KPDR0
005334  001401                          BEQ     .+4
005336  104006                          HLT                             ;KERNEL PDR 0 INCORRECT
                                                                        ;W BIT SHOULD HAVE BEEN SET BY THE STACK WRITE
005340  005777  173532                  TST     @KPDR1
005344  001401                          BEQ     .+4
005346  104006                          HLT                             ;KERNEL PDR 1 INCORRECT
005350  021627  005246                  CMP     (R6),#ADR25A            ;CHECK VALUE PUSHED ON STACK
005354  001401                          BEQ     .+4
005356  104006                          HLT                             ;INCORRECT VALUE ON STACK
005360  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK
005362  005077  173600          DON25:  CLR     @KTSTA                  ;CHANGE TRAP VECTOR TO CAUSE A
005366  016777  173574  173570          MOV     KTSTA,@KTVEC            ;HALT ON A FALSE TRAP
                                ;SHOW THAT WRITING A PAGE WILL SET THE W BIT IN THE CORRESPONDING
                                ;PDR, AND THAT NO OTHER W BITS SET AT THE SAME TIME
                                ;SHOW THAT WRITING THE PDR (VIA A DATO) WILL CLEAR THE W BIT
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                                ;SINCE THIS IS DONE FOR ALL PDR'S, THIS IS ALSO
                                ;A TEST OF INDIRECT ADDRESSING (VIA A VIRTUAL ADDRESS) OF THE PDR'S
005374  104400                  TEST25: SCOPE
005376  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005402  004767  010710                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SPC
005406  000025                          25                              ;TEST NUMBER
005410  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
005412  012767  000400  010150          MOV     #400,ICOUNT             ;LOAD ITERATION COUNT
005420  004767  007672                  JSR     %7,RWALL                ;MAP ALL PAR/PDR PAIR'S 4K, BANK 0, RW
005424  004767  010752                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
005430  012777  007600  173434          MOV     #7600,@UPAR7            ;MAP USER 7 TO EXTERNAL BANK
005436  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
005444  012706  000400                  MOV     #USTACK,R6              ;SET UP USER STACK
005450  005037  177776                  CLR     @#PS                    ;REINITIALIZE STATUS TO KERNEL MODE
005454  012704  001034                  MOV     #ADRTAB,R4
005460  012705  000010          LOP31A: MOV     #10,R5                  ;LOAD R4 WITH ADDRESS OF ADR TABLE
005464  022734  077406          LOP31B: CMP     #77406,@(R4)+           ;INIT COUNTER OF PDR'S LEFT TO CHECK
005470  001401                          BEQ     .+4                     ;CHECK ALL PDR W BITS BITS CLEAR
005472  104006                          HLT                             ;PDR INCORRECT - W BIT SET OR ANOTHER
                                                                        ;BIT INCORRECT IN PDR WHOSE ADDRESS
005474  077505                          SOB     R5,LOP31B               ;IS IN THE LOCATION POINTED TO BY R4
005476  062704  000020                  ADD     #20,R4                  ;MOVE POINTER TO FIRST ADR OF NEXT SET
005502  020427  001132                  CMP     R4,#ADREND
005506  003001                          BGT     CNT31A                  ;BRANCH IF DONE
005510  000763                          BR      LOP31A
005512  012700  001144          CNT31A: MOV     #STATAB,R0              ;SET UP START OF STATE TABLE
005516  012001                  LOP31C: MOV     (R0)+,R1        ;R1 CONTAINS ADDRESS OF PDR OF ADDRESS
005520  012702  017776                  MOV     #17776,R2               ;SET UP VIRTUAL ADDRESS TO BE REFERENCED
005524  012037  177776                  MOV     (R0)+,@#PS              ;SET UP STATUS FOR CURRENT MODE
005530  005277  173270          LOP31D: INC     @SR0            ;TURN ON KT11-D
005534  011212                          MOV     (R2),(R2)               ;REFERENCE PAGE TO SET W BIT
005536  005077  173262                  CLR     @SR0                    ;TURN OFF KT11-D
005542  032771  000100  000000          BIT     #100,@(R1)              ;CHECK W BIT
005550  001001                          BNE     .+4
005552  104006                          HLT                             ;W BIT NOT SET IN PDR AFTER PAGE WRITTEN
005554  012703  001034                  MOV     #ADRTAB,R3              ;SET UP ADDRESS OF ADDRESS TABLE
005560  012704  000010          LOP31E: MOV     #10,R4                  ;NOW CHECK ALL PDR TO SHOW NO OTHER
005564  020103                  LOP31F: CMP     R1,R3                   ;W BITS WERE SET
005566  001405                          BEQ     CNT31B
005570  032773  000100  000000          BIT     #100,@(R3)
005576  001401                          BEQ     .+4
005600  104006                          HLT                             ;W BIT SET IN THE PDR WHOSE ADDRESS IS POINTED T
                                                                        ;AS WELL AS THE W BIT IN THE PDR
                                                                        ;FOR THE PAGE THAT WAS WRITTEN
005602  005723                  CNT31B: TST     (R3)+                   ;UPDATE ADDRESS POINTER
005604  077411                          SOB     R4,LOP31F               ;TEST NEW PDW
005606  062703  000020                  ADD     #20,R3                  ;UPDATE POINTER TO NEXT SET
005612  020327  001132                  CMP     R3,#ADREND
005616  002760                          BLT     LOP31E
005620  012771  077406  000000          MOV     #77406,@(R1)            ;CLEAR W BIT VIA DATO TO PDR
005626  032771  000100  000000          BIT     #100,@(R1)              ;CHECK W BIT
005634  001401                          BEQ     .+4
005636  104006                          HLT                             ;W BIT DIDN'T CLEAR WHEN PDR
                                                                        ;WAS WRITTEN (ADDRESS OF ADDRESS
                                                                        ;OF PDR IS IN R1)
005640  005721                          TST     (R1)+                   ;UPDATE POINTER
```

```
005642  062702  020000                  ADD     #20000,R2               ;CHANGE VA TO REFERENCE NEXT PAGE
005646  103330                          BCC     LOP31D                  ;BRANCH TO TEST NEXT PAGE IN THIS MODE
005650  020027  001152                  CMP     R0,#STAEND              ;IF DONE THIS MODE, CHECK NEXT MODE
005654  002720                          BLT     LOP31C                  ;LOOP UNTIL ALL STATES HAVE BEEN TESTED
005656  005077  173142                  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
005662  104400                  TEST26: SCOPE
005664  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005670  004767  010422                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
005674  000026                          26                              ;TEST NUMBER
005676  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
005700  004767  007412                  JSR     %7,RWALL                ;MAP ALL PAGES RW,4K,BANK 0
005704  012777  000004  173164          MOV     #4,@KPDR1               ;MAP KERNEL 1 NR, 1 PAGE
005712  004767  010464                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
005716  012777  005742  173240          MOV     #RET33,@KTVEC           ;SETUP ABORT RETURN
005724  005077  173236                  CLR     @KTSTA
005730  005277  173070                  INC     @SR0                    ;TURN ON KT11-D
005734  005737  030000                  TST     @#30000                 ;REFERENCE NR KERNEL 1 - SHOULD ABORT
005740  000000                          HALT                            ;NO NR ABORT
005742  022777  140003  173054  RET33:  CMP     #140003,@SR0            ;CHECK SR0
005750  001401                          BEQ     .+4
005752  104006                          HLT                             ;SR0 INCORRECT - SHOULD SHOW KERNEL
                                                                        ;PAGE 1, AND BOTH NR + PL ERRORS SET
005754  005077  173044                  CLR     @SR0
005760  016777  173202  173176          MOV     KTSTA,@KTVEC            ;RESTORE TRAP CATCHER

                                ;SHOW THAT KERNEL AND USER STACKS ARE ACCESSED CORRECTLY. AN IOT IS DONE TO
                                ;EACH MODE. THE LOCATION WRITTEN INTO WHEN THE STACK IS PUSHED
                                ;SHOWS WHICH STACK WAS USED.
005766  104400                  TEST27: SCOPE
005770  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
005774  004767  010316                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
006000  000027                          27                              ;TEST NUMBER
006002  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
006004  004767  007262                  JSR     %7,CLRALL               ;INITIALIZE ALL KT11-D REGISTERS
006010  012705  000500                  MOV     #500,SP                 ;SET THE KERNEL STACK TO VIRTUAL ADDRESS 500
006014  012737  140000  177776          MOV     #140000,@#PS
006022  012706  000100                  MOV     #100,SP                 ;SET THE USER STACK TO VA 100
006026  005037  177776                  CLR     @#PS
006032  012777  077406  173034          MOV     #77406,@KPDR0           ;MAP KERNEL, AND USER TO BANK 0,4K,RW
006040  012777  077406  172766          MOV     #77406,@UPDR0
006046  012737  006114  000020          MOV     #KRET34,@#20            ;TEST USING IOT TRAP (THRU KERNEL SPACE)
006054  005037  000022                  CLR     @#22                    ;RETURN FROM TRAP IN KERNEL MODE
006060  016701  172740                  MOV     SR0,R1                  ;REFERENCE SR0 THRU R1
006064  004767  010312                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
006070  012777  077406  172754          MOV     #77406,@UPDR7           ;MAP USER PAGE 7
006076  012777  007600  172766          MOV     #7600,@UPAR7            ;TO THE EXTERNAL BANK
006104  005277  172714                  INC     @SR0                    ;TURN ON KT11-D
006110  000004                          IOT                             ;SHOULD USE STACK IN KERNEL ADDRESS SPACE
006112  000240                          NOP
006114  005011                  KRET34: CLR     @R1                     ;TURN OFF KT11-D
006116  012737  006150  000020          MOV     #URET34,@#20            ;SETUP FOR IOT TO USER
006124  012737  140000  000022          MOV     #140000,@#22
006132  012737  140000  177776          MOV     #140000,@#PS
```

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006140  005277  172660                  INC     @SR0                    ;TURN ON KT11-D
006144  000004                          IOT                             ;SHOULD USE STACK IN USER SPACE
006146  000240                          NOP
006150  005011                  URET34: CLR     @R1                     ;TURN OFF KT11-D
006152  022737  006112  000474          CMP     #KRET34-2,@#474
006160  001401                          BEQ     .+4
006162  104006                          HLT                             ;KERNEL STACK CONTENTS WRONG. PC NOT WHERE IT
006164  022737  000000  000476          CMP     #0,@#476                ;SHOULD HAVE BEEN PUSHED OR
```

B03


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006172  001401                          BEQ     .+4                     ;VALUE WRONG
006174  104006                          HLT                             ;KERNEL STACK WRONG-TRAP STATUS NOT
006176  022737  006146  000074          CMP     #URET34-2,@#74          ;NOT WHERE IT SHOULD HAVE BEEN PUSHED
006204  001401                          BEQ     .+4                     ;OR VALUE WRONG
006206  104006                          HLT                             ;USER STACK WRONG-PC NOT WHERE
006210  022737  140000  000076          CMP     #140000,@#76            ;IT SHOULD HAVE BEEN PUSHED
006216  001401                          BEQ     .+4                     ;OR VALUE WRONG
006220  104006                          HLT                             ;USER STACK WRONG-TRAP STATUS
                                                                        ;NOT WHERE IT SHOULD HAVE BEEN
                                                                        ;PUSHED OR VALUE WRONG
006222  012737  000076  000074          MOV     #76,@#74                ;REINITIALIZE LOCATIONS CHECKED
006230  005037  000076                  CLR     @#76
006234  012737  000476  000474          MOV     #476,@#474
006242  005037  000476                  CLR     @#476
006246  012706  001000                  MOV     #KSTACK,SP

                                ;SHOW THAT TRAP,EMT, AND INTERRUPTS TAKE VECTORS FROM KERNEL
                                ;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
                                ;NOTE THAT IF DUAL ADDRESSING OCCURS, THE ERROR
                                ;ADDRESS WILL BE USED (THE D OVERRIDES THE I)
006252  104400                  TEST30: SCOPE
006254  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
006260  004767  010032                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
006264  000030                          30                              ;TEST NUMBER
006266  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
006270  005077  172530                  CLR     @SR0
006274  004767  007016                  JSR     %7,RWALL                ;MAP ALL PAR/PDR PAIR'S RW, 4K, BANK 0
006300  012777  000001  172546          MOV     #1,@UPAR0               ;OFFSET USER 0 1 PAGE
006306  004767  010070                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
006312  012777  007600  172552          MOV     #7600,@UPAR7            ;MAP USER 7 TO THE EXTERNAL BANK
006320  016701  172500                  MOV     SR0,R1                  ;SETUP R1 TO REFERENCE SR0
006324  012737  140000  177776          MOV     #140000,@#PS            ;SETUP USER STACK
006332  012706  000400                  MOV     #USTACK,SP
006336  005037  177776                  CLR     @#PS
006342  012706  001000                  MOV     #KSTACK,SP              ;SETUP THE KERNEL STACK POINTER
006346  012737  006506  000130          MOV     #NG35B,@#130            ;SETUP FAILURE RETURN
006354  012737  006524  000030          MOV     #OK35B,@#30             ;SETUP SUCCESS RETURN
006362  005037  000132                  CLR     @#132
006366  005037  000032                  CLR     @#32
006372  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
006400  005277  172420                  INC     @SR0                    ;TURN ON KT11-D
006404  000000                          0
006406  000000                          0
006410  000000                          0
006412  000000                          0
006414  000000                          0
006416  000000                          0
006420  000000                          0
006422  000000                          0
006424  000000                          0
006426  000000                          0
006430  000000                          0
006432  000000                          0
006434  000000                          0
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006436  000000                                  0
006440  000000                                  0
006442  000000                                  0
006444  000000                                  0
006446  000000                                  0
006450  000000                                  0
006452  000000                                  0
006454  000000                                  0
006456  000000                                  0
006460  000000                                  0
006462  000000                                  0
006464  000000                                  0
006466  000000                                  0
006470  000000                                  0
006472  000000                                  0
006474  000000                                  0
006476  000000                                  0
006500  000000                                  0
006502  000000                                  0
006504  104000                                  EMT                             ;SHOULD PICK UP RETURN ADDRESS FROM KERNEL
006506  022626                          NG358:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
006510  005011                                  CLR     @R1                     ;TURN OFF KT11-D
006512  012737  016246  000030                  MOV     #EMTSRV,@#30
006520  104006                                  HLT                             ;EMT VECTOR DIDN'T GO THRU KERNEL
006522  000402                                  BR      IOT35
006524  022626                          OK358:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
006526  005011                                  CLR     @R1                     ;TURN OFF KT11-D
006530  012737  016246  000030          IOT35:  MOV     #EMTSRV,@#30            ;RESTORE EMT SERVICE POINTER
006536  012737  000340  000032                  MOV     #340,@#32
006544  012737  000132  000130                  MOV     #132,@#130
006552  005037  000132                          CLR     @#132
006556  012737  006716  000120                  MOV     #NG35C,@#120            ;SETUP IOT FAILURE RETURN
006564  012737  006726  000020                  MOV     #OK35C,@#20             ;SETUP IOT SUCCESS RETURN
006572  005037  000122                          CLR     @#122
006576  005037  000022                          CLR     @#22
006602  012737  140000  177776                  MOV     #140000,@#PS            ;SET MODE TO USER
006610  005277  172210                          INC     @SR0                    ;TURN ON KT11-D
006614  000000                                  0
006616  000000                                  0
006620  000000                                  0
006622  000000                                  0
006624  000000                                  0
006626  000000                                  0
006630  000000                                  0
006632  000000                                  0
006634  000000                                  0
006636  000000                                  0
006640  000000                                  0
006642  000000                                  0
006644  000000                                  0
006646  000000                                  0
006650  000000                                  0
006652  000000                                  0
006654  000000                                  0
006656  000000                                  0
006660  000000                                  0
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006662  000000
006664  000000
006666  000000
006670  000000
006672  000000
006674  000000
006676  000000
006700  000000
006702  000000
006704  000000
006706  000000
006710  000000
006712  000000
006714  000004
006716  022626                  N1350:  CMP     (SP)+,(SP)+             ;SHOULD PICK UP RETURN ADDRESS FROM KERNEL
006720  005011                          CLR     @R1                     ;RESTORE STACK POINTER
006722  104006                          EMT     6                       ;TURN OFF KT11-D
006724  000402                          BR      INT35                   ;TRAP VECTOR DIDN'T GO THRU KERNEL
006726  022626                  OK350:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
006730  005011                          CLR     @R1                     ;TURN OFF KT11-D
006732  012737  000022  000020  INT35:  MOV     #22,@#20
006740  005037  000022                  CLR     @#22
006744  012737  000122  000120          MOV     #122,@#120
006752  005037  000122                  CLR     @#122
006756  012737  007140  000164          MOV     #NG350,@#164            ;SETUP TTY FAILURE RETURN
006764  012737  007154  000064          MOV     #OK350,@#64             ;SETUP TTY SUCCESS RETURN
006772  005037  000166                  CLR     @#166
006776  005037  000066                  CLR     @#66
007002  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
007010  005277  172010                  INC     @SRC                    ;TURN ON KT11-D
007014  000000
007016  000000
007020  000000
007022  000000
007024  000000
007026  000000
007030  000000
007032  000000
007034  000000
007036  000000
007040  000000
007042  000000
007044  000000
007046  000000
007050  000000
007052  000000
007054  000000
007056  000000
007060  000000
007062  000000
007064  000000
007066  000000
007070  000000
007072  000000
007074  000000
007076  000000
```

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007100  000000                          0
007102  000000                          0
007104  000000                          0
007106  000000                          0
007110  000000                          0
007112  000000                          0
007114  012737  000100  177564          MOV     #100,@#177564           ;SET TTY INTERRUPT ENABLE-SHOULD
007122  000240                          NOP                             ;INTERRUPT IMMEDIATELY
007124  000240                          NOP
007126  005011                          CLR     @R1                     ;TURN OFF KT11-D
007130  005077  171662                  CLR     @TCSR                   ;CLEAR TTY IE
007134  104006                          HLT                             ;TTY FAILED TO INTERRUPT
007136  000412                          BR      ODDAD
007140  022626                  NG35D:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
007142  005011                          CLR     @R1                     ;TURN OFF KT11-D
007144  005077  171646                  CLR     @TCSR                   ;CLEAR TTY IE
007150  104006                          HLT                             ;TTY INTERRUPT DIDN'T GO THRU KERNEL
007152  000404                          BR      ODDAD
007154  022626                  OK35D:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
007156  005011                          CLR     @R1                     ;TURN OFF KT11-D
007160  005077  171632                  CLR     @TCSR
007164  012737  000066  000064  ODDAD:  MOV     #66,@#64                ;RESTORE TTY VECTOR RETURN TO CAUSE
007172  005037  000066                  CLR     @#66                    ;A HALT ON A FALSE INTERRUPT
007176  012737  000162  000160          MOV     #162,@#160
007204  005037  000162                  CLR     @#162
007210  005037  177776                  CLR     @#PS
007214  012737  007360  000104          MOV     #NG35E,@#104            ;SETUP INTERNAL TRAP FAILURE RETURN
007222  012737  000340  000106          MOV     #340,@#106
007230  012737  007370  000004          MOV     #OK35E,@#4              ;SETUP INTERNAL TRAP SUCCESS RETURN
007236  005037  000006                  CLR     @#6
007242  012737  140000  177776          MOV     #140000,@#PS            ;SET MODE TO USER
007250  005277  171550                  INC     @SR0                    ;TURN ON KT11-D
007254  000000                          0
007256  000000                          0
007260  000000                          0
007262  000000                          0
007264  000000                          0
007266  000000                          0
007270  000000                          0
007272  000000                          0
007274  000000                          0
007276  000000                          0
007300  000000                          0
007302  000000                          0
007304  000000                          0
007306  000000                          0
007310  000000                          0
007312  000000                          0
007314  000000                          0
007316  000000                          0
007320  000000                          0
007322  000000                          0
007324  000000                          0
007326  000000                          0
007330  000000                          0
007332  000000                          0
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007334  000000                          0
007336  000000                          0
007340  000000                          0
007342  000000                          0
007344  000000                          0
007346  000000                          0
007350  000000                          0
007352  000000                          0
007354  005737  000001                  TST     @#1                     ;ODD ADDRESS REFERENCE - AN "INTERNAL
                                                                        ;TRAP" SHOULD OCCUR
007360  022626                  NG35E:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
007362  005011                          CLR     @R1                     ;TURN OFF KT11-D
007364  104006                          HLT                             ;ODD ADDRESS TRAP DIDN'T TAKE
                                                                        ;VECTOR FROM KERNEL
007366  000407                          BR      END35
007370  022626                  OK35E:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
007372  005011                          CLR     @R1                     ;TURN OFF KT11-D
007374  032737  000340  177776          BIT     #340,@#PS               ;WAS CORRECT STATUS PICKED UP?
007402  001401                          BEQ     .+4                     ;YES- BRANCH
007404  104006                          HLT                             ;PICKED UP NEW STATUS WORD FROM USER SPACE
007406  012737  000006  000004  END35:  MOV     #6,@#4                  ;RESTORE TRAP CATCHER
007414  012737  000106  000104          MOV     #106,@#104


                                        ;SHOW THAT THE ABORT LOGIC "LOCKS" SR0, AND SR2 AFTER A NR
                                        ;ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0, WHEN
                                        ;THEY RESUME TRACKING. A NR ERROR SHOULD STILL ABORT TO 250 EVEN
                                        ;WHEN BIT 15 (SR0) IS ALREADY SET
007422  104400                  TEST31: SCOPE
007424  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
007430  004767  006662                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
007434  000031                          31                              ;TEST NUMBER
007436  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
007440  004767  005626                  JSR     %7,CLRALL               ;CLEAR ALL KT11-D REGISTERS
007444  004767  006732                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
007450  012777  077406  171416          MOV     #77406,@KPDR0           ;MAP KERNEL 0 RW,RK,BANK0
007456  012777  077400  171412          MOV     #77400,@KPDR1           ;MAP KERNEL 1 NR,4 K,BANK0
007464  012777  007520  171472          MOV     #INT36,@KTVEC           ;SETUP RETURN VECTOR
007472  005077  171470                  CLR     @KTSTA
007476  005277  171322                  INC     @SR0                    ;TURN ON KT11-D
007502  013737  037776  037776  ADR36:  MOV     @#37776,@#37776         ;REFERENCE KERNEL 1 - 1ST ABORT
007510  005077  171310                  CLR     @SR0                    ;TURN OFF KT11-D
007514  104006                          HLT                             ;REFERENCE TO KERNEL 1
007516  000510                          BR      DONE36                  ;DIDN'T ABORT
007520  042777  000001  171276  INT36:  BIC     #1,@SR0                 ;TURN OFF KT11-D
007526  022777  100002  171270          CMP     #100002,@SR0            ;CHECK SR0
007534  001401                          BEQ     .+4
007536  104006                          HLT                             ;SR0 INCORRECT AFTER NR ABORT
007540  012777  007574  171416          MOV     #INT36A,@KTVEC          ;SETUP NEW RETURN VECTOR
007546  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
007550  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
007554  052777  000001  171242          BIS     #1,@SR0                 ;TURN ON KT11-D
007562  012242                          MOV     (R2)+,-(R2)             ;REFERENCE KERNEL 1 -2ND ABORT
007564  005077  171234          ADR36A: CLR     @SR0            ;TURN OFF KT11-D
007570  104006                          HLT                             ;2ND REFERENCE TO KERNEL 1
007572  000462                          BR      DONE36                  ;DIDN'T ABORT
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007574  042777  000001  171222  INT36A: BIC     #1,@SR0         ;TURN OFF KT11-D
007602  022777  100002  171214          CMP     #100002,@SR0            ;CHECK SR0
007610  001401                          BEQ     .+4
007612  104006                          HLT                             ;SR0 INCORRECT AFTER 2ND NR ABORT
007614  022777  007502  171210          CMP     #ADR36,@SR2             ;CHECK SR2
007622  001401                          BEQ     .+4
007624  104006                          HLT                             ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
007626  021627  007564                  CMP     (R6),#ADR36A            ;CHECK ADDRESS PUSHED ON STACK
007632  001401                          BEQ     .+4
007634  104006                          HLT                             ;INCORRECT ADDRESS ON STACK
007636  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
007640  012777  007674  171316          MOV     #INT36B,@KTVEC          ;CHANGE RETURN ADDRESS
007646  005077  171152                  CLR     @SR0                    ;CLEAR NR ERROR BIT-SHOULD
                                                                        ;"UNLOCK" ERROR TRACKING

007652  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
007656  005277  171142                  INC     @SR0                    ;TURN ON KT11-D
007662  012242          ADR36B: MOV     (R2)+,-(R2)     ;3RD NR REFERENCE, ERROR BIT WAS CLEARED
007664  005077  171134  ADR36C: CLR     @SR0            ;TURN OFF KT11-D
007670  104006                          HLT                             ;3RD REFERENCE TO KERNEL 1
007672  000422                          BR      DONE36                  ;DIDN'T ABORT
007674  042777  000001  171122  INT36B: BIC     #1,@SR0         ;TURN OFF KT11-D
007702  022777  100002  171114          CMP     #100002,@SR0            ;CHECK SR0
007710  001401                          BEQ     .+4
007712  104006                          HLT                             ;SR0 INCORRECT
007714  022777  007662  171110          CMP     #ADR36B,@SR2            ;CHECK SR2
007722  001401                          BEQ     .+4
007724  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
                                                                        ;LAST FETCH ADDRESS BEFORE ABORT
007726  022716  007664                  CMP     #ADR36C,(SP)            ;CHECK STACK
007732  001401                          BEQ     .+4
007734  104006                          HLT                             ;PC ON STACK INCORRECT
007736  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
007740  005077  171060          DONE36: CLR     @SR0                    ;CLEAR ERROR BIT
007744  005077  171216                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
007750  016777  171212  171206          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT

                        ;SHOW THAT THE ABORT LOGIC "LOCKS" SR0, AND SR2 AFTER A PL
                        ;ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0, WHEN
                        ;THEY RESUME TRACKING. A PL ERROR SHOULD STILL ABORT TO 250 EVEN
                        ;WHEN BIT 14 (SR0) IS ALREADY SET
007756  104400          TEST32: SCOPE
007760  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
007764  004767  006326                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
007770  000032                          32                              ;TEST NUMBER
007772  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
007774  004767  005272                  JSR     %7,CLRALL               ;CLEAR ALL KT11-D REGISTERS
010000  004767  006376                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
010004  012777  077406  171062          MOV     #77406,@KPDR0           ;MAP KERNEL 0 RW,RK,BANK0
010012  012777  017406  171056          MOV     #17406,@KPDR1           ;MAP KERNEL 1 PL,1 K,BANK0
010020  012777  010054  171136          MOV     #INT37,@KTVEC           ;SETUP RETURN VECTOR
010026  005077  171134                  CLR     @KTSTA
010032  005277  170766                  INC     @SR0                    ;TURN ON KT11-D
010036  013737  037776  037776  ADR37:  MOV     @#37776,@#37776         ;REFERENCE KERNEL 1 - 1ST ABORT
010044  005077  170754                  CLR     @SR0                    ;TURN OFF KT11-D
010050  104006                          HLT                             ;REFERENCE TO KERNEL 1
010052  000510                          BR      DONE37                  ;DIDN'T ABORT
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010054  042777  000001  170742  INT37:  BIC     #1,@SR0                 ;TURN OFF KT11-D
010062  022777  040002  170734          CMP     #40002,@SR0             ;CHECK SR0
010070  001401                          BEQ     .+4
010072  104006                          HLT                             ;SR0 INCORRECT AFTER PL ABORT
010074  012777  010130  171062          MOV     #INT37A,@KTVEC          ;SETUP NEW RETURN VECTOR
010102  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
010104  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
010110  052777  000001  170706          BIS     #1,@SR0                 ;TURN ON KT11-D
010116  012242                          MOV     (R2)+,-(R2)             ;REFERENCE KERNEL 1 -2ND ABORT
010120  005077  170700          ADR37A: CLR     @SR0            ;TURN OFF KT11-D
010124  104006                          HLT                             ;2ND REFERENCE TO KERNEL 1
010126  000462                          BR      DONE37                  ;DIDN'T ABORT
010130  042777  000001  170666  INT37A: BIC     #1,@SR0         ;TURN OFF KT11-D
010136  022777  040002  170660          CMP     #40002,@SR0             ;CHECK SR0
010144  001401                          BEQ     .+4
010146  104006                          HLT                             ;SR0 INCORRECT AFTER 2ND PL ABORT
010150  022777  010036  170654          CMP     #ADR37,@SR2             ;CHECK SR2
010156  001401                          BEQ     .+4
010160  104006                          HLT                             ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
010162  021627  010120                  CMP     (R6),#ADR37A            ;CHECK ADDRESS PUSHED ON STACK
010166  001401                          BEQ     .+4
010170  104006                          HLT                             ;INCORRECT ADDRESS ON STACK
010172  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
010174  012777  010230  170762          MOV     #INT37B,@KTVEC          ;CHANGE RETURN ADDRESS
010202  005077  170616                  CLR     @SR0                    ;CLEAR PL ERROR BIT-SHOULD
                                                                        ;"UNLOCK" ERROR TRACKING
010206  012702  037776                  MOV     #37776,R2               ;SETUP R2 TO REFERENCE KERNEL 1
010212  005277  170606                  INC     @SR0                    ;TURN ON KT11-D
010216  012242          ADR37B: MOV     (R2)+,-(R2)     ;3RD PL REFERENCE, ERROR BIT WAS CLEARED
010220  005077  170600          ADR37C: CLR     @SR0            ;TURN OFF KT11-D
010224  104006                          HLT                             ;3RD REFERENCE TO KERNEL 1
010226  000422                          BR      DONE37                  ;DIDN'T ABORT
010230  042777  000001  170566  INT37B: BIC     #1,@SR0         ;TURN OFF KT11-D
010236  022777  040002  170560          CMP     #40002,@SR0             ;CHECK SR0
010244  001401                          BEQ     .+4
010246  104006                          HLT                             ;SR0 INCORRECT
010250  022777  010216  170554          CMP     #ADR37B,@SR2            ;CHECK SR2
010256  001401                          BEQ     .+4
010260  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
                                                                        ;LAST FETCH ADDRESS BEFORE ABORT
010262  022716  010220                  CMP     #ADR37C,(SP)            ;CHECK STACK
010266  001401                          BEQ     .+4
010270  104006                          HLT                             ;PC ON STACK INCORRECT
010272  022626                          CMP     (R6)+,(R6)+             ;RESTORE STACK POINTER
010274  005077  170524          DONE37: CLR     @SR0                    ;CLEAR ERROR BIT
010300  005077  170662                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
010304  016777  170656  170652          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT

                        ;SHOW THAT THE ABORT LOGIC "LOCKS"  SR0, AND SR2 AFTER A ACC
                        ;ABORT UNTIL THE CORRESPONDING ABORT BIT IS CLEARED IN SR0, WHEN
                        ;THEY RESUME TRACKING. A ACC ERROR SHOULD STILL ABORT TO 250 EVEN
                        ;WHEN BIT 13 (SR0) IS ALREADY SET
010312  104400          TEST33: SCOPE
010314  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
010320  004767  005772                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
010324  000033                          33                              ;TEST NUMBER
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010326  104006                          HLT             ;TEST EXECUTED OUT OF SEQUENCE
010330  004767  004736                  JSR     %7,CLRALL       ;CLEAR ALL KT11-D REGISTERS
010334  004767  006042                  JSR     PC,KERN7        ;MAP KERNEL PAR/PDR 7 TO EXT BANK
010340  012777  077406  170526          MOV     #77406,@KPDR0   ;MAP KERNEL 0 RW,RK,BANK0
010346  012777  077402  170522          MOV     #77402,@KPDR1   ;MAP KERNEL 1 ACC,4 K,BANK0
010354  012777  010410  170602          MOV     #INT40,@KTVEC   ;SETUP RETURN VECTOR
010362  005077  170600                  CLR     @KTSTA
010366  005277  170432                  INC     @SR0            ;TURN ON KT11-D
010372  013737  037776  037776  ADR40:  MOV     @#37776,@#37776 ;REFERENCE KERNEL 1 - 1ST ABORT
010400  005077  170420                  CLR     @SR0            ;TURN OFF KT11-D
010404  104006                          HLT                     ;REFERENCE TO KERNEL 1
010406  000510                          BR      DONE40          ;DIDN'T ABORT
010410  042777  000001  170406  INT40:  BIC     #1,@SR0         ;TURN OFF KT11-D
010416  022777  020002  170400          CMP     #20002,@SR0     ;CHECK SR0
010424  001401                          BEQ     .+4
010426  104006                          HLT                     ;SR0 INCORRECT AFTER ACC ABORT
010430  012777  010464  170526          MOV     #INT40A,@KTVEC  ;SETUP NEW RETURN VECTOR
010436  022626                          CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER
010440  012702  037776                  MOV     #37776,R2       ;SETUP R2 TO REFERENCE KERNEL 1
010444  052777  000001  170352          BIS     #1,@SR0         ;TURN ON KT11-D
010452  012242                          MOV     (R2)+,-(R2)     ;REFERENCE KERNEL 1 -2ND ABORT
010454  005077  170344          ADR40A: CLR     @SR0            ;TURN OFF KT11-D
010460  104006                          HLT                     ;2ND REFERENCE TO KERNEL 1
010462  000462                          BR      DONE40          ;DIDN'T ABORT
010464  042777  000001  170332  INT40A: BIC     #1,@SR0         ;TURN OFF KT11-D
010472  022777  020002  170324          CMP     #20002,@SR0     ;CHECK SR0
010500  001401                          BEQ     .+4
010502  104006                          HLT                     ;SR0 INCORRECT AFTER 2ND ACC ABORT
010504  022777  010372  170320          CMP     #ADR40,@SR2     ;CHECK SR2
010512  001401                          BEQ     .+4
010514  104006                          HLT                     ;SR2 DOESN'T CONTAIN VALUE FROM 1ST ABORT
010516  021627  010454                  CMP     (R6),#ADR40A    ;CHECK ADDRESS PUSHED ON STACK
010522  001401                          BEQ     .+4
010524  104006                          HLT                     ;INCORRECT ADDRESS ON STACK
010526  022626                          CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER
010530  012777  010564  170426          MOV     #INT40B,@KTVEC  ;CHANGE RETURN ADDRESS
010536  005077  170262                  CLR     @SR0            ;CLEAR ACC ERROR BIT-SHOULD
                                                                ;"UNLOCK" ERROR TRACKING
010542  012702  037776                  MOV     #37776,R2       ;SETUP R2 TO REFERENCE KERNEL 1
010546  005277  170252                  INC     @SR0            ;TURN ON KT11-D
010552  012242          ADR40B: MOV     (R2)+,-(R2)     ;3RD ACC REFERENCE, ERROR BIT WAS CLEARED
010554  005077  170244          ADR40C: CLR     @SR0            ;TURN OFF KT11-D
010560  104006                          HLT                     ;3RD REFERENCE TO KERNEL 1
010562  000422                          BR      DONE40          ;DIDN'T ABORT
010564  042777  000001  170232  INT40B: BIC     #1,@SR0         ;TURN OFF KT11-D
010572  022777  020002  170224          CMP     #20002,@SR0     ;CHECK SR0
010600  001401                          BEQ     .+4
010602  104006                          HLT                     ;SR0 INCORRECT
010604  022777  010552  170220          CMP     #ADR40B,@SR2    ;CHECK SR2
010612  001401                          BEQ     .+4
010614  104006                          HLT                     ;SR2 INCORRECT - SHOULD CONTAIN
                                                                ;LAST FETCH ADDRESS BEFORE ABORT
010616  022716  010554                  CMP     #ADR40C,(SP)    ;CHECK STACK
010622  001401                          BEQ     .+4
010624  104006                          HLT                     ;PC ON STACK INCORRECT
010626  022626                          CMP     (R6)+,(R6)+     ;RESTORE STACK POINTER
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010630  005077  170170          DONE40: CLR     @SR0                    ;CLEAR ERROR BIT
010634  005077  170326                  CLR     @KTSTA                  ;CHANGE TRAP RETURN TO CAUSE A HALT
010640  016777  170322  170316          MOV     KTSTA,@KTVEC            ;ON A FALSE INTERRUPT

                                ;SHOW THAT INIT CLEARS SR0<13-15>
010646  104400                  TEST34: SCOPE
010650  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
010654  004767  005436                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
010660  000034                          34                              ;TEST NUMBER
010662  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
010664  112777  000340  170134          MOVB    #340,@SR0H      ;SET SR0 BITS 13-15
010672  122777  000340  170126          CMPB    #340,@SR0H      ;MAKE SURE THEY SET CORRECTLY
010700  001401                          BEQ     .+4
010702  104006                          HLT                     ;SR0 INCORRECT (HIGH BYTE)
010704  000005                          RESET                   ;ISSUE INIT
010706  122777  000000  170112          CMPB    #0,@SR0H        ;CHECK SR0 HIGH BYTE
010714  001401                          BEQ     .+4
010716  104006                          HLT                     ;SR0 INCORRECT AFTER INIT
010720  012767  000010  004642          MOV     #10,ICOUNT      ;DROP ITERATION COUNT

                                ;SHOW THAT INIT CLEARS SR0 AFTER ABORT
010726  104400                  TEST35: SCOPE
010730  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
010734  004767  005356                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
010740  000035                          35                              ;TEST NUMBER
010742  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
010744  004767  004346                  JSR     %7,RWALL        ;MAP ALL PAR/PDR PAIR'S 4K,RW,BANK 0
010750  012777  000416  170116          MOV     #416,@KPDR0     ;MAP KERNEL 0 RW,4K LESS 1 PAGE
                                                                ;DOWN (100-17776 RW)
010756  004767  005420                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
010762  012777  077400  170106          MOV     #77400,@KPDR1   ;MAP KERNEL PAGE 1 NR
010770  012777  011024  170166          MOV     #RET2,@KTVEC    ;SETUP ABORT RETURN
010776  005077  170164                  CLR     @KTSTA
011002  012746  000020                  MOV     #20,-(SP)               ;SET T BIT IN STATUS ON STACK
011006  012746  011020                  MOV     #ADR2,-(SP)             ;SETUP ADDRESS ON STACK
011012  005277  170006                  INC     @SR0                    ;TURN ON KT11-D
011016  000002                          RTI                             ;SHOULD TRACE TRAP IMMEDIATELY SINCE T-BIT
                                                                        ;IS SET - SINCE T-BIT VECTOR IS OUTSIDE ALLOWED
                                                                        ;PAGE LENGTH, SHOULD DO A MEMORY
                                                                        ;MANAGEMENT ABORT
011020  000000          ADR2:   HALT                            ;NO PL ABORT OCCURRED
011022  000412                  BR      DONE2
011024  022777  040001  167772  RET2:   CMP     #40001,@SR0     ;CHECK SR0
011032  001401                  BEQ     .+4
011034  104006                  HLT                             ;SR0 INCORRECT - SHOULD SHOW
                                                                ;REFERENCE TO KERNEL 0
                                                                ;AND PL ABORT SHOULD BE SET
011036  000005                  RESET                           ;ISSUE INIT - SHOULD CLEAR SR0
011040  005777  167760                  TST     @SR0            ;CHECK SR0
011044  001401                  BEQ     .+4
011046  104006                  HLT                             ;SR0 INCORRECT AFTER INIT
011050  005077  167750  DONE2:  CLR     @SR0                    ;REINITIALIZE SR0
011054  016777  170106  170102          MOV     KTSTA,@KTVEC
011062  012737  000016  000014          MOV     #16,@#14                ;RESTORE T-BIT TRAP CATCHER

                                ;SHOW THAT INIT CLEARS SR0<0-3,5-6>
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                                ;REFERENCE NR USER PAGE 7 TO SET ALL BITS(0-6)
                                ;THEN ISSUE INIT
011070  104400                  TEST36: SCOPE
011072  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011076  004767  005214                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
011102  000036                          36                              ;TEST NUMBER
011104  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
011106  004767  004204                  JSR     %7,RWALL        ;MAP ALL PAR/PDR PAIR'S INITIALLY RW,4K,
                                                                ;BANK 0
011112  012777  077400  167732          MOV     #77400,@UPDR7   ;MAKE USER 7 NR
011120  004767  005256                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
011124  012777  011162  170032          MOV     #RET3,@KTVEC    ;SETUP ABORT RETURN
011132  005077  170030                  CLR     @KTSTA
011136  012737  140000  177776          MOV     #140000,@#PS    ;SET MODE TO USER
011144  012706  000400                  MOV     #USTACK,R6      ;SETUP USER STACK IN CASE NEEDED
011150  005277  167650                  INC     @SR0            ;TURN ON KT11-D
011154  005737  160000                  TST     @#160000        ;REFERENCE PAGE 7
011160  000777                          BR      .               ;NO ABORT ON NR REFERENCE
011162  022777  100157  167634  RET3:   CMP     #100157,@SR0    ;CHECK SR0
011170  001401                          BEQ     .+4
011172  104006                          HLT                             ;SR0 INCORRECT - SHOULD HAVE TRACKED
                                                                ;NR REFERENCE TO USER 7
011174  000005                          RESET                           ;ISSUE INIT
011176  005777  167622                  TST     @SR0            ;CHECK SR0
011202  001401                          BEQ     .+4
011204  104006                          HLT                             ;SR0 INCORRECT AFTER INIT
011206  005077  167612                  CLR     @SR0
011212  012767  000010  004350          MOV     #10,ICOUNT      ;DROP ITERATION COUNT
011220  016777  167742  167736          MOV     KTSTA,@KTVEC

                                ;SHOW THAT BYTE ADDRESSING OF SR0 WORKS
011226  104400                  TEST37: SCOPE
011230  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011234  004767  005056                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
011240  000037                          37                              ;TEST NUMBER
011242  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
011244  004767  004046                  JSR     %7,RWALL        ;MAP ALL PAR/PDR PAIRS RW,4K,BANK 0
011250  004767  005126                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
011254  012777  160001  167542          MOV     #160001,@SR0    ;TURN ON KT11-D AND SET ERROR FLAGS
011262  105077  167536                  CLRB    @SR0            ;DATOB (LOW) TO SR0
011266  032777  160000  167530          BIT     #160000,@SR0    ;CHECK SR0
011274  001001                          BNE     .+4
011276  104006                          HLT                             ;SR0 INCORRECT AFTER DATOB
011300  012777  160001  167516          MOV     #160001,@SR0
011306  105077  167514                  CLRB    @SR0H           ;DATOB (HIGH) TO SR0
011312  022777  000017  167504          CMP     #17,@SR0                ;CHECK SR0
011320  001401                          BEQ     .+4
011322  104006                          HLT                             ;SR0 INCORRECT AFTER DATOB
011324  005077  167474                  CLR     @SR0

                                ;SHOW THAT SR0 <1-3> TRACK PAGE REFERENCED IF
                                ;KT11-D IS ON AND REFERENCE IS NOT TO A KT11-D REGISTER
                                ;SHOW THAT EACH VALUE IS CORRECTLY "LOCKED" IN SR0 AFTER AN ABORT
011330  104400                  TEST40: SCOPE
011332  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011336  004767  004754                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
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011342  000040                          40                              ;TEST NUMBER
011344  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
011346  004767  003744                  JSR     %7,RWALL
011352  004767  005024                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
011356  012777  011434  167600          MOV     #RET5,@KTVEC
011364  005077  167576                  CLR     @KTSTA
011370  016701  167440                  MOV     UPDR0,R1
011374  005002                          CLR     R2
011376  012703  100141                  MOV     #100141,R3
011402  012704  000010                  MOV     #10,R4
011406  012711  077400          LOOP5:  MOV     #77400,@R1              ;MAKE USER NR
011412  012737  140000  177776          MOV     #140000,@#PS    ;ENTER USER MODE
011420  005277  167400                  INC     @SR0
011424  005712                          TST     @R2
011426  000777                          BR      .                       ;REFERENCE TO NR PAGE DIDN'T ABORT
011430  000005                          RESET                           ;AFTER ERROR, TURN OFF KT11-D
011432  000423                          BR      DONE5
011434  017705  167364          RET5:   MOV     @SR0,R5                 ;SAVE CONTENTS OF SR0
011440  005077  167360                  CLR     @SR0                    ;TURN OFF KT11-D
011444  020503                          CMP     R5,R3                   ;CHECK SAVED CONTENTS OF SR0
011446  001401                          BEQ     .+4
011450  104006                          HLT                             ;SR0 INCORRECT
011452  020167  167356                  CMP     R1,UPDR0                ;IS USER 0 UNDER TEST
011456  001002                          BNE     LOP5A                   ;NO, CONTINUE
011460  012711  077406                  MOV     #77406,@R1              ;MAKE USER 0 RESIDENT
011464  022626          LOP5A:  CMP     (R6)+,(R6)+
011466  005721                          TST     (R1)+
011470  062703  000002                  ADD     #2,R3
011474  062702  020000                  ADD     #20000,R2
011500  077436                          SOB     R4,LOOP5
011502  016777  167460  167454  DONE5:  MOV     KTSTA,@KTVEC
011510  005077  167452                  CLR     @KTSTA

                                ;SHOW THAT SR0 <5-6> TRACK PAGE REFERENCED (MODE) IF
                                ;KT11-D IS ON AND THE REFERENCE IS NOT TO A KT11-D REGISTER
                                ;SHOW THAT EACH VALUE IS CORRECTLY "LOCKED" IN SR0 AFTER AN ABORT
011514  104400                  TEST41: SCOPE
011516  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011522  004767  004570                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
011526  000041                          41                              ;TEST NUMBER
011530  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
011532  004767  003560                  JSR     %7,RWALL        ;MAP ALL PAGES RW,4K, BANK 0
011536  004767  004640                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
011542  012777  077400  167326          MOV     #77400,@KPDR1   ;SETUP PAGE 1 IN EACH MODE TO BE NR
011550  012777  077400  167260          MOV     #77400,@UPDR1
011556  012777  011604  167400          MOV     #RET7A,@KTVEC   ;SETUP ABORT RETURN
011564  005277  167234                  INC     @SR0            ;TURN ON KT11-D
011570  005737  020000                  TST     @#20000         ;REFERENCE PAGE 1 (NR)
011574  005077  167224                  CLR     @SR0            ;TURN OFF KT11-D
011600  104006                          HLT                     ;NR REFERENCE DIDN'T ABORT
011602  000436                          BR      DONE7
011604  017701  167214          RET7A:  MOV     @SR0,R1         ;SAVE SR0 CONTENTS IN R1
011610  005077  167210                  CLR     @SR0            ;TURN OFF KT11-D
011614  022701  100003                  CMP     #100003,R1      ;CHECK SAVED CONTENTS OF SR0
011620  001401                          BEQ     .+4
011622  104006                          HLT                     ;SR0 INCORRECT SHOULD SHOW NR ERR, KERNEL PAGE 1
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011624  012777  011660  167332          MOV     #RET7C,@KTVEC   ;SETUP NEXT ABORT RETURN
011632  012737  140000  177776          MOV     #140000,@#PS    ;CHANGE MODE TO USER
011640  005277  167160                  INC     @SR0            ;TURN ON KT11-D
011644  005737  020000                  TST     @#20000         ;REFERENCE USER PAGE 1 (NR)
011650  005077  167150                  CLR     @SR0            ;TURN OFF KT11-D
011654  104006                          HLT                     ;NR REFERENCE DIDN'T ABORT
011656  000410                          BR      DONE7
011660  017701  167140          RET7C:  MOV     @SR0,R1         ;SAVE CONTENTS OF SR0
011664  005077  167134                  CLR     @SR0            ;TURN OFF KT11-D
011670  022701  100143                  CMP     #100143,R1      ;CHECK SAVED CONTENTS OF SR0
011674  001401                          BEQ     .+4
011676  104006                          HLT                     ;SR0 INCORRECT - SHOULD SHOW NR
                                                                ;ERROR, USER PAGE 1
011700  016777  167262  167256  DONE7:  MOV     KTSTA,@KTVEC    ;RESTORE TRAP CATCHER

                                ;SHOW THAT SR0 (1-3,5-6) DOESN'T TRACK IF KT11-D IS OFF BUT DOES IF REFERENCE IS TO
                                ;AN INTERNAL (KT11-D) REGISTER
011706  104400                  TEST42: SCOPE
011710  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
011714  004767  004376                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
011720  000042                          42                              ;TEST NUMBER
011722  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
011724  004767  003366                  JSR     %7,RWALL        ;SET ALL PAR/PDR PAIRS RW, 4K, BANK 0
011730  012777  007600  167134          MOV     #7600,@UPAR7    ;MAP USER 7 TO THE EXT. BANK
011736  012737  140000  177776          MOV     #140000,@#PS    ;SET MODE TO USER
011744  005277  167054                  INC     @SR0            ;TURN ON KT11-D
011750  042777  000001  167046          BIC     #1,@SR0         ;TURN OFF KT11-D
011756  005037  177776                  CLR     @#PS            ;CHANGE TO KERNEL MODE
011762  022777  000156  167034          CMP     #156,@SR0       ;CHECK SR0
011770  001401                          BEQ     .+4
011772  104006                          HLT                     ;SR0 INCORRECT - SHOULD SHOW REFERENCE
                                                                ;TO USER 7
                                                                ;IF IT SHOWS USER 0
                                                                ;IT DID NOT TRACK THE INTERNAL REFERENCE
                                                                ;IF IT SHOWS KERNEL 0, IT IS
                                                                ;TRACKING WITH KT11-D OFF
011774  005077  167024                  CLR     @SR0

                        ;SHOW THAT IF AN INSTRUCTION IS COMPLETED BEFORE A MEMORY MANAGEMENT FAULT
                        ;OCCURS, SR2 WILL CONTAIN THE ADDRESS OFLAST FETCH BEFORE ABORT
                        ;TO TEST THIS, TRACE TRAP IS USED.  THE VECTOR IS MADE NON-RESIDENT BY MAKING
                        ;KERNEL PAGE 0 MAPPED DOWN FROM 17776 TO 100. THUS THE MEMORY MANAGEMENT
                        ;VECTOR IS RESIDENT WHILE THE TRACE TRAP VECTOR IS OUTSIDE THE ALLOWED
                        ;PAGE LENGTH.
012000  104400          TEST43: SCOPE
012002  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012006  004767  004304          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
012012  000043                  43                              ;TEST NUMBER
012014  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
012016  004767  003274          JSR     %7,RWALL        ;INITIALIZE ALL PAGES RW,4K,BANK 0
012022  012777  000416  167044  MOV     #416,@KPDR0     ;MAP KERNEL TO EXCLUDE
                                                        ;LOCATIONS 0 TO 77
012030  004767  004346          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
012034  012777  012072  167122  MOV     #RET11,@KTVEC   ;SETUP MEMORY MANAGEMENT ABORT RETURN
012042  005077  167120          CLR     @KTSTA
012046  012746  000020          MOV     #20,-(SP)       ;PREPARE STACK TO TURN ON T-BIT
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012052  012746  012060                  MOV     #.+6,-(SP)
012056  000006                          RTT                     ;SET T-BIT VIA RTT
012060  012777  000001  166736  ADR11:  MOV     #1,@SR0         ;TURN ON KT11-D - SHOULD
                                                                ;ATTEMPT TO TRACE TRAP AT END OF
                                                                ;INSTRUCTION - SHOULD GET A PAGE
                                                                ;LENGTH ERROR ON THAT ATTEMPT
012066  000000                          HALT                    ;NO PAGE LENGTH ERROR ON TRACE TRAP
012070  000415                          BR      CONT11
012072  042777  000001  166724  RET11:  BIC     #1,@SR0         ;TURN OFF KT11-D
012100  022777  040000  166716          CMP     #40000,@SR0     ;CK SR0
012106  001401                          BEQ     .+4
012110  104006                          HLT                     ;SR0 INCORRECT - PL FAULT,KERNEL 0 REFERENCE COMPLETED
012112  022777  012060  166712          CMP     #ADR11,@SR2     ;CK SR2
012120  001401                          BEQ     .+4
012122  104006                          HLT                     ;SR2 INCORRECT - SHOULD CONTAIN
                                                                ;ADDRESS OF  LAST FETCH BEFORE ABORT
012124  005077  166674          CONT11: CLR     @SR0            ;REINITIALIZE SR0
012130  016777  167032  167026          MOV     KTSTA,@KTVEC    ;RESTORE TRAP CATCHER

                        ;SHOW THAT HAVING THE ABORT ERROR
                        ;BITS SET WILL NOT PREVENT A MEMORY MANAGEMENT TRAP
012136  104400          TEST44: SCOPE
012140  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012144  004767  004146          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
012150  000044                  44                              ;TEST NUMBER
012152  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
012154  004767  003136          JSR     %7,RWALL        ;INITIALIZE ALL PAR/PDR PAIRS TO RW,4K, BANK 0
012160  012777  077402  166712  MOV     #77402,@KPDR2   ;SET KERNEL PAR/PDR PAIR 2 RPO,4K
012166  004767  004210          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
012172  012777  012234  166764  MOV     #RET13A,@KTVEC  ;SETUP MEMORY MANAGEMENT ABORT RETURN
012200  005077  166762          CLR     @KTSTA
012204  005277  166614          INC     @SR0            ;TURN ON KT11-D
012210  012777  160001  166606  MOV     #160001,@SR0    ;SET ABORT ERROR BITS
012216  013737  007000  047000  MOV     @#7000,@#47000  ;WRITE KERNEL PAR/PDR PAIR 2 (RR0)-SHOULD TRAP
012224  005077  166574          CLR     @SR0
012230  104006                  HLT                             ;NO TRAP OCCURRED
012232  000416                  BR      DONE13
012234  022626          RET13A: CMP     (SP)+,(SP)+             ;RESTORE THE STACK POINTER
012236  017701  166562          MOV     @SR0,R1         ;SAVE CONTENTS OF SR0
012242  005077  166556          CLR     @SR0            ;TURN OFF KT11-D
012246  022701  160017          CMP     #160017,R1
012252  001401                  BEQ     .+4
012254  104006                  HLT                             ;SAVED CONTENTS OF SR0 INCORRECT
012256  022777  077402  166614  CMP     #77402,@KPDR2   ;CHECK THE PDR CORRESPONDING TO THE TRAP REFERENCE
012264  001401                  BEQ     .+4
012266  104006                  HLT                             ;THE PDR CORRESPONDING TO THE TRAP REFERENCE IS INCORREC
012270  016777  166672  166666  DONE13: MOV     KTSTA,@KTVEC    ;RESTORE MEMORY MANAGEMENT TRAP RETURN
                                                                ;TO CAUSE A HALT ON A FALSE TRAP OR ABORT
012276  005077  166522          CLR     @SR0            ;REINITIALIZE SR0

                        ;SHOW THAT MEMORY MANAGEMENT WILL NOT TRAP ON AN INTERNAL REFERENCE
012302  104400          TEST45: SCOPE
012304  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
012310  004767  004002          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
012314  000045                  45                              ;TEST NUMBER
012316  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
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B04


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012320  004767  002772                  JSR     %7,RWALL          ;MAP ALL PAR/PDR PAIRS 4K, RW, BANK 0
012324  004767  004052                  JSR     PC,KERN7                    ;MAP KERNEL PAR/PDR 7 TO EXT BANK
012330  012777  012372  166626          MOV     #RET16,@KTVEC     ;SETUP TRAP RETURN IN CASE
012336  005077  166624                  CLR     @KTSTA
012342  005277  166456                  INC     @SR0              ;TURN ON KT11-D
012346  005777  166452                  TST     @SR0              ;TRAP REFERENCE TO A KT11-D REGISTER
012352  005077  166446                  CLR     @SR0
012356  022777  077406  166526          CMP     #77406,@KPDR7
012364  001401                          BEQ     .+4
012366  104006                          HLT
012370  000404                          BR      DONE16
012372  042777  000001  166424  RET16:  BIC     #1,@SR0
012400  104006                          HLT
012402  005077  166416          DONE16: CLR     @SR0
012406  016777  166554  166550          MOV     KTSTA,@KTVEC

                                ;TEST PAGE LENGTH ERROR CHECKING (EXPAND DOWN NOT SET)
                                ;KERNEL PAR/PDR PAIR1 IS USED WITH ALL PAGE LENGTH VALUES
                                ;SHOW THAT REFERENCES TO BOTH BOUNDARIES OF THE ALLOWED AREA DON'T TRAP OR ABORT
                                ;SHOW THAT A REFERENCE TO THE FIRST WORD BEYOND THE ALLOWABLE AREA DOES TRAP
012414  104400                  TEST46: SCOPE
012416  012706  001000                  MOV     #KSTACK,SP                  ;INITIALIZE KERNEL STACK POINTER
012422  004767  003670                  JSR     PC,ORDER                    ;CHECK TEST SEQUENCE + INIT SR0
012426  000046                          46                                  ;TEST NUMBER
012430  104006                          HLT                                 ;TEST EXECUTED OUT OF SEQUENCE
012432  004767  002660                  JSR     %7,RWALL          ;INITIALIZE ALL PAR/PDR PAIRS TO RW,4K, BANK  0
012436  004767  003740                  JSR     PC,KERN7                    ;MAP KERNEL PAR/PDR 7 TO EXT BANK
012442  012702  000006                  MOV     #6,R2             ;R2 CONTAINS VALUE TO BE LOADED IN THE
                                                                  ;PDR BEING CHECKED (INCLUDING PLF)
012446  012701  020076                  MOV     #20076,R1         ;R1 IS USED TO REFERENCE THE TOP ADDRESS
                                                                  ;WITHIN THE ALLOWED AREA
012452  012777  012532  166504  LOOP23: MOV     #RET23A,@KTVEC    ;SETUP ABORT RETURN IN CASE REFERENCE
012460  005077  166502                  CLR     @KTSTA            ;WITHIN ALLOWED AREA ABORTS
012464  005277  166334                  INC     @SR0              ;TURN ON KT11-D
012470  010277  166402                  MOV     R2,@KPDR1         ;SET KERNEL PAR/PDR PAIR 1 TO NEW PAGE LENGTH
012474  005737  020000                  TST     @#20000           ;READ LOWER BOUNDARY-SHOULDN'T ABORT
012500  005711                          TST     @R1               ;READ UPPER ALLOWED BOUNDARY-SHOULDN'T
                                                                  ;ABORT
012502  012777  012552  166454          MOV     #RET23B,@KTVEC    ;SETUP ABORT RETURN
012510  020127  037776                  CMP     R1,#37776         ;CHECK FOR DONE (TO AVOID REFERENCING
                                                                  ;NEXT PAR/PDR PAIR)
012514  103041                          BHIS    DONE23            ;EXIT LOOP IF DONE
012516  005761  000002                  TST     2(R1)             ;REFERENCE OUTSIDE ALLOWED AREA -
                                                                  ;SHOULD ABORT
012522  005077  166276                  CLR     @SR0              ;TURN KT11-D OFF
012526  104006                          HLT                       ;NO ABORT OCCURRED ON A REFERENCE
012530  000426                          BR      CONT23            ;OUTSIDE THE ALLOWED PAGE LENGTH
012532  042777  000001  166264  RET23A: BIC     #1,@SR0           ;TURN OFF KT11-D
012540  022626                          CMP     (SP)+,(SP)+       ;RESTORE STACK POINTER
012542  104006                          HLT                       ;REFERENCE WITHIN ALLOWED AREA
012544  005077  166254                  CLR     @SR0              ;CLEAR ERROR BITS
012550  000416                          BR      CONT23            ;CAUSED A TRAP OR ABORT
012552  022626                  RET23B: CMP     (SP)+,(SP)+       ;RESTORE STACK POINTER
012554  017703  166244                  MOV     @SR0,R3           ;SAVE CURRENT SR0
012560  005077  166240                  CLR     @SR0              ;TURN OFF KT11-D
012564  022703  040003                  CMP     #40003,R3         ;CK SAVED SR0
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012570  001401                          BEQ     .+4
012572  104006                          HLT
                                                        ;CONTENTS OF SRC INCORRECT AFTER
                                                        ;PAGE LENGTH ERROR ABORT
012574  022777  000002  166222          CMP     #2,@SRC ;CHECK SRC TO BE SURE PL BIT CLEARED
012602  001401                          BEQ     .+4
012604  104006                          HLT
                                                        ;SRC INCORRECT AFTER CLEARING IT
                                                        ;ONLY KERNEL PAGE 1 SHOULD STILL BE SET
012606  062701  000100          CONT23: ADD     #100,R1 ;SETUP R1 TO REFERENCE BOUNDARY OF
                                                        ;NEXT PAGE
012612  062702  000400                  ADD     #400,R2 ;ADD 1 TO VALUE TO BE LOADED IN
                                                        ;PAGE LENGTH FIELD
012616  000715                          BR      LOOP23  ;CHECK NEXT PAGE LENGTH VALUE
012620  005077  166200          DONE23: CLR     @SRC    ;TURN OFF KT11-D
012624  016777  166336  166332          MOV     KTSTA,@KTVEC    ;RESTORE MEMORY MANAGEMENT ABORT RETURN
012632  005077  166330                  CLR     @KTSTA  ;TO CAUSE HALT ON A FALSE TRAP
                                                        ;OR ABORT

                                ;TEST PAGE LENGTH ERROR CHECKING (EXPAND DOWN SET)
                                ;KERNEL PAR/PDR PAIR1 IS TESTED WITH ALL VALUES OF PAGE LENGTH FIELD
                                ;SHOW THAT REFERENCES TO BOTH BOUNDARIES OF THE ALLOWED AREA DON'T TRAP OR ABORT
                                ;SHOW THAT A REFERENCE TO THE WORD IMMEDIATELY BELOW THE ALLOWED AREA DOES TRAP
012636  104400                  TEST47: SCOPE
012640  012706  001000                  MOV     #KSTACK,SP      ;INITIALIZE KERNEL STACK POINTER
012644  004767  003446                  JSR     PC,ORDER        ;CHECK TEST SEQUENCE + INIT SRC
012650  000047                          47                      ;TEST NUMBER
012652  104006                          HLT                     ;TEST EXECUTED OUT OF SEQUENCE
012654  004767  002436                  JSR     %7,RWALL        ;INITIALIZE ALL PAR/PDR PAIRS TO RW,4K, BANK 0
012660  004767  003516                  JSR     PC,KERN7        ;MAP KERNEL PAR/PDR 7 TO EXT BANK
012664  012702  077416                  MOV     #77416,R2       ;R2 CONTAINS VALUE TO BE LOADED IN THE
                                                                ;PDR BEING CHECKING (INCLUDING PLF)
012670  012701  037700                  MOV     #37700,R1       ;R1 IS USED TO REFERENCE THE LOWEST
                                                                ;ALLOWED ADDRESS IN THE PAGE
012674  012777  012754  166262  LOOP24: MOV     #RET24A,@KTVEC  ;SETUP ABORT RETURN IN CASE REFERENCE
012702  005077  166260                  CLR     @KTSTA          ;WITHIN ALLOWED AREA ABORTS
012706  005277  166112                  INC     @SRC            ;TURN ON KT11-D
012712  010277  166160                  MOV     R2,@KPDR1       ;SET KERNEL PAR/PDR PAIR 1 TO NEW PAGE LENGTH
012716  005737  037776                  TST     @#37776         ;REFERENCE UPPER ALLOWED BOUNDARY
012722  005711                          TST     @R1             ;REFERENCE LOWER ALLOWED BOUNDARY
                                                                ;- NEITHER REFERENCE SHOULD ABORT
012724  012777  012766  166232          MOV     #RET24B,@KTVEC  ;SETUP ABORT RETURN
012732  020127  020000                  CMP     R1,#20000       ;CHECK FOR DONE
012736  001436                          BEQ     DONE24          ;EXIT LOOP IF DONE
012740  005761  177776                  TST     -2(R1)          ;REFERENCE BELOW ALLOWED AREA -
                                                                ;SHOULD ABORT
012744  005077  166054                  CLR     @SRC            ;TURN KT11-D OFF
012750  104006                          HLT                     ;NO ABORT OCCURRED ON A REFERENCE
012752  000423                          BR      CONT24          ;OUTSIDE THE ALLOWED PAGE LENGTH
012754  005077  166044          RET24A: CLR     @SRC            ;TURN OFF KT11-D AND CLEAR
                                                                ;ERROR BITS
012760  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
012762  104006                          HLT                     ;REFERENCE WITHIN ALLOWED AREA CAUSED
012764  000416                          BR      CONT24          ;A TRAP OR ABORT
012766  022626                  RET24B: CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
012770  017703  166030                  MOV     @SRC,R3         ;SAVE CURRENT SRC
012774  005077  166024                  CLR     @SRC            ;TURN OFF KT11-D
013000  022703  040003                  CMP     #40003,R3       ;CK SAVED SRC
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013004  001401                          BEQ     .+4
013006  104006                          HLT                     ;CONTENTS OF SR0 INCORRECT AFTER
                                                                ;PAGE LENGTH ERROR ABORT
013010  022777  000002  166006          CMP     #2,@SR0         ;CHECK SR0 TO BE SURE PL BIT CLEARED
013016  001401                          BEQ     .+4
013020  104006                          HLT                     ;SR0 INCORRECT AFTER CLEARING IT
013022  162701  000100          CONT24: SUB     #1.0,R1         ;SETUP R1 TO REFERENCE BOUNDARY
                                                                ;OF NEXT PAGE DOWN
013026  162702  000400                  SUB     #400,R2         ;INCREASE ALLOWED PAGE LENGTH
                                                                ;(DOWN) BY 1 PAGE
013032  000720                          BR      LOOP24          ;CHECK NEXT PAGE LENGTH VALUE
013034  005077  165764          DONE24: CLR     @SR0            ;TURN OFF KT11-D
013040  016777  166122  166116          MOV     KTSTA,@KTVEC    ;RESTORE MEMORY MANAGEMENT ABORT RETURN
013046  005077  166114                  CLR     @KTSTA          ;TO CAUSE A HALT ON A FALSE TRAP
                                                                ;OR ABORT

                                        ;TEST ALL COMBINATIONS OF VALUES FOR THE PAGE LENGTH COMPARATORS-
                                        ;USE KERNEL PAGE PAGE 1
013052  104400                  TEST50: SCOPE
013054  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013060  004767  003232                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
013064  000050                          50                              ;TEST NUMBER
013066  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
013070  012767  000020  002472          MOV     #20,ICOUNT      ;DROP ITERATION COUNT
013076  004767  002214                  JSR     %7,RWALL        ;INITIALIZE ALL PAGES RW, BANK 0
013102  004767  003274                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
013106  012777  013220  166050          MOV     #RET25,@KTVEC   ;SETUP ABORT RETURN
013114  005077  166046                  CLR     @KTSTA
013120  012701  000006                  MOV     #6,R1           ;R1 CONTAINS THE VALUE TO BE
                                                                ;LOADED INTO THE PDR
013124  012777  000001  165672          MOV     #1,@SR0         ;TURN ON KT11-D
013132  012703  020000          L25A:   MOV     #20000,R3       ;R3 CONTAINS VA USED
013136  010177  165734                  MOV     R1,@KPDR1       ;LOAD NEW PAGE LENGTH FIELD
013142  010102                  L25B:   MOV     R1,R2           ;R2 IS A COPY OF R1
013144  010304                          MOV     R3,R4           ;R4 IS A COPY OF R3
013146  042704  160000                  BIC     #160000,R4
013152  005713                          TST     (R3)            ;USE VA IN R3 TO REFERENCE PAGE 1
013154  000302                          SWAB    R2              ;NO TRAP-CHECK TO MAKE SURE
013156  042702  177400                  BIC     #177400,R2
013162  006304                          ASL     R4              ;VIRTUAL ADDRESS WAS WITHIN
013164  006304                          ASL     R4
013166  000304                          SWAB    R4
013170  020402                          CMP     R4,R2           ;ALLOWED PAGE LENGTH
013172  003401                          BLE     .+4
013174  104006                          HLT                     ;REFERENCE OUTSIDE ALLOWED PAGE LENGTH
                                                                ;DIDN'T ABORT
013176  062703  000100          C25:    ADD     #100,R3
013202  020327  037776                  CMP     R3,#37776
013206  003755                          BLE     L25B
013210  062701  000400                  ADD     #400,R1
013214  100346                          BPL     L25A
013216  000413                          BR      DONE25
013220  022626                  RET25:  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
013222  000302                          SWAB    R2              ;CHECK TO MAKE SURE VIRTUAL
013224  042702  177400                  BIC     #177400,R2
013230  006304                          ASL     R4              ;ADDRESS WAS OUTSIDE ALLOWED
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013232  006304                          ASL     R4
013234  000304                          SWAB    R4
013236  020402                          CMP     R4,R2           ;PAGE LENGTH
013240  003001                          BGT     .+4
013242  104006                          HLT                     ;REFERENCE WITHIN ALLOWED
013244  000754                          BR      C25             ;PAGE LENGTH ABORTED-R3 CONTAINS
                                                                ;VA USED, R1 CONTAINS VALUE
                                                                ;LOADED INTO THE PDR
013246  016777  165714  165710  DONE25: MOV     KTSTA,@KTVEC
013254  005077  165544                  CLR     @SR0

                                ;SHOW THAT THE W BIT DOESN'T SET IF THE KT11-D IS OFF
013260  104400                  TEST51: SCOPE
013262  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013266  004767  003024                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
013272  000051                          51                              ;TEST NUMBER
013274  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
013276  012767  002000  002264          MOV     #2000,ICOUNT    ;RESTORE ITERATION COUNT
013304  004767  001762                  JSR     %7,CLRALL       ;CLEAR ALL KT11-D REGISTERS
013310  013737  010000  010000          MOV     @#10000,@#10000 ;WRITE BANK 0
013316  005777  165552                  TST     @KPDR0
013322  001401                          BEQ     .+4
013324  104006                          HLT                     ;W BIT SET OR ANOTHER BIT INCORRECT
                                                                ;IN KERNEL 0 PDR

                                ;SHOW THAT THE W BIT IS CLEARED BY WRITING (VIA DATO) THE CORRESPONDING PAR
                                ;CHECK EACH PDR
013326  104400                  TEST52: SCOPE
013330  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013334  004767  002756                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
013340  000052                          52                              ;TEST NUMBER
013342  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
013344  004767  001746                  JSR     %7,RWALL
013350  004767  003026                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
013354  012777  007600  165510          MOV     #7600,@UPAR7    ;MAP USER 7 TO EXTERNAL BANK
013362  012737  140000  177776          MOV     #140000,@#PS    ;SET MODE TO USER
013370  012706  000400                  MOV     #USTACK,R6      ;SETUP USER STACK
013374  012700  001144                  MOV     #STATAB,R0      ;SET UP KT REG TABLE POINTER
013400  012001                  LOP27:  MOV     (R0)+,R1        ;R1 CONTAINS ADDRESS OF
                                                                ;ADDRESS OF CURRENT PDR
013402  012702  017776                  MOV     #17776,R2       ;R2 CONTAINS VIRTUAL ADDRESS TO
                                                                ;REFERENCE DESIRED PAGE
013406  012037  177776                  MOV     (R0)+,@#PS      ;SETUP STATUS FOR CURRENT MODE
013412  005277  165406          LOP27A: INC     @SR0            ;TURN ON KT11-D
013416  011212                          MOV     (R2),(R2)       ;WRITE
013420  005077  165400                  CLR     @SR0            ;TURN OFF KT11-D
013424  004767  000016                  JSR     %7,CKWBIT       ;TEST W BIT
013430  062702  020000                  ADD     #20000,R2       ;CHANGE VA TO REFERENCE NEXT PAGE
013434  103366                          BCC     LOP27A          ;LOOP UNTIL ALL PDR'S HAVE BEEN
                                                                ;CHECKED IN THE CURRENT MODE
013436  020027  001152                  CMP     R0,#STAEND
013442  002756                          BLT     LOP27
013444  000416                          BR      EXT27
013446  032771  000100  000000  CKWBIT: BIT     #100,@(R1)      ;CHECK W BIT
013454  001001                          BNE     .+4
013456  104006                          HLT                     ;W BIT DIDN'T SET IN PDR WHOSE
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                                                        ;ADDRESS IS POINTED TO BY R1
013460  005071  000020          CLR     @20(R1)         ;CLEAR W BIT BY WRITING CORRESPONDING
                                                        ;PAR VIA DATO
013464  032771  000100  000000  BIT     #100,@(R1)      ;CHECK W BIT
013472  001401                  BEQ     .+4
013474  104006                  HLT                     ;W BIT DIDN'T CLEAR IN PDR WHOSE
013476  005721                  TST     (R1)+           ;ADDRESS IS POINTED TO BY R1
013500  000207                  RTS     %7
013502                  EXT27:

                        ;SHOW THAT THE W BIT IS CLEARED BY A DATOB TO THE PDR
                        ;CHECK BOTH HIGH AND LOW DATOB'S, ON KERNEL 0
013502  104400          TEST53: SCOPE
013504  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013510  004767  002602          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
013514  000053                  53                              ;TEST NUMBER
013516  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
013520  004767  001572          JSR     %7,RWALL        ;MAP ALL PAR/PDR PAIRS 4K, RW, BANK 0
013524  004767  002652          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
013530  005277  165270          INC     @SR0            ;TURN ON KT11-D
013534  013737  000000  000000  MOV     @#0,@#0         ;WRITE INTO PAGE 0
013542  005077  165256          CLR     @SR0            ;TURN OFF KT11-D
013546  032777  000100  165320  BIT     #100,@KPDR0     ;CHECK W BIT
013554  001001                  BNE     .+4
013556  104006                  HLT                     ;W BIT NOT SET AFTER WRITING PAGE
013560  112777  000106  165306  MOVB    #106,@KPDR0     ;DATOB SHOULD CLEAR W BIT
013566  032777  000100  165300  BIT     #100,@KPDR0
013574  001401                  BEQ     .+4
013576  104006                  HLT                     ;W BIT DIDN'T CLEAR VIA DATOB (LOW)
                                                        ;TO THE PDR
013600  005277  165220          INC     @SR0            ;TURN ON KT11-D
013604  013737  017776  017776  MOV     @#17776,@#17776 ;WRITE INTO PAGE 0 AGAIN
013612  005077  165206          CLR     @SR0            ;TURN OFF KT11-D
013616  032777  000100  165250  BIT     #100,@KPDR0     ;CHECK W BIT
013624  001001                  BNE     .+4
013626  104006                  HLT                     ;W BIT NOT SET AFTER WRITING PAGE
013630  016701  165240          MOV     KPDR0,R1        ;SETUP R1 TO REFERENCE HIGH BYTE
013634  005201                  INC     R1              ;OF KPDR0
013636  112711  000177          MOVB    #177,@R1        ;DATOB TO HIGH BYTE OF KPDR0
013642  032777  000100  165224  BIT     #100,@KPDR0     ;CHECK W BIT
013650  001401                  BEQ     .+4
013652  104006                  HLT                     ;W BIT DIDN'T CLEAR VIA DATOB
                                                        ;TO HIGH BYTE OF PDR
                        ;SHOW THAT THE W BIT IS CLEARED BY A DATOB TO THE PAR
                        ;CHECK BOTH HIGH AND LOW DATOB'S, ON KERNEL 0
013654  104400          TEST54: SCOPE
013656  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
013662  004767  002430          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
013666  000054                  54                              ;TEST NUMBER
013670  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
013672  004767  001420          JSR     %7,RWALL        ;MAP ALL PAR/PDR PAIRS 4K, RW, BANK 0
013676  004767  002500          JSR     PC,KERN7                ;MAP KERNEL PAR PDR 7 TO EXT BANK
                                                        ;EXTERNAL BANK
013702  005277  165116          INC     @SR0            ;TURN ON KT11-D
013706  013737  000000  000000  MOV     @#0,@#0         ;WRITE INTO PAGE 0
013714  005077  165104          CLR     @SR0            ;TURN OFF KT11-D
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013720  032777  000100  165146          BIT     #100,@KPDR0     ;CHECK W BIT
013726  001001                          BNE     .+4
013730  104006                          HLT                     ;W BIT NOT SET AFTER WRITING PAGE
013732  112777  000000  165154          MOVB    #0,@KPAR0       ;DATOB TO THE PAR
013740  032777  000100  165126          BIT     #100,@KPDR0     ;CHECK W BIT
013746  001401                          BEQ     .+4
013750  104006                          HLT                     ;W BIT DIDN'T CLEAR VIA DATOB
                                                                ;(LOW) TO THE PAR
013752  005277  165046                  INC     @SR0            ;TURN ON KT11-D
013756  013737  017776  017776          MOV     @#17776,@#17776 ;WRITE INTO PAGE 0 AGAIN
013764  005077  165034                  CLR     @SR0            ;TURN OFF KT11-D
013770  032777  000100  165076          BIT     #100,@KPDR0     ;CHECK W BIT
013776  001001                          BNE     .+4
014000  104006                          HLT                     ;W BIT NOT SET AFTER WRITING PAGE
014002  016701  165106                  MOV     KPAR0,R1        ;SETUP R1 TO REFERENCE HIGH BYTE
014006  005201                          INC     R1              ;OF KPAR0
014010  112711  000000                  MOVB    #0,@R1          ;DATOB TO HIGH BYTE OF KPAR0
014014  032777  000100  165052          BIT     #100,@KPDR0     ;CHECK W BIT
014022  001401                          BEQ     .+4
014024  104006                          HLT                     ;W BIT DIDN'T CLEAR VIA DATOB
                                                                ;TO HIGH BYTE OF PAR

                        ;SHOW THAT THE W BIT IS NOT CLEARED BY INIT
                        ;INITIALLY SET ALL THE W BITS, THEN DO A RESET AND CHECK THE W BITS
014026  104400          TEST55: SCOPE
014030  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014034  004767  002256          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
014040  000055                  55                              ;TEST NUMBER
014042  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
014044  012767  000020  001516  MOV     #20,ICOUNT
014052  004767  001240          JSR     %7,RWALL        ;INITIALIZE ALL PAGES RW,4K,BANK 0
014056  004767  002320          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
014062  012777  007600  165002  MOV     #7600,@UPAR7    ;MAP USER 7 TO THE EXTERNAL BANK
014070  012737  140000  177776  MOV     #140000,@#PS    ;SET MODE TO USER
014076  012706  000400          MOV     #USTACK,R6      ;SETUP USER STACK
014102  012700  001144          MOV     #STATAB,R0      ;R0 POINTS TO INFORMATION FOR
                                                        ;CURRENT MODE
014106  005720          LOOP32: TST     (R0)+           ;MOVE POINTER
014110  012037  177776          MOV     (R0)+,@#PS      ;SETUP MODE TO REFERENCE NEXT SET OF REGS
014114  012702  017776          MOV     #17776,R2       ;SETUP R2 TO REFERENCE DESIRED PAGE
014120  005277  164700          INC     @SR0
014124  011212          LOP32C: MOV     (R2),(R2)       ;WRITE IN
014126  062702  020000          ADD     #20000,R2       ;CHANGE VA TO REFERENCE NEXT PAGE
014132  103374                  BCC     LOP32C          ;SET ALL W-BITS IN CURRENT MODE
014134  005077  164664          CLR     @SR0            ;TURN OFF KT11-D
014140  020027  001152          CMP     R0,#STAEND      ;CHECK FOR DONE SETTING THE W BITS
014144  002760                  BLT     LOOP32          ;IF NOT, LOOP TO DO NEXT MODE
014146  012701  001034          MOV     #ADRTAB,R1      ;SETUP R1 TO REFERENCE ADDRESSES OF PDR'S OF PDR'S
014152  012702  000010  LOP32D: MOV     #10,R2          ;USE R2 AS COUNTER TO CHANGE ADDRESS
                                                        ;AT END OF EACH SET OF REGISTERS
014156  032771  000100  000000  LOP32E: BIT     #100,@(R1)      ;CHECK W BIT
014164  001001                  BNE     .+4
014166  104006                  HLT                     ;W BIT NOT SET IN PDR WHOSE
                                                        ;ADDRESS IS POINTED TO BY R1-
                                                        ;SHOULD HAVE BEEN SET WHEN
                                                        ;PAGE WAS WRITTEN INTO
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014170  005721                          TST     (R1)+           ;MOVE POINTER
014172  077207                          SOB     R2,LOP32E       ;CHECK ALL PDR'S IN THIS SET
014174  062701  000020                  ADD     #20,R1          ;CHANGE R1 TO REFERENCE NEXT
                                                                ;SET OF PDR ADDRESSES
014200  020127  001132                  CMP     R1,#ADREND      ;CHECK FOR DONE
014204  002762                          BLT     LOP32D          ;IF NOT, CHECK NEXT SET OF PDR'S
014206  005037  177776                  CLR     @#PS            ;SET MODE TO KERNEL
014212  005277  164606                  INC     @SR0            ;TURN KT11-D ON
014216  000005                          RESET                   ;INIT WITH KT11-D ON
014220  000005                          RESET                   ;INIT WITH KT11-D OFF
014222  012701  001034                  MOV     #ADRTAB,R1      ;R1 REFERENCES ADDRESS OF PDR
014226  012702  000010          LOP32F: MOV     #10,R2          ;R2 KEEPS TRACK OF WHEN TO CHANGE
                                                                ;REGISTER SETS
014232  032771  000100  000000  LOP32G: BIT     #100,@(R1)      ;CHECK W BIT
014240  001001                          BNE     .+4
014242  104006                          HLT                     ;INIT CLEARED W BIT IN PDR WHOSE
                                                                ;ADDRESS IS POINTED TO BY R1
014244  005721                          TST     (R1)+           ;MOVE POINTER
014246  077207                          SOB     R2,LOP32G       ;CHECK ALL PDR'S IN THIS SET
014250  062701  000020                  ADD     #20,R1          ;CHANGE R1 TO REFERENCE NEXT SET
                                                                ;OF PDR ADDRESSES
014254  020127  001132                  CMP     R1,#ADREND      ;CHECK FOR DONE
014260  002762                          BLT     LOP32F          ;IF NOT, CHECK NEXT SET OF PDR'S
014262  005077  164536                  CLR     @SR0            ;REINITIALIZE SR0

                        ;SHOW THAT A DATO TO A PDR WILL CLEAR THE W BIT
                        ;EVEN WHEN THE INSTRUCTION ALSO CAUSES A TRAP REFERENCE TO
                        ;THE CORRESPONDING PAGE
                        ;MAP KERNEL PAGE 1 RRW AND MAKE A WRITE ACCESS TO PAGE 1
                        ;TO SET THE W BIT
                        ;THEN LOAD THE PDR, MAKING A TRAP REFERENCE TO PAGE 1 IN THE SOURCE
                        ;FETCH OF THE SAME INSTRUCTION-THE W BIT SHOULD BE CLEARED DUE
                        ;TO THE DATO TO THE PDR
014266  104400          TEST56: SCOPE
014270  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014274  004767  002016          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SRC
014300  000056                  56                              ;TEST NUMBER
014302  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
014304  012767  002000  001256  MOV     #2000,ICOUNT
014312  004767  001000          JSR     %7,RWALL        ;INITIALIZE ALL PAGES RW, BANK 0
014316  004767  002060          JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
014322  012777  077406  164546  MOV     #77406,@KPDR1   ;MAKE KERNEL PAGE 1 RRW
014330  012777  000001  164466  MOV     #1,@SR0         ;TURN ON KT11-D
014336  013737  020000  020000  MOV     @#20000,@#20000 ;READ AND WRITE PAGE 1
014344  022777  077506  164524  CMP     #77506,@KPDR1   ;CHECK PDR OF PAGE 1
014352  001401                  BEQ     .+4
014354  104006                  HLT                             ;KERNEL PAGE 1 PDR
                                                                ;INCORRECT - W BIT SHOULD
                                                                ;BE SET DUE TO PREVIOUS MOVE INSTRUCTION
014356  012767  077506  164436  MOV     #77506,TEMP     ;LOAD TEMP WITH VALUE TO BE MOVED TO KPDR1
014364  016777  004432  164504  MOV     TEMP+20000,@KPDR1       ;PAGE 1 REFERENCE SHOULD SET
                                                                ;BUT DATO TO THE PDR CLEARS W BIT
014372  022777  077406  164476  CMP     #77406,@KPDR1   ;CHECK PAGE 1 PDR
014400  001401                  BEQ     .+4
014402  104006                  HLT                             ;PDR INCORRECT - W BIT
014404  005077  164414          CLR     @SR0            ;SHOULD HAVE BEEN CLEARED
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                                        ;CHECK TO SEE THAT MULTIPLE ACCESSES TO A PAGE AFTER SETTING THE
                                        ;W BIT DON'T CLEAR THE W BIT
014410  104400                  TEST57: SCOPE
014412  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014416  004767  001674                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
014422  000057                          57                              ;TEST NUMBER
014424  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
014426  012767  000010  001134          MOV     #10,ICOUNT
014434  004767  000656                  JSR     %7,RWALL        ;INITIALIZE ALL PAGES 4K, RW, BANK 0
014440  004767  001736                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
014444  012777  077406  164424          MOV     #77406,@KPDR1   ;MAP KERNEL PAGE 1 RRW
014452  012777  000001  164344          MOV     #1,@SR0         ;TURN ON SEGMENTATION
014460  013737  020000  020000          MOV     @#20000,@#20000 ;READ AND WRITE PAGE 1
014466  022777  077506  164402          CMP     #77506,@KPDR1   ;CHECK THE PDR
014474  001401                          BEQ     .+4
014476  104006                          HLT                             ;KERNEL PDR1 INCORRECT
                                                                        ;W BIT SHOULD BE SET
014500  012701  020000                  MOV     #20000,R1
014504  012702  000100                  MOV     #100,R2
014510  005721                  L40:    TST     (R1)+                   ;READ PAGE 1 REPEATEDLY
014512  077202                          SOB     R2,L40
014514  022777  077506  164354          CMP     #77506,@KPDR1   ;CHECK W BIT AGAIN
014522  001401                          BEQ     .+4
014524  104006                          HLT                             ;KERNEL PDR 1
                                                                        ;INCORRECT AFTER REPEATEDLY READING PAGE 1
014526  005077  164272                  CLR     @SR0                    ;TURN OFF SEGMENTATION

                                        ;SHOW THAT IF KT11-D IS ON. SETTING THE CURRENT MODE TO 10 WILL
                                        ;CAUSE A MEMORY MANAGEMENT ABORT.  NON RESIDENT SHOULD BE SET, AND ALSO PL SHOULD
                                        ;BE SET
014532  104400                  TEST60: SCOPE
014534  012706  001000                  MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014540  004767  001552                  JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
014544  000060                          60                              ;TEST NUMBER
014546  104006                          HLT                             ;TEST EXECUTED OUT OF SEQUENCE
014550  012767  002000  001012          MOV     #2000,ICOUNT    ;RESTORE ITERATION COUNT
014556  004767  000534                  JSR     %7,RWALL
014562  004767  001614                  JSR     PC,KERN7                ;MAP KERNEL PAR/PDR 7 TO EXT BANK
014566  012777  014634  164370          MOV     #RET42,@KTVEC   ;SETUP MEMORY MANAGEMENT ABORT RETURN
014574  005077  164366                  CLR     @KTSTA
014600  012777  000001  164216          MOV     #1,@SR0         ;TURN ON KT11-D
014606  012737  040000  177776  ADD42:  MOV     #40000,@#PS     ;SET MODE TO 01-FETCH OF NEXT
014614  000240                          NOP                             ;INSTRUCTION SHOULD ABORT
014616  005077  163154                  CLR     @PS                     ;RESTORE MODE TO KERNEL
014622  042777  000001  164174          BIC     #1,@SR0         ;TURN OFF KT11-D
014630  104006                          HLT                             ;NO ABORT WHEN MODE WAS SET
014632  000415                          BR      CONT42          ;TO 01 (ILLEGAL)
014634  042777  000001  164162  RET42:  BIC     #1,@SR0         ;TURN OFF KT11-D AFTER ABORT
014642  022777  100040  164154          CMP     #100040,@SR0    ;CK SR0
014650  001401                          BEQ     .+4
014652  104006                          HLT                             ;SR0 INCORRECT AFTER MODE 01 ABORT
                                                                        ;NR,AND MODE 01 SHOULD BE SET
014654  022777  014606  164150          CMP     #ADD42,@SR2     ;CHECK SR2
014662  001401                          BEQ     .+4
014664  104006                          HLT                             ;SR2 INCORRECT - SHOULD CONTAIN
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                                                        ;ADDRESS OF THE INSTRUCTION
                                                        ;IMMEDIATELY AFTER THE ONE SETTING
                                                        ;THE MODE TO 01
014666  005077  164132          CONT42: CLR     @SR0    ;REINITIALIZE SR0
014672  016777  164270  164264          MOV     KTSTA,@KTVEC    ;RESTORE TRAP CATCHER

                        ;*THIS TEST WAS WRITTEN TO CHECK-OUT ECO #M-7236-00005.  IT USES KPAR'S 0
                        ;*AND 2 TO REFERENCE KPAR1 AND UPAR1 RESPECTIVELY.  A COUNT PATTERN IS
                        ;*RUN THROUGH THE VIRTUAL ADDRESS STARTING AT BIT6 AND THE RECIPROCAL
                        ;*COUNT PATTERN IS SIMULTANEOUSLY RUN THROUGH THE PAR'S.  AFTER A
                        ;*RELOCATED REFERENCE IS MADE THE KT-11 IS TURNED OFF AND THE DATA IS
                        ;*CHECKED TO ENSURE THAT, WHATEVER THE CONDITION OF THE BITS IS IN THE
                        ;*VIRTUAL ADDRESS, THE DECODING FOR USER AND KERNAL PAR'S IS DONE BY
                        ;*THE PHYSICAL ADDRESS.
014700  104400          TEST61: SCOPE
014702  012706  001000          MOV     #KSTACK,SP              ;INITIALIZE KERNEL STACK POINTER
014706  004767  001404          JSR     PC,ORDER                ;CHECK TEST SEQUENCE + INIT SR0
014712  000061                  61                              ;TEST NUMBER
014714  104006                  HLT                             ;TEST EXECUTED OUT OF SEQUENCE
014716  004767  000374          JSR     %7,RWALL        ;SETUP ALL PDR'S FOR 4K R/W
014722  004767  001454          JSR     PC,KERN7        ;SET UP KERNAL 7 REGISTERS
014726  012777  007723  164160  MOV     #7723,@KPAR0    ;LOAD KPAR0 WITH ADDR OF KPAR1
014734  012777  007776  164156  MOV     #7776,@KPAR2    ;LOAD KPAR2 WITH ADDR OF UPAR1
014742  005000                  CLR     R0              ;CLEAR COUNTER REGISTER
014744  012701  000042          MOV     #42,R1          ;LOAD OFFSET & BIT TO SELECT KPAR0
014750  012702  040042          MOV     #40042,R2       ;LOAD OFFSET & BIT TO SELECT KPAR2
014754  052777  000400  164042  3$:     BIS     #400,@SR0       ;TURN ON MAINTENENCE MODE
014762  012711  005252          MOV     #5252,(R1)      ;LOAD PATTERN IN KERNAL PAR1
014766  005077  164032          CLR     @SR0            ;TURN OFF MAINTENENCE MODE
014772  027727  164120  005252  CMP     @KPAR1,#5252    ;DID DATA GET STORED IN KPAR1?
015000  001401                  BEQ     1$              ;BRANCH IF DATA STORED CORRECTLY
015002  104006                  HLT                     ;A HALT HERE INDICATES THAT THE
                                                        ;RELOCATION TO KPAR1 WAS NOT
                                                        ;SUCCESSFUL R1 HAS VIRTUAL ADDR AND
                                                        ;KPAR0 HAS THE BASE.
015004  005077  164106          1$:     CLR     @KPAR1          ;CLEAR KPAR1 FOR NEXT TEST
015010  052777  000400  164006  BIS     #400,@SR0       ;TURN ON MAINTENENCE MODE
015016  012712  005252          MOV     #5252,(R2)      ;LOAD PATTERN IN USER PAR1
015022  005077  163776          CLR     @SR0            ;TURN OFF MAINTENENCE MODE
015026  027727  164024  005252  CMP     @UPAR1,#5252    ;DID DATA GET STORED IN UPAR1?
015034  001401                  BEQ     2$              ;BRANCH IF DATA STORED CORRECTLY
015036  104006                  HLT                     ;A HALT HERE INDICATES THAT THE
                                                        ;RELOCATION TO UPAR1 DID NOT WORK
                                                        ;R2 HAS THE VIRTUAL ADDR AND KPAR2
                                                        ;HAS THE BASE
015040  005077  164012          2$:     CLR     @UPAR1          ;CLEAR UPAR1 FOR NEXT TEST
015044  022700  010000          CMP     #10000,R0       ;CHECK TO SEE IF TEST IS DONE
015050  001415                  BEQ     EOP             ;BRANCH IF TEST IS OVER
015052  062700  000100          ADD     #100,R0         ;ADD BIT6 TO COUNTER
015056  062701  000100          ADD     #100,R1         ;ADD BIT6 TO KPAR1'S VIRTUAL ADDR
015062  062702  000100          ADD     #100,R2         ;ADD BIT6 TO UPAR1'S VIRTUAL ADDR
015066  162777  000001  164020  SUB     #1,@KPAR0       ;SUBTRACT BIT1 FROM KPAR1'S BASE
015074  162777  000001  164016  SUB     #1,@KPAR2       ;SUBTRACT BIT1 FROM UPAR1'S BASE
015102  000724                  BR      3$              ;CONTINUE TEST
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015104  104400                  EOP:    SCOPE
015106  032767  010000  162454          BIT     #BIT12,SR               ;INHIBIT BELL?
015114  001003                          BNE     1$              ;BRANCH IF BELL IS INHIBITED
015116  012700  015261                  MOV     #BELL,R0        ;PUT ADDRESS OF BELL CHARS IN R0
015122  000402                          BR      2$              ;BRANCH TO OUTPUT CODE
015124  012700  015265          1$:     MOV     #ASTER,R0       ;PUT ADDRESS OF ASTERICK CHARS IN R0
015130  112001                  2$:     MOVB    (R0)+,R1        ;CHECK FOR TERMINATOR CODE
015132  001405                          BEQ     LOGICT          ;BRANCH IF BYTE IS ZERO
015134  010177  163660          3$:     MOV     R1,@TDBR        ;OUTPUT CHARACTER TO BUFFER
015140  105777  163652                  TSTB    @TCSR           ;SEE IF STATUS REG GETS SET
015144  100373                          BPL     3$              ;BRANCH UNTIL IT DOES
015146  013701  000042          LOGICT: MOV     @#42,R1         ;MONITOR HOOK
015152  001405                          BEQ     END
015154  000005                          RESET
015156  004711                  LOGIC:  JSR     PC,@R1
015160  000240                          NOP
015162  000240                          NOP
015164  000240                          NOP
015166  000167  164006          END:    JMP     START

                                ;
                                ;MESSAGE AREA
015172  005015  052113  030461  MTIT:   .ASCII  <15><12>'KT11-D LOGIC TEST MAINDEC-11-DBKTA-D'<15><12>'@'
015200  042055  046040  043517
015206  041511  052040  051505
015214  020124  040515  047111
015222  042504  026503  030461
015230  042055  045502  040524
015236  042055  005015     100
015243     015  050012  036503  MPC:    .ASCII  <15><12>'PC= @'
015250  040040
015252  020040  051520  020075  MPS:    .ASCII  '  PS= @'
015260     100
015261     207  177777     000  BELL:   .ASCIZ  <207><377><377>
015265     052  177777     000  ASTER:  .ASCIZ  /*/<377><377>
        015272                          .EVEN


                                ;SUBROUTINE TO CLEAR ALL KT11-D REGISTERS (EXCEPT SR1,SR2)
015272  005077  163526          CLRALL: CLR     @SR0
015276  005000                          CLR     R0
015300  012701  000040                  MOV     #32.,R1                 ;COUNT OF REGISTERS TO BE CLEARED
015304  005070  001034          CLRLP:  CLR     @ADRTAB(R0)             ;CLEAR REGISTERS THRU ADDRESS TABLE
015310  005720                          TST     (R0)+                   ;MOVE POINTER
015312  077104                          SOB     R1,CLRLP                ;LOOP TILL DONE
015314  000207                          RTS     %7

                                ;SUBROUTINE TO MAKE ALL PAGES RW, BANK 0, 4K, UP
015316  005077  163502          RWALL:  CLR     @SR0
015322  012701  001034                  MOV     #ADRTAB,R1      ;R1 POINTS TO ADDRESS TABLE
015326  012700  000010          RWL1:   MOV     #10,R0          ;R0 IS COUNTER
015332  005071  000020          RWL2:   CLR     @20(R1)         ;CLEAR PAR
015336  012731  077406                  MOV     #77406,@(R1)+   ;SET PDR RW, 4K
015342  077005                          SOB     R0,RWL2
015344  062701  000020                  ADD     #20,R1
015350  020127  001132                  CMP     R1,#ADREND      ;POINTER TO NEXT GROUP
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015354  002764                          BLT     RWL1
015356  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 TESTX
                                ;TAG) AT THE 1ST HALT, SET SWITCH REGISTER
                                ;OPTIONS AT THE 2ND HALT.
                                ;NOTE THAT SW11 MUST BE DOWN AFTER THE 2ND HALT
015360  005037  177776          TESTX:  CLR     @#PS
015364  012706  001000                  MOV     #KSTACK,SP
015370  012737  140000  177776          MOV     #140000,@#PS            ;SETUP USER TRAP
015376  012706  000400                  MOV     #USTACK,SP
015402  005037  177776                  CLR     @#PS
015406  000000                          HALT                            ;WAIT FOR STARTING ADDRESS
015410  016767  162154  000036          MOV     SR,RETRNX               ;LOAD STARTING ADDRESS IN RETRNX
015416  062767  000002  000030          ADD     #2,RETRNX               ;ADD 2 TO POINT TO INSTRUCTION AFTER
015424  000000                          HALT                            ;SET SR OPTIONS
015426  005067  000140                  CLR     SCOPEF                  ;KEEP COUNT AT ZERO
015432  012767  015444  000134          MOV     #XLOOP,RETURN           ;LOAD SCOPE LOOP RETURN POINTER
015440  000177  000010                  JMP     @RETRNX                 ;JUMP TO TEST
015444  005067  000122          XLOOP:  CLR     SCOPEF                  ;KEEP COUNT AT ZERO
015450  000177  000000                  JMP     @RETRNX                 ;JUMP TO TEST
015454  000000                  RETRNX: 0
                                ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 4000 TIMES
015456  032737  040000  177570  SCOPEC: BIT     #BIT14,@#SR             ;TEST SR FOR SCOPE
015464  001015                          BNE     SCOPEB                  ;YES,SCOPE
015466  032737  004000  177570          BIT     #BIT11,@#SR             ;NO-TEST FOR ITERATION
015474  001020                          BNE     SCOPEG                  ;INHIBIT ITERATION
015476  026767  000070  000064          CMP     SCOPEF, ICOUNT          ;COMPARE CURRENT COUNT TO MAX NUMBER
015504  100014                          BPL     SCOPEG                  ;EXIT-DONE
015506  005267  000060                  INC     SCOPEF                  ;INCREMENT COUNT
015512  012737  000340  177776          MOV     #340,@#PS               ;PREVENT TRAPPING WHILE MOVING STACK
015520  022626                  SCOPEB: CMP     (6)+,(6)+                       ;REPOSITION STACK
015522  005037  177776                  CLR     @#PS
015526  005077  163272                  CLR     @SR0
015532  000177  000036                  JMP     @RETURN                 ;REPEAT TEST
015536  005067  000030          SCOPEG: CLR     SCOPEF                  ;CLEAR COUNT
015542  005267  163426                  INC     TESTCT                  ;STEP TEST COUNTER TO ALLOW CHECKING
                                                                        ;ORDER OF EXECUTION.
015546  011667  000022                  MOV     @%6,RETURN              ;SAVE SCOPE RETURN POINTER
015552  022626                          CMP     (6)+,(6)+                       ;RETURN INLINE-NEXT TEST
015554  005037  177776                  CLR     @#PS
015560  005077  163240                  CLR     @SR0
015564  000177  000004                  JMP     @RETURN
015570  004000                  ICOUNT:4000                             ;ITERATION COUNT
015572  000000                  SCOPEF: 0                               ;COUNT LOCATION FOR ITERATION LOOP
015574  000000                  RETURN: 0                               ;ADDRESS OF LAST TEST

                                ;ENTERED WITH SYSTEM TRAP CALL (HLT)
                                ;PRINT OUT THE ERROR PC+2 AND STATUS REGISTER
015576  012767  000340  162172  PRINT:  MOV     #340,PS                 ;SET PRIORITY TO 7
015604  032737  020000  177570          BIT     #BIT13,@#SR             ;TEST FOR INHIBIT PRINT OUT
015612  001401                          BEQ     .+4                     ;BRANCH TO PRINT
015614  000430                          BR      CK                      ;INHIBIT, CHECK FOR HALT
015616  012667  000066                  MOV     (6)+,SAVPC              ;PC OF FAILING ROUTINE
```

```
015622  012667  000064                  MOV     (6)+,SAVPSR             ;PSR OF ERROR CONDITION
015626  024646                          CMP     -(6),-(6)               ;RESTORE STACK
015630  012767  000200  162140          MOV     #200,PS
015636  016767  000046  000374          MOV     SAVPC,PTEMP1            ;LOAD WITH FAILING PC+2
```

```
015644  004767  000044                  JSR     PC,TYPE
015650  015243                          MPC
015652  004767  000116                  JSR     PC,PRSHRT       ;PRINT FAILING PC+2
015656  004767  000032                  JSR     PC,TYPE
015662  015252                          MPS
015664  016767  000022  000346          MOV     SAVPSR,PTEMP1   ;LOAD PROCESSOR STATUS
015672  004767  000130                  JSR     PC,PROCT        ;PRINT PROCESSOR STATUS
015676  005767  161666          CK:     TST     SR              ;CHECK SR FOR HALT SWITCH
015702  100001                          BPL     .+4             ;BRANCH IF NOT SET
015704  000000                          HALT                    ;HALT ON ERROR UP
015706  000002                          RTI                     ;RETURN TO MAIN LINE
015710  000000                  SAVPC:  0
015712  000000                  SAVPSR: 0

                                ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE
015714  010067  000052          TYPE:   MOV     %0,SAVR0
015720  011600                          MOV     (6),%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
015722  062716  000002                  ADD     #2,@%6          ;SET UP EXIT
015726  011000                          MOV     @%0,%0
015730  112067  000034          TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
015734  122767  000100  000026          CMPB    #100,TYPDAT     ;CHECK FOR "@" CHARACTER
015742  001003                          BNE     TYPB            ;BRANCH IF NOT "@"
015744  016700  000022                  MOV     SAVR0,%0        ;RESTORE R0
015750  000207                          RTS     PC              ;TERMINATOR CHAR. EXIT
015752  116777  000012  163040  TYPB:   MOVB    TYPDAT,@TDBR    ;OUTPUT CHAR TO PRINTER
015760  105777  163032                  TSTB    @TCSR           ;WAIT FOR TTY READY
015764  100375                          BPL     .-4
015766  000760                          BR      TYPA
015770  000000                  TYPDAT: 0
015772  000000                  SAVR0:  0

                                ;SUBROUTINE TO PRINT OUT OCTAL NUMBER
                                ;PRSHRT DELETES LEADING ZEROS
                                ;PROCT PRINTS OUT 6 OCTAL DIGITS
015774  012767  000001  000232  PRSHRT: MOV     #1,PRSFLG       ;SET FLAG TO INDICATE SHORT PRINTOUT
016002  005767  000232                  TST     PTEMP1          ;CHECK FOR ZERO
016006  001011                          BNE     PROCT+4         ;BRANCH IF NOT ZERO
016010  012777  000260  163002          MOV     #260,@TDBR      ;OUTPUT A SINGLE ZERO
016016  105777  162774                  TSTB    @TCSR           ;WAIT FOR TTY READY
016022  100375                          BPL     .-4
016024  000207                          RTS     %7              ;RETURN
016026  005067  000202          PROCT:  CLR     PRSFLG          ;CLEAR FLAG TO INDICATE FULL PRINTOUT
016032  005067  000206                  CLR     PTEMP3          ;CLEAR R4 FOR COUNTING CHARACTERS OUTPUT
016036  005067  000174                  CLR     PRFLG           ;INITIALIZE CARRY FLAG FOR ROTATES
016042  012767  000260  000172          MOV     #260,PTEMP2     ;SETUP R3
016050  005767  000164                  TST     PTEMP1          ;CHECK BIT 15 OF NUMBER
016054  100002                          BPL     .+6             ;BRANCH IF ZERO
016056  005267  000160                  INC     PTEMP2          ;INCREMENT R3 IF ONE
016062  006167  000152                  ROL     PTEMP1          ;ROTATE LEFT MOST OCTAL TO RIGHT END
016066  006167  000146                  ROL     PTEMP1
016072  005567  000140                  ADC     PRFLG           ;STORE CARRY
016076  005767  000132          P.CK:   TST     PRSFLG          ;CHECK FOR SHORT PRINTOUT
016102  001404                          BEQ     P.WAIT          ;BRANCH IF NOT SET
016104  026727  000132  000260          CMP     PTEMP2,#260     ;CHECK FOR ZERO IF SET
016112  001410                          BEQ     P.CONT          ;IF SET, GO TO NEXT CHARACTER
016114  016777  000122  162676  P.WAIT: MOV     PTEMP2,@TDBR    ;OUTPUT NEXT CHARACTER
```

```
016122  105777  162670                  TSTB    @TCSR                   ;WAIT FOR TTY READY
016126  100375                          BPL     .-4
016130  005067  000100                  CLR     PRSFLG                  ;PRINT REST OF NUMBER AFTER A NON-ZERO DIGIT
016134  005267  000104          P.CONT: INC     PTEMP3                  ;COUNT
016140  026727  000100  000006          CMP     PTEMP3,#6               ;CHECK FOR DONE
016146  001001                          BNE     P.CNT1                  ;BRANCH IF NOT DONE
016150  000207                          RTS     %7
016152  000241                  P.CNT1: CLC                             ;CLEAR CARRY
016154  005767  000056                  TST     PRFLG                   ;CHECK FOR PREVIOUS CARRY
016160  001403                          BEQ     .+10                    ;BRANCH IF PREVIOUSLY ZERO
016162  005067  000050                  CLR     PRFLG                   ;INITIALIZE FLAG
016166  000261                          SEC                             ;SET CARRY
016170  006167  000044                  ROL     PTEMP1                  ;ROTATE NEXT CHARACTER INTO RIGHT END OF REGISTE
016174  006167  000040                  ROL     PTEMP1
016200  006167  000034                  ROL     PTEMP1
016204  005567  000026                  ADC     PRFLG                   ;STORE CARRY
016210  016767  000024  000024          MOV     PTEMP1,PTEMP2           ;LOAD DATA INTO R3
016216  042767  177770  000016          BIC     #177770,PTEMP2          ;CLEAR ALL BUT LOWEST OCTAL DIGIT
016224  052767  000260  000010          BIS     #260,PTEMP2             ;SET TO ASCII EQUIVALENT
016232  000721                          BR      P.CK                    ;LOOP
016234  000000          PRSFLG: 0
016236  000000          PRFLG:  0
016240  000000          PTEMP1: 0                                       ;CONTAINS VALUE TO BE OUTPUT
016242  000000          PTEMP2: 0                                       ;SCRATCH
016244  000000          PTEMP3: 0                                       ;USED TO COUNT CHARACTERS OUTPUT

                        ;EMT HANDLER
                        ;FIRST 3 CALLS LEFT OPEN IN TABLE FOR EASY PATCHES
016246  011667  000032  EMTSRV: MOV     @SP,EPC                         ;GET CALL
016252  162767  000002  000024          SUB     #2,EPC
016260  017767  000020  000016          MOV     @EPC,EPC
016266  105067  000013                  CLRB    EPC+1                   ;SAVE OFFSET ONLY
016272  062767  016306  000004          ADD     #EMTAB,EPC              ;POINT TO TABLE OF ADDRESSES
016300  017737  000000                  MOV     @EPC,PC                 ;JUMP TO DESIRED ROUTINE
016304  000000          EPC:    0
                        PATCH1=EMT+0
                        PATCH2=EMT+2
                        PATCH3=EMT+4
016306  104000          EMTAB:  PATCH1
016310  104002                  PATCH2
016312  104004                  PATCH3
016314  015576                  PRINT
                        ;
                        ;SUBROUTINE TO CHECK TEST SEQUENCE
016316  005037  177776  ORDER:  CLR     @#PS                            ;CLEAR PROCESSOR STATUS
016322  011667  000052          MOV     (SP),TEMPN                      ;GET TEST NUMBER ADDRESS
016326  017767  000046  000044          MOV     @TEMPN,TEMPN            ;GET TEST NUMBER
016334  032737  002000  177570          BIT     #BIT10,@#SR
016342  001404                          BEQ     ORDERB
016344  016700  000030                  MOV     TEMPN,R0
016350  000005                          RESET
016352  000000                          HALT
016354  026767  162614  000016  ORDERB: CMP     TESTCT,TEMPN            ;IS TEST SEQUENCE CORRECT
016362  001403                          BEQ     ORDERA                  ;YES, CONTINUE
016364  062716  000002                  ADD     #2,(SP)                 ;UPDATE FOR ERROR RETURN
016370  000207                          RTS     PC
```

```
016372  062716  000004          ORDERA: ADD     #4.(SP)                 ;UPDATE FOR GOOD RETURN
016376  000207                          RTS     PC
016400  000000          TEMPN:  0
                        ;MAP KERNEL PAR/PDR 7 TO EXTERNAL BANK
016402  012777  007600  162522  KERN7:  MOV     #7600,@KPAR7
016410  012777  077406  162474          MOV     #77406,@KPDR7
016416  000207                          RTS     PC
                                .=17712

017712  125252          DESTAD: 125252
                                .END
```

DOS


```
ADD23    004650       1084*   1097
ADD24    005050       1123*   1134
ADD42    014606       2478*   2489
ADREND=  001132        375*    547    1218    1243    2384    2401    2603
ADRTAB   001034        339*    524     526    1210    1231    2371    2390    2590*   2597
ADR11    012060       1990*   2000
ADR2     011020       1798    1804*
ADR25    005244       1162*   1172    1177
ADR25A   005246       1163*   1187
ADR36    007502       1580*   1600
ADR36A   007564       1593*   1603
ADR36B   007662       1612*   1620
ADR36C   007664       1613*   1624
ADR37    010036       1648*   1668
ADR37A   010120       1661*   1671
ADR37B   010216       1680*   1688
ADR37C   010220       1681*   1692
ADR40    010372       1716*   1736
ADR40A   010454       1729*   1739
ADR40B   010552       1748*   1756
ADR40C   010554       1749*   1760
AD13     002514        700*    701
AD13A    002530        704*    706
AD13B    002560        710*    712
AD13C    002610        716*    718
AD21A  = 003742        910     911*
AD21B  = 003754        916     917*
AD21C    004064        923*    945*
ASTER    015265       2553    2582*
BELL     015261       2551    2581*
BIT0   = 000001        283*
BIT1   = 000002        284*
BIT10  = 002000        293*   2767
BIT11  = 004000        294*   2631
BIT12  = 010000        295*   2549
BIT13  = 020000        296*    716    2656
BIT14  = 040000        297*    710     715    2629
BIT15  = 100000        298*    704     709
BIT2   = 000004        285*
BIT3   = 000010        286*
BIT4   = 000020        287*
BIT5   = 000040        288*
BIT6   = 000100        289*
BIT7   = 000200        290*
BIT8   = 000400        291*
BIT9   = 001000        292*
BLK22    003470        860     863*    875
BLOCKS   001176        397*    856*    874*
CK       015676       2658    2671*
CKWBIT   013446       2258    2265*
CLRALL   015272        464     495     523     563     590     731     758     784     803     833     898     961    1079
                      1118    1155    1288    1573    1641    1709    2230    2587*
CLRLP    015304       2590*   2592
CNT22B   004220        979     987*
CNT22C   004300        998    1006*
CNT22D   004374       1018    1026*
```

EOS


```
CNT22E   004470        1040    1049#
CNT31A   005512        1219    1221#
CNT31B   005602        1234    1240#
CONT11   012124        1995    2004#
CONT23   012606        2090    2095    2107#
CONT24   013022        2146    2151    2162#
CONT42   014666        2483    2495#
CONT5    001702         533     537     543#
C25      013176        2202#   2217
DATA16   003034         761     767     768     776#    799     806
DESTAD   017712         988*   1082*   1098    2785#
DONE13   012270        2024    2034#
DONE16   012402        2054    2057#
DONE2    011050        1805    1815#
DONE23   012620        2085    2112#
DONE24   013034        2141    2167#
DONE25   013246        2207    2220#
DONE36   007740        1583    1595    1615    1628#
DONE37   010274        1651    1663    1683    1696#
DONE40   010630        1719    1731    1751    1764#
DONE5    011502        1892    1906#
DONE5A   001720         549     554#
DONE7    011700        1926    1938    1945#
DON25    005362        1165    1191#
DST21A   004056         903     906*    922*    926     940*    942#
DST21B   004060         904     907*    930     939*    943#    945
DST21C   004062         905     908*    924*    934     938*    944#
EMTAB    016306        2752    2758#
EMTSRV   016246         307    1394    1399    2748#
END      015166        2560    2566#
END20    003554         878     881#
END22E   004560        1063    1067#
END35    007406        1554    1560#
EOP      015104        2539    2548#
EPC      016304        2748*   2749*   2750*   2751*   2752*   2753    2754#
ERR22A   004206         973     980#
ERR22B   004272         992     999#
ERR22C   004360        1012    1019#
ERR22D   004454        1033    1041#
ERR22E   004552        1056    1064#
EXIT10   002302         640     645#
EXIT11   002432         675     680#
EXIT2    001416         438     452#
EXIT21   004066         941     946#
EXIT23   004770        1096    1108#
EXIT24   005164        1132    1141#
EXT27    013502        2264    2276#
FTITLE   001172         395#    406     410*
HLT    = 104006         282#    418     422     425     434     437     447     462     473     494     506     522     538
                        561     572     578     589     599     605     616     634     652     669     687     692     699
                        703     708     714     720     730     756     783     799     832     896     913     919     928
                        932     936     960     978     981     997    1000    1017    1020    1039    1042    1061    1065
                       1076    1093    1116    1130    1154    1170    1174    1179    1182    1186    1189    1202    1214
                       1230    1237    1248    1264    1275    1287    1314    1317    1320    1323    1342    1395    1444
                       1495    1500    1552    1559    1572    1582    1587    1594    1599    1602    1605    1614    1619
                       1622    1626    1640    1650    1655    1662    1667    1670    1673    1692    1697    1690    1694
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                        1708    1718    1723    1730    1735    1738    1741    1750    1755    1758    1762    1773    1777
                        1781    1789    1808    1814    1826    1840    1845    1855    1862    1867    1877    1897    1916
                        1925    1931    1937    1943    1953    1962    1980    1999    2003    2013    2023    2030    2033
                        2043    2053    2056    2068    2089    2093    2101    2105    2125    2145    2150    2157    2161
                        2178    2200    2216    2228    2234    2243    2267    2273    2284    2292    2296    2303    2309
                        2317    2326    2330    2337    2343    2352    2376    2395    2417    2426    2434    2443    2452
                        2460    2471    2482    2487    2491    2510    2523    2533
:COUNT  015570           403*    426*    463*    554*    562*    617*    688*    736*    757*    841*    897*   1077*   1117*
                        1203*   1782*   1847*   2179*   2229*   2353*   2418*   2444*   2472*   2633    2649*
:INT25  005256          1158    1166*
:INT35  006732          1445    1448*
:INT36  007520          1577    1584*
:INT36A 007574          1588    1596*
:INT36B 007674          1607    1616*
:INT37  010054          1645    1652*
:INT37A 010130          1656    1664*
:INT37B 010230          1675    1684*
:INT4C  010410          1713    1720*
:INT40A 010464          1724    1732*
:INT40B 010564          1743    1752*
:OT35   006530          1396    1399*
KERN?   016402           790     901     964    1081    1121    1157    1205    1267    1298    1346    1574    1642    1710
                        1793    1830    1857    1879    1918    1984    2016    2045    2070    2127    2181    2245    2286
                        2319    2355    2420    2446    2474    2512    2780*
KPAR0   001114           367*    759*    785*    899*   1079*   1119*   2327*   2338    2513*   2543*
KPAR1   001116           368*    968*    987*   1006*   1026*   1049*   2521    2527*
KPAR2   001120           369*   2514*   2544*
KPAR3   001122           370*
KPAR4   001124           371*
KPAR5   001126           372*
KPAR6   001130           373*
KPAR7   001132           374*   2780*
KPDR0   001074           358*    382     734*    760*    787*    900*    962*   1080*   1120*   1156*   1180    1293*   1575*
                        1643*   1711*   1791*   1982*   2232    2290    2293*   2294    2301    2304    2307    2324    2329
                        2335    2341
KPDR1   001076           359*    963*   1184    1266*   1576*   1644*   1712*   1794*   1919*   2078*   2135*   2189*   2421*
                        2424    2430*   2432    2447*   2450    2458
KPDR2   001100           360*   2015*   2031
KPDR3   001102           361*
KPDR4   001104           362*
KPDR5   001106           363*
KPDR6   001110           364*
KPDR7   001112           365*   2051    2781*
KRET34  006114          1295    1304*   1312
KSTACK  001000           324*    402     415     431     459     491     519     558     586     613     649     684     696
                         727     753     780     829     893     957    1073    1113    1151    1199    1261    1284    1330
                        1339    1352    1569    1637    1705    1770    1786    1823    1852    1874    1913    1950    1977
                        2010    2040    2065    2122    2175    2225    2240    2281    2314    2349    2414    2440    2468
                        2507    2614
KTSTA   001166           393*    887     888*   1159*   1191*   1192    1269*   1278    1578*   1629*   1630    1646*   1697*
                        1698    1714*   1765*   1766    1796*   1816    1832*   1848    1881*   1906    1907*   1945    1986*
                        2005    2018*   2034    2047*   2058    2076*   2113    2114*   2133*   2168    2169*   2183*   2220
                        2476*   2496
KTVEC   001164           392*    887*   1158*   1192*   1268*   1278*   1577*   1588*   1607*   1630*   1645*   1656*   1675*
                        1698*   1713*   1724*   1743*   1766*   1795*   1816*   1831*   1848*   1880*   1906*   1921*   1932*
                        1945*   1985*   2005*   2017*   2034*   2046*   2058*   2075*   2082*   2113*   2132*   2139*   2168*
```

```
                        2182*   2220*   2475*   2496*
K123    001012           327*    839
K134    001014           328*    840
LOGIC   015156           313    2562*
LOGICT  015146          2555    2559*
LOOP10  002210           622*    626
LOOP11  002340           657*    661
LOOP2   001356           440*    450
LOOP23  012452          2075*   2111
LOOP24  012674          2132*   2166
LOOP3   001456           467*    482
LOOP3A  001464           469*    481
LOOP3B  001470           470*    478
LOOP32  014106          2361*   2370
LOOP4   001546           497*    515
LOOP4A  001554           500*    513
LOOP4B  001560           501*    510
LOOP5   011406          1886*   1905
LOOP6   001766           566*    582
LOOP6A  001774           568*    581
LOOP7   002072           593*    609
LOOP7A  002100           595*    608
LOP10A  002216           624*    625
LOP10B  002236           630*    638
LOP10C  002244           632*    637
LOP11A  002346           659*    660
LOP11B  002366           665*    673
LOP11C  002374           667*    672
LOP27   013400          2250*   2263
LOP27A  013412          2255*   2260
LOP31A  005460          1211*   1220
LOP31B  005464          1212*   1216
LOP31C  005516          1222*   1255
LOP31D  005530          1225*   1253
LOP31E  005560          1232*   1244
LOP31F  005564          1233*   1241
LOP32C  014124          2365*   2367
LOP32D  014152          2372*   2385
LOP32E  014156          2374*   2381
LOP32F  014226          2391*   2402
LOP32G  014232          2393*   2398
LOP5A   011464          1899    1901*
LOP5AA  001644           526*    551
LOP5B   001662           532*    544
L25A    013132          2187*   2206
L25B    013142          2189*   2204
L40     014510          2456*   2457
MFC     015243          2577*   2665
MFS     015252          2579*   2668
MTIT    015172           409    2570*
NG3EB   006506          1353    1392*
NG3EC   006716          1403    1442*
NG3ED   007140          1452    1497*
NG3EE   007360          1510    1550*
NOP   = 000240           268*
ODDAD   007164          1496    1501    1505*
```

```
0%35B   006524          1354    1397#
0%35C   006726          1404    1446#
0%35D   007154          1453    1502#
0%35E   007370          1512    1555#
ORDER   016316           416     432     460     492     520     559     587     614     650     685     697     728     754
                         781     830     894     958    1074    1114    1152    1200    1262    1285    1340    1570    1638
                        1706    1771    1787    1824    1853    1875    1914    1951    1978    2011    2041    2066    2123
                        2176    2226    2241    2282    2315    2350    2415    2441    2469    2508    2764#
ORDERA  016372          2773    2776#
ORDERB  016354          2768    2772#
PAGES   001156           389#    851*    858     877*
PAGE2   003432           856#    880
PARTAB  001140           379#    465     564     620     628
PATCH1= 104000          2755#   2758
PATCH2= 104002          2756#   2759
PATCH3= 104004          2757#   2760
PDREND  001136           378#    514
PDRM2   001170           394#    502
PDRTAB  001134           377#    496     591     655     663
PRFLG   016236          2707*   2714*   2728    2730*   2735*   2741#
PRINT   015576          2655#   2761
PROCT   016026          2670    2700    2705#
PRSF_G  016234          2698*   2705*   2715    2722*   2740#
PRSHRT  015774          2666    2698#
PS    = 177776           280#    281     401*    810*    842*    844*    849*    883*    969*    976     983*   1207*   1209*
                        1224*   1290*   1292*   1307*   1349*   1351*   1357*   1407*   1456*   1509*   1514*   1557    1833*
                        1887*   1933*   1956*   1959*   2247*   2254*   2357*   2362*   2336*   2478*   2480*   2613*   2615*
                        2617*   2636*   2638*   2646*   2655*   2662*   2764*
PTEMP1  016240          2663*   2669*   2699    2709    2712*   2713*   2732*   2733*   2734*   2736    2742#
PTEMP2  016242          2708*   2711*   2717    2719    2736*   2737*   2738*   2743#
PTEMP3  016244          2706*   2723*   2724    2744#
P.CK    016076          2715#   2739
P.CNT1  016152          2725    2727#
P.CONT  016134          2718    2723#
P.WAIT  016114          2716    2719#
RETRNX  015454          2619*   2620*   2624    2626    2627#
RETURN  015574           404*   2623*   2640    2644*   2648    2651#
RET11   012072          1985    1996#
RET13A  012234          2017    2025#
RET16   012372          2046    2055#
RET2    011024          1795    1806#
RET23A  012532          2075    2091#
RET23B  012552          2082    2096#
RET24A  012754          2132    2147#
RET24B  012766          2139    2152#
RET25   013220          2182    2208#
RET3    011162          1831    1838#
RET33   005742          1268    1273#
RET42   014634          2475    2484#
RET5    011434          1880    1893#
RET7A   011604          1921    1927#
RET7C   011660          1932    1939#
RWALL   015316           834    1204    1265    1344    1790    1827    1856    1879    1917    1954    1981    2014    2044
                        2069    2126    2180    2244    2285    2318    2354    2419    2445    2473    2511    2596#
RWL1    015326          2598#   2604
RWL2    015332          2599#   2601
```

CROSS REFERENCE TABLE -- USER SYMBOLS


```
SAVEA   001160           390#   835*   885
SAVEB   001162           391#   836*   886
SAVPC   015710          2659*  2663   2675#
SAVPSR  015712          2660*  2669   2676#
SAVRO   015772          2679*  2686   2693#
SCOPE = 104400           267#   414    430    458    490    518    557    585    612    648    683    695    726
                         752    779    828    892    956   1072   1112   1150   1198   1260   1283   1338   1568
                        1636   1704   1769   1785   1822   1851   1873   1912   1949   1976   2009   2039   2064
                        2121   2174   2224   2239   2280   2313   2348   2413   2439   2467   2506   2548
SCOPEB  015520          2630   2637#
SCOPEC  015456           310   2629#
SCOPEF  015572          2622*  2625*  2633   2635*  2641*  2650#
SCOPEG  015536          2632   2634   2641#
SR    = 177570           279#  2549   2619   2629   2631   2656   2671   2767
SRO     001024           333#   420    435    444*   445*   451*   704*   709*   710*   715*   716*   737*   742
                         748*   762*   769*   791    792*   797    809    811*   853    863*   884*   902    909*
                         970*   975*   980*   990*   994*   999*  1009*  1014*  1019*  1029*  1035*  1041*  1053*
                        1058*  1064*  1083*  1090   1095*  1122*  1128   1135*  1161*  1164*  1166   1167*  1225*
                        1227*  1256*  1270*  1273   1277*  1297   1301*  1308*  1343*  1348   1358*  1408*  1457*
                        1515*  1579*  1581*  1584*  1585   1591*  1593*  1596*  1597   1608*  1611*  1613*  1616*
                        1617   1628*  1647*  1649*  1652*  1653   1659*  1661*  1664*  1665   1676*  1679*  1681*
                        1684*  1685   1696*  1715*  1717*  1720*  1721   1727*  1729*  1732*  1733   1744*  1747*
                        1749*  1752*  1753   1764*  1799*  1806   1812   1815*  1835*  1838   1843   1846*  1858*
                        1859*  1860   1863*  1865   1868*  1888*  1893   1894*  1922*  1924*  1927   1928*  1934*
                        1936*  1939   1940*  1957*  1958*  1960   1968*  1990*  1996*  1997   2004*  2019*  2020*
                        2022*  2026   2027*  2036*  2048*  2049   2050*  2055*  2057*  2077*  2088*  2091*  2094*
                        2097   2098*  2103   2112*  2134*  2144*  2147*  2153   2154*  2159   2167*  2186*  2221*
                        2255*  2257*  2287*  2289*  2296*  2300*  2321*  2323*  2332*  2334*  2364*  2368*  2387*
                        2403*  2422*  2435*  2448*  2462*  2477*  2481*  2484*  2485   2495*  2518*  2520*  2528*
                        2530*  2587*  2596*  2639*  2647*
SROH    001026           334#  1774*  1775   1779   1864*
SR1     001030           335#   423    689*   690
SR2     001032           336#   700    706    712    718   1172   1176*  1177   1600   1620   1668   1688   1736
                        1756   2000   2489
STAEND  001152           385#   881   1254   2262   2369
STAPNT  001154           388#   845*   846    848*   849    850*   881
START   001200           317    401#  2566
STATAB  001144           382#   845   1221   2249   2359
STATUS= 177776           281#
STAT2D  003352           846#   882
TCSR    001016           329#  1494*  1499*  1504*  2557   2689   2702   2720
TDBR    001020           330#  2556*  2688*  2701*  2719*
TEMP    001022           331#  2429*  2430
TEMPN   016400          2765*  2766*  2769   2772   2778#
TESTCT  001174           396#   405*  2642*  2772
TESTN = 000062           399#   414#   430#   458#   490#   518#   557#   585#   612#   648#   683#   695#   726#
                         752#   779#   828#   892#   956#  1072#  1112#  1150#  1198#  1260#  1283#  1338#  1568#
                        1636#  1704#  1769#  1785#  1822#  1851#  1873#  1912#  1949#  1976#  2009#  2039#  2064#
                        2121#  2174#  2224#  2239#  2280#  2313#  2348#  2413#  2439#  2467#  2506#
TESTX   015360           319   2613#
TEST1   001254           404    407    414#
TEST10  002144           612#
TEST11  002302           648#
TEST12  002434           683#
TEST13  002476           695#
TEST14  002632           726#
```

```
TEST15  002716            752#
TEST16  003036            779#
TEST17  003232            828#
TEST2   001322            430#
TEST20  003622            892#
TEST21  004070            956#
TEST22  004564           1072#
TEST23  004772           1112#
TEST24  005166           1150#
TEST25  005374           1198#
TEST26  005662           1260#
TEST27  005766           1283#
TEST3   001416            458#
TEST30  006252           1338#
TEST31  007422           1568#
TEST32  007756           1636#
TEST33  010312           1704#
TEST34  010646           1769#
TEST35  010726           1785#
TEST36  011070           1822#
TEST37  011226           1851#
TEST4   001520            490#
TEST40  011330           1873#
TEST41  011514           1912#
TEST42  011706           1949#
TEST43  012000           1976#
TEST44  012136           2009#
TEST45  012302           2039#
TEST46  012414           2064#
TEST47  012636           2121#
TEST5   001616            518#
TEST50  013052           2174#
TEST51  013260           2224#
TEST52  013326           2239#
TEST53  013502           2280#
TEST54  013654           2313#
TEST55  014026           2348#
TEST56  014266           2413#
TEST57  014410           2439#
TEST6   001726            557#
TEST60  014532           2467#
TEST61  014700           2506#
TEST7   002040            585#
TST10   002200            620#    643
TST10F  002300            618#    639     641#    644#
TST11   002330            655#    678
TST11F  002430            653#    674     676#    679#
TYPA    015730           2683#   2691
TYPB    015752           2685    2688#
TYPDAT  015770           2683#   2684    2688    2692#
TYPE    015714            408    2664    2667    2679#
UPAR0   001054            349#    804#   1345#
UPAR1   001056            350#   2531    2537#
UPAR2   001060            351#
UPAR3   001062            352#
UPAR4   001064            353#
```

```
UPAR5   001066            354#
UPAR6   001070            355#
UPAR7   001072            356#    807*   1206*   1300*   1347*   1955*   2246*   2356*
UPDR0   001034            340#    384     805*   1294*   1882    1898
UPDR1   001036            341#   1920*
UPDR2   001040            342#
UPDR3   001042            343#
UPDR4   001044            344#
UPDR5   001046            345#
UPDR6   001050            346#
UPDR7   001052            347#    808*   1299*   1829*
URET34  006150           1305    1311#   1318
USTACK  000400            322#    843    1208    1350    1834    2248    2358    2616
XLOOP   015444           2623    2625#
.     = 017714            304#    306#    309#    312#    316#    318#    321#    323#    375     411     421     424     436
                          446     472     505     571     577     598     604     633     668     691     702     707     713
                          719     743     764     771     775     795     798     814     815     865     868     911     912
                          917     918     927     931     935     977     996    1016    1038    1060    1092    1097#   1131
                         1107    1129    1134#   1140    1169    1173    1178    1181    1185    1188    1213    1229    1236
                         1247    1274    1313    1316    1319    1322    1558    1586    1598    1601    1604    1618    1621
                         1625    1654    1666    1669    1672    1686    1689    1693    1722    1734    1737    1740    1754
                         1757    1761    1776    1780    1807    1813    1837    1839    1844    1861    1866    1890    1896
                         1930    1942    1961    1988    1998    2001    2029    2032    2052    2100    2104    2156    2160
                         2199    2215    2233    2266    2272    2291    2295    2302    2308    2325    2329    2336    2342
                         2375    2394    2425    2433    2451    2459    2486    2490    2583#   2657    2672    2690    2703
                         2710    2721    2729    2783#
```

LOS

```
DBKTA.D MACY11 27.1006)  07-OCT-76  09:10  PAGE 65
DBKTAD.P11    13-SEP-76 10:28          CROSS REFERENCE TABLE -- MACRO NAMES                                    SEQ 0063

ABRT     1563#   1564    1632    1700
TESTNO    399#    414     430     458     490     518     557     585     612     648     683     695     726     752     779
           828     892     956    1072    1112    1150    1198    1260    1283    1338    1563    1636    1704    1769    1795
          1822    1851    1873    1912    1949    1976    2009    2039    2064    2121    2174    2224    2239    2280    2313
          2348    2413    2439    2467    2506

. ABS.  017714     000


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DBKTAD,DBKTAD/SOL/CRF←DBKTAD
 RUN-TIME: 9 19 2 SECONDS
 RUN-TIME RATIO: 56/31=1.7
 CORE USED:  8K  (16 PAGES)
```

M05

Spooler runtime 11 Seconds, 48 KCS, 266 disk reads, 4 disk writes, 63 pages