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IDENTIFICATION

PRODUCT CODE: AC-8054B-MC

PRODUCT NAME: CFKTHB0 PDP 11/34 MEM MGMT

DATE: JUNE 22,1978

MAINTAINER: DIAGNOSTIC PROGRAMMIMG

AUTHOR: DIAGNOSTIC ENGINEERING

SEQ 0002

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PROGRAM HISTORY

DATE	REVISION	REASON FOR REVISION
31-JAN-77	A	FIRST RELEASE
28-JUN-78	B	HARDWARE FAULT NOT DETECTED

TABLE OF CONTENTS

1.0 PROGRAM INFORMATION

1.1 ABSTRACT

THIS PROGRAM WAS DESIGNED USING A "BOTTOM UP" APPROACH STARTING WITH THE SMALLEST SEGMENT OF MEMORY MANAGMENT LOGIC POSSIBLE AND BUILDING TO COVER ALL OF THE LOGIC. THE DIAGNOSTIC WILL PROVIDE ENOUGH INFORMATION SUCH THAT BY DEDUCTION, THE FAILURE CAN BE ISOLATED TO A SMALL SEGMENT OF THE MEMORY MANAGEMENT LOGIC.

THE PROGRAM BEGINS BY TESTING SOME OF THE INTERNAL CPU DATA AND ADDRESS PATHS AND ADDRESS DETECTION LOGIC, THEN WORKS OUTWARD THROUGH THE MEMORY MANAGEMENT REGISTERS. AFTER THE REGISTERS ARE FOUND TO BE USEABLE, RELOCATION (CONSTRUCTION OF PHYSICAL ADDRESSES FROM A VIRTUAL ADDRESS AND THE ASSOCIATED PAR/PDR INFORMATION) IS TESTED FOLLOWED BY TESTING OF THE ABORT AND STATUS SEGMENTS OF LOGIC. FINALLY, CHECKS OF SPECIAL ABORT SEQUENCES AND TESTING OF THE MFPI/MTPI INSTRUCTIONS ARE DONE.

1.2 REQUIREMENTS

A PDP 11/34 PROCESSOR WITH A MINIMUM OF 16K OF MEMORY AND A CONSOLE TERMINAL ARE REQUIRED TO RUN THE PROGRAM UNLESS THE PROGRAM IS RUNNING UNDER APT OR ACT IN WHICH CASE THE CONSOLE TERMINAL IS NOT NECESSARY.

1.3 RELATED DOCUMENTS AND STANDARDS

1. ACT11/XXDP PROGRAMMING SPECIFICATION
2. STANDARD APT SYSTEM TO A PDP11 DIAGNOSTIC INTERFACE
3. DIAGNOSITC ENGINEERING STANDARDS AND CONVENTIONS
4. PDP11 MAINDEC SYSMAC PACKAGE
5. XXDP USER'S MANUAL

1.4 PRELIMINARY PROGRAMS

BEFORE THIS MEMORY MANAGEMENT DIAGNOSITC IS RUN, THE FOLLOWING CPU DIAGNOSTICS SHOULD BE RUN:

MD-11-DFKAA	PDP 11/34 BASIC CPU TESTS
MD-11-DFKAB	PDP 11/34 TRAPS TESTS

ALSO, ONE OF THE MAIN MEMORY DIAGNOSTICS SHOULD BE RUN TO SCAN AT LEAST THE FIRST 16K TO SEE THAT A PROGRAM CAN BE EXECUTED.

2.0 OPERATING INSTRUCTIONS

2.1 LOADING PROCEDURES

THE PROGRAM IS SUPPLIED ON THE DIAGNOSTIC LOAD MEDIA. REFER TO THE XXDP USER'S MANUAL FOR FURTHER INFORMATION. FOR USE WITH ACT OR APT, REFER TO THEIR RESPECTIVE DOCUMENTS. THE PROGRAM CAN ALSO BE DIRECTLY LOADED USING THE ABSOLUTE LOADER AND THE BINARY PAPER TAPE.

2.2 STARTING PROCEDURES

THE PROGRAM IS STARTED BY LOADING ADDRESS 200 AND STARTING. IF THE PROCESSOR HAS THE OPTIONAL PROGRAMMER'S CONSOLE, THE SWITCH REGISTER SHOULD BE SET ACCORDING TO SECTION 2.3 BEFORE THE PROGRAM IS STARTED. IF THERE IS NO HARDWARE SWITCH REGISTER, THE PROGRAM WILL USE THE SOFTWARE SWITCH REGISTER AT LOCATION 176 (LOCATION 174 WILL BE USED AS THE SOFTWARE DISPLAY REGISTER). IN THAT CASE THE PROGRAM WILL ASK FOR THE INITIAL SWITCH REGISTER VALUE BY TYPING "SWR= XXXXXX NEW= " AFTER TYPING THE NAME OF THE PROGRAM (XXXXXX = THE OCTAL CONTENTS OF LOCATION 176). (SEE SECTION 2.4)

ALSO THE PROGRAM CAN BE MADE TO USE THE SOFTWARE SWITCH REG. EVEN IF THE HARDWARE SWITCH REG. IS PRESENT BY LOADING "177777" INTO THE HARDWARE SWITCH REG. BEFORE STARTING THE PROGRAM.

2.3 CONTROL SWITCH SETTINGS

SWITCH	OCTAL VALUE	USE
SW15	100000	HALT ON ERROR THIS SWITCH WHEN SET WILL HALT THE PROCESSOR WHEN AN ERROR IS DETECTED AFTER THE ERROR MESSAGE HAS BEEN TYPED. PRESSING CONTINUE WILL RESUME TESTING (SEE SECTION 3.1 ABOUT LOADING THE SWITCH REG BEFORE CONTINUING).
SW14	040000	LOOP ON TEST THIS SWITCH WHEN SET WILL CAUSE THE PROGRAM TO LOOP ON THE CURRENT SUBTEST.
SW13	020000	INHIBIT ERROR TYPEOUTS THIS SWITCH WHEN SET WILL INHIBIT THE TYPING OF ERROR MESSAGES.
SW12	010000	INHIBIT TRACE TRAP THIS SWITCH WHEN SET WILL INHIBIT T-BIT TRAPPING WHICH

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                                        NORMALLY TAKES PLACE DURING
                                        EVERY OTHER PASS STARTING
                                        WITH  THE THIRD PASS.

            SW11    004000      INHIBIT SUBTEST ITERATIONS
                                        THIS SWITCH WHEN SET INHIBITS
                                        ITERATIONS OF EACH SUBTEST AFTER
                                        THE FIRST PASS.  IF THIS SWITCH
                                        IS NOT SET, EACH SUBTEST IS RUN
                                        200. TIMES.

            SW10    002000      BELL ON ERROR
                                        THIS SWITCH WHEN SET WILL RING
                                        THE CONSOLE TERMINAL BELL WHEN
                                        AN ERROR HAS BEEN DETECTED.

            SW9     001000      LOOP ON ERROR
                                        THIS SWITCH WHEN SET WILL
                                        CAUSE THE PROGRAM TO LOOP ON THE
                                        FIRST FAILURE WHICH IS ENCOUNTERED
                                        EVEN IF THE FAILURE IS INTERMITTANT

            SW8     000400      LOOP ON TEST IN SWR<7:0>
                                        THIS SWITCH WHEN SET WILL
                                        CAUSE THE PROGRAM TO LOOP ON THE
                                        TEST WHOSE TEST NUMBER IS SET
                                        IN BITS 7-0 OF THE SWITCH REG.

2.4         LOADING THE SWITCH REGISTER
            ---------------------------

            THE HARDWARE SWITCH REGISTER PROVIDED WHEN THE OPTIONAL
            PROGRAMMER'S CONSOLE IS PRESENT IS LOADED DIRECTLY FROM
            THE CONSOLE KEYPAD BY DEPRESSING THE "LSR" KEY.  THE
            VALUE OF THE HARDWARE SWITCH REG. CAN BE CHANGED ANY
            TIME WHETHER THE PROGRAM IS RUNNING OR NOT.

            TO LOAD THE SOFTWARE SWITCH REG. WHILE THE PROGRAM IS
            RUNNING, A CONTROL G (^G) SHOULD BE TYPED ON THE CONSOLE
            TERMINAL. (THE "SCOPE" AND "ERROR" ROUTINES CHECK TO SEE
            IF A ^G HAS BEEN TYPED.)  THE ORIGINAL VALUE OF THE SOFTWARE
            SWTICH REG. WILL BE REQUESTED AS MENTIONED IN SECTION 2.2.

            IN RESPONSE TO A ^G OR AT THE BEGINNING OF THE PROGRAM, THE
            PROGRAM WILL TYPE:

                    SWR = XXXXXX  NEW =

            WHERE "XXXXXX" IS THE CURRENT OCTAL CONTENTS OF LOC. 176.
            THE OPERATOR MAY THEN TYPE ANY ONE OF THE FOLLOWING:
                XXXXXX<CR>  ONE TO SIX OCTAL DIGITS FOLLOWED BY A
                            CARRIAGE RETURN WHICH WILL BE LOADED
                            AS THE NEW VALUE FOR THE SWITCH REG.
                    <CR>    JUST A <CR>, LEAVES THE SWITCH REG.
                            AS IT IS.
                    XXX^U   A CONTROL-U (^U) WILL CAUSE ALL OF THE
```

```
                                DIGITS TYPED SO FAR TO BE IGNORED.
                        ^C      WILL CAUSE THE PROGRAM TO TYPE THE PRESENT
                                TEST AND PASS NUMBERS, REQUEST A NEW VALUE
                                FOR THE SWITCH REG., AND JUMP TO THE END-
                                OF-PASS ROUTINE SO THE PROGRAM WILL GO DIRECTLY
                                TO THE NEXT PASS WITH A NEW SW. REG. VALUE
                    <ILL.CHAR>  ANY CHARACTER TYPED WHICH IS NOT ANY OF THE
                                ABOVE OR AN OCTAL DIGIT WILL CAUSE THE PROGRAM
                                TO TYPE A "?<CRLF>" AND REACT AS THOUGH A
                                ^U HAD BEEN TYPED.

                        NOTE:   RECOGNITION OF A ^G MAY BE HAMPERED BY
                        -----   EXECUTION OF A COUPLE "RESET" INSTRUCTIONS
                                WITHIN THE PROGRAM.

2.5     EXECUTION TIMES
        ---------------

        THE RUN TIME FOR A SINGLE PASS WITH NO ITERATIONS
        OR TRACE TRAPPING IS APPROXIMATELY 5 SECONDS.

        THE RUN TIME FOR A SINGLE PASS WITH ITERATIONS
        AND TRACE TRAPPING ENABLED IS APPROXIMATELY 3 1/4 MINUTES.

3.0     ERROR INFORMATION
        -----------------

3.1     ERROR REPORTING PROCEDURES
        --------------------------

        IF AN ERROR IS DETECTED, THE PROGRAM WILL TRAP TO THE
        ERROR HANDLING ROUTINE ($ERROR).  THE VALUE OF BITS
        15,13,10, AND 9 IN THE SWITCH REGISTER ARE CONSIDERED
        IN REPORTING AN ERROR (SEE SECTION 2.3).  THE
        ERROR INFORMATION WILL BE TYPED UNLESS SW13 = 1.

        IF SW15 = 1, THE PROCESSOR WILL HALT AFTER THE ERROR IS
        REPORTED.  IF THE CONTENTS OF THE SOFTWARE SWITCH REGISTER
        ARE TO BE CHANGED, A ^G SHOULD BE TYPED BEFORE PRESSING
        "CONTINUE" TO RESUME TESTING.

        IF SW9 = 1 (LOOP ON ERROR), THE PROGRAM WILL GO TO THE
        ADDRESS CONTAINED IN LOCATION "$LPERR".  AFTER REPORTING
        THE ERROR.  "$LPERR" IS SET BY EACH "SCOPE" CALL AND IS
        SET DIRECTLY DURING SOME SUBTESTS TO PROVIDE THE SMALLEST
        LOOP FOR LOOPING ON ERROR.  IF SW9 = 0, THE PROGRAM WILL
        RETURN TO THE INSTRUCTION FOLLOWING THE ERROR CALL.
        (SEE SECTION 5.3 FOR MORE ON "LOOP ON ERROR").

3.2     INTERPRETING ERROR REPORTS
        --------------------------

        EVERY ERROR REPORT TYPES THE NUMBER OF THE TEST IN WHICH
        THE ERROR TOOK PLACE (TESTNO) AND THE LOCATION OF THE
        ERROR CALL (ERRORPC).  THESE TWO VALUES PINPOINT THE
        PLACE IN THE CODE THAT THE ERROR OCCURRED.  BY REFERRING
```

TO THE PROGRAM LISTING, THE OPERATOR CAN THEN READ THE
COMMENTS ASSOCIATED WITH THAT PARTICULAR ERROR AND SUBTEST.
A DESCRIPTION OF THE TEST FOUND IN THE PROGRAM LISTING
WILL ALSO PROVIDE THE OPERATOR WITH INFORMATION ON THE LOGIC
AND FUNCTIONS BEING TESTED.

EVERY ERROR REPORT ALSO TYPES AN ERROR MESSAGE
GIVING A VERBAL DESCRIPTION OF THE ERROR THAT HAS
BEEN DETECTED.

BY USING THE COMMENTS AND TEST DESCRIPTION FOUND IN
THE PROGRAM LISTING TO DETERMINE WHAT FUNCTION OR
LOGIC WAS BEING TESTED, THE OPERATOR CAN THEN REFER
TO THE ENGINEERING DRAWINGS TO ISOLATE THE PROBABLE
CAUSE FOR THE FAILURE.

3.3 SAMPLE ERROR REPORT

BELOW IS AN EXAMPLE OF AN ERROR WHICH COULD HAVE
OCCURRED DURING EXECUTION OF THE PROGRAM:

```
MEM. MGMT. REG. BITS NOT SET CORRECTLY
REGISTR WROTE   READ    READ-(BINARY)
ADDRESS (OCTAL) (OCTAL) 5432109876543210  TESTNO  ERRORPC
177572  040000  060000  0110000000000000  000012  022060
```

WE SEE THAT THE ERROR OCCURRED IN TEST 12 AT LOACTION
022060. THE "REGISTR ADDRESS" TELLS US THAT WE WERE
TESTING MEMORY MANAGEMENT'S STATUS RGISTER 0 (SR0).
IN THE LISTING, THE TEST DESCRIPTION SAYS THAT THE
ERROR BITS (BITS <15:13>) OF SR0 WERE BEING SET AND
CLEARED INDIVIDUALLY. THE ERROR REPORT SAYS WE TRIED
TO SET BIT 14 BY WRITING "040000" TO SR0 BUT WHEN WE
READ IT BACK WE READ "060000". IT APPEARS THAT BIT 13 IS
STUCK AT "1" OR IT IS GETTING SET WHEN BIT 14 IS SET
TO "1". ERROR REPORTS BEFORE AND AFTER THIS ONE COULD
TELL US WHICH IS THE CASE.

4.0 MISCELLANEOUS INFORMATION

4.1 ACT/APT/XXDP COMPATABILITY

THE PROGRAM IS FULLY ACT AND APT COMPATABLE
AND IS SUPPORTED UNDER THE XXDP PACKAGE.

4.2 END-OF-PASS MESSAGE

AT THE END OF EACH PASS OF THE PROGRAM THE PASS NUMBER
AND TOTAL NUMBER OF ERRORS SINCE THE LAST END-OF-PASS ARE
REPORTED IN THE END-OF-PASS MESSAGE. FOR EXAMPLE:

```
        END OF PASS #2  TOTAL ERRORS SINCE LAST REPORT 0
```

THAT WOULD INDICATE THAT PASS TWO WAS JUST COMPLETED
AND NO ERRORS WERE DETECTED DURING THAT PASS. BOTH
THE PASS NUMBER AND NUMBER OF ERRORS ARE DECIMAL NUMBERS.

4.3 T-BIT TRAPPING

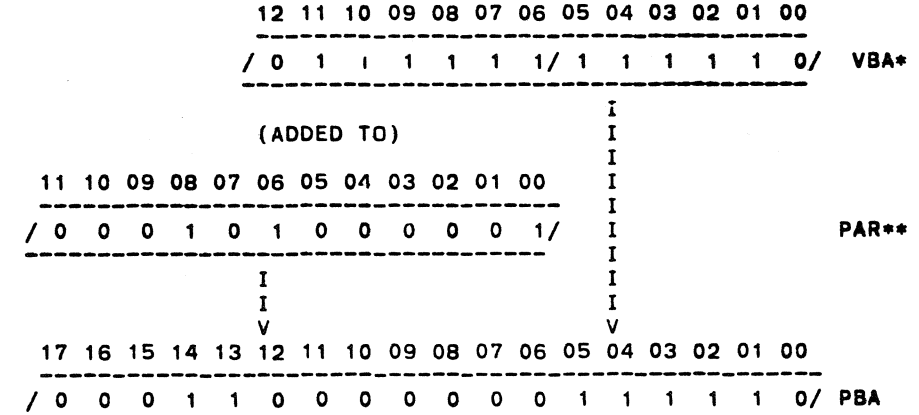
THE "T-BIT" (BIT 4) IN THE PROCESSOR STATUS WORD IS SET
BY AN "RTI" IN THE END-OF-PASS ROUTINE FOR EVERY OTHER PASS
BEGINNING WITH THE THIRD PASS (PASSES 3,5,7,9...). T-BIT
TRAPPING CAN BE INHIBITED BY SETTING BIT 12 = 1 IN THE SWITCH
REGISTER (SEE SECTION 2.4).

4.4 POWER FAILURE HANDLING

IF A POWER FAIL OCCURS (FOLLOWED BY A POWER UP), THE
MESSAGE "POWER FAILURE-RESTARTING" IS TYPED OUT AND
THE PROGRAM WILL RESTART EXECUTION AT "START:" (THE
VERY BEGINNING OF THE PROGRAM. IF THE SOFTWARE
SWITCH REGISTER IS BEING USED, ITS CONTENTS WILL BE
RESTORED. IF THERE IS A HARDWARE SWITCH REGISTER,
THERE IS NO WAY TO RESTORE THE VALUE OF THE SWITCH
REGISTER SO THE OPERATOR MUST RELOAD IT FROM THE CONSOLE.

4.5 PHYSICAL BUS ADDRESS CONSTRUCTION

BELOW IS A SIMPLIFIED DIAGRAM OF HOW THE MEMORY
MAMAGEMENT LOGIC CONSTRUCTS A PHYSICAL BUS ADDRESS
USING THE VIRTUAL ADDRESS AND THE PAGE ADDRESS REGISTER.
THE PAGE DESCRIPTOR REGISTER SELECTED WILL CONTAIN THE
PAGE EXPANSION, LENGTH, AND ACCESS INFORMATION.



*= VBA BITS <15:13> SELECT THE APPROPRIATE PAR AND PDR
**= PSW MODE BIT 01 (BIT 15) SELECTS THE USER (=1) OR

KERNEL (=0) SET OF PAR'S/PDR'S

5.0 PROGRAM DESCRIPTION

5.1 SUBROUTINES USED BY THIS PROGRAM

FOLLOWING IS A LIST OF THE SUBROUTINES AND HANDLERS USED BY THIS PROGRAM THAT ARE NOT PROVIDED BY THE "SYSMAC PACKAGE". DETAILS OF THE SUBROUTINES UNIQUE TO THIS PROGRAM MAY BE FOUND IN THE PROGRAM LISTING. REFER TO THE "SYSMAC" DOCUMENT AND PROGRAM LISTING FOR THE OTHER ROUTINES.

1. TURN OFF T-BIT AND SAVE CURRENT PSW
2. TURN ON T-BIT AND RESTORE PREVIOUS PSW
3. SET ALL WRITEABLE BITS IN ALL PAR/PDR'S
4. READ AND COMPARE KERNEL AND USER PAR/PDR'S
5. CONVERT VIRTUAL ADDRESS TO PHYSICAL ADDRESS

5.2 PROGRAM LISTING

A TABLE OF CONTENTS APPEARS AT THE BEGINNING OF THE LISTING WHICH CONTAINS THE NAMES OF EACH SECTION, SUBTEST, AND ROUTINE AND THE LINE NUMBERS CORRESPONDING TO THE START OF EACH.

FOLLOWING THIS SECTION OF DOCUMENTATION IS THE ACTUAL PROGRAM LISTING COMPLETE WITH SUBTEST DESCRIPTIONS AND "CODING COMMENTS".

5.3 USING THE PROGRAM TO DIAGNOSE A FAULT

WHEN AN ERROR OCCURS, ONE OF THE THINGS THAT'S IMPORTANT TO NOTE IS WHAT PASS THE ERROR OCCURRED ON. IF THE PASS NUMBER IS ODD AND IS THREE OR GREATER, THE ERROR MIGHT BE T-BIT SENSITIVE. TRY RUNNING THE PROGRAM AGAIN WITH BIT 12 OF THE SWITCH REG. EQUAL TO "1" TO INHIBIT T-BIT TRAPPING. IF THE PASS NUMBER IS GREATER THAN ONE, THE ERROR MAY BE ITERATION SENSITIVE. TRY RUNNING THE PROGRAM AGAIN WITH BIT 11 OF THE SWITCH REG. EQUAL TO "1" TO INHIBIT ITERATIONS. THESE HINTS SHOULD HELP YOU DETERMINE WHAT MAKES THE MACHINE FAIL AND WHEN.

IF YOU HAVE BEEN RUNNING WITH BIT 15 OF THE SWITCH REG. EQUAL TO "0", THEN YOU ARE ABLE TO LOOK AT ALL THE ERRORS THAT MAY BE RELATED TO THE FAULT YOU ARE DIAGNOSING. A FAULT IN AN EARLIER TEST MAY RESULT IN ERRORS DURING LATER TESTS WHICH MAY GIVE YOU MORE CLUES ABOUT THE NATURE OF THE FAULT. NOW USE THE METHOD OUTLINED IN SECTION 3.2 FOR EACH ERROR TO GATHER AS MUCH INFORMATION AS POSSIBLE.

```
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
```

NOW TO TEST YOUR IDEAS ON THE CAUSE OF THE FAILURE,
YOU MAY WANT TO SCOPE THIS ERROR CONDITION. SET BIT 09
OF THE SWITCH REG. EQUAL TO "1" TO LOOP ON THE ERROR.
FOR AN EVEN TIGHTER SCOPE LOOP THE ERROR CALL CAN BE
REPLACED WITH A BRANCH (REFER TO COMMENTS BY ERROR CALLS
IN THE PROGRAM LISTING).

OR YOU COULD LOOP ON THE TEST BY EITHER SETTING BIT 14
OF THE SWITCH REG. EQUAL TO "1" OF BY SETTING BIT 08 OF THE
SWITCH REG. EQUAL TO "1" AND THEN SETTING THE TEST NUMBER
IN BITS 07-00 OF THE SWITCH REG. YOU WILL PROBABLY WANT TO
INHIBIT ERROR TYPEOUTS BY SETTING BIT 13 OF THE SWITCH REG.
EQUAL TO "1".

```
                        .TITLE  CFKTHB0 PDP 11/34 MEM MGNT DIAG
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            INHIBIT TRACE TRAP
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
```



```
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
```

```
                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004                          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                          TBITVEC=14              ;;"T" BIT
000014                          TRTVEC= 14              ;;TRACE TRAP
000014                          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                          PWRVEC= 24              ;;POWER FAIL
000030                          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                          TRAPVEC=34              ;;"TRAP" TRAP
000060                          TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                          TPVEC=  64              ;;TTY PRINTER VECTOR
000240                          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                .SBTTL  MEMORY MANAGEMENT DEFINITIONS

                                ;*KT11 VECTOR ADDRESS

000250                          MMVEC=  250

                                ;*KT11 STATUS REGISTER ADDRESSES

177572                          SR0=    177572
177574                          SR1=    177574
177576                          SR2=    177576
172516                          SR3=    172516

                                ;*USER "I" PAGE DESCRIPTOR REGISTERS

177600                          UIPDR0= 177600
177602                          UIPDR1= 177602
177604                          UIPDR2= 177604
177606                          UIPDR3= 177606
177610                          UIPDR4= 177610
177612                          UIPDR5= 177612
177614                          UIPDR6= 177614
177616                          UIPDR7= 177616

                                ;*USER "I" PAGE ADDRESS REGISTERS

177640                          UIPAR0= 177640
177642                          UIPAR1= 177642
177644                          UIPAR2= 177644
177646                          UIPAR3= 177646
177650                          UIPAR4= 177650
177652                          UIPAR5= 177652
177654                          UIPAR6= 177654
177656                          UIPAR7= 177656

                                ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS

172300                          KIPDR0= 172300
172302                          KIPDR1= 172302
172304                          KIPDR2= 172304
```



```
172306                          KIPDR3= 172306
172310                          KIPDR4= 172310
172312                          KIPDR5= 172312
172314                          KIPDR6= 172314
172316                          KIPDR7= 172316

                                ;*KERNEL "I" PAGE ADDRESS REGISTERS

172340                          KIPAR0= 172340
172342                          KIPAR1= 172342
172344                          KIPAR2= 172344
172346                          KIPAR3= 172346
172350                          KIPAR4= 172350
172352                          KIPAR5= 172352
172354                          KIPAR6= 172354
172356                          KIPAR7= 172356

                                        .EQUIV  SP,KSP
                                        .EQUIV  SP,USP
                                        .EQUIV  BIT4,TBIT
                                        .EQUIV  BIT6,WBIT
001100                                  KERSTK= STACK
000700                                  USESTK= STACK-200

                                ;*ADDITIONAL DEFINITIONS
                                ;*


                                .SBTTL  TRAP CATCHER

                                        .=0
000000                          ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                                        .=174
000174                          DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  020000                  JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
                                .SBTTL  ACT11 HOOKS

                                ;;*****************************************************************
                                ;HOOKS REQUIRED BY ACT11
000204                                  $SVPC=.                 ;SAVE PC
000046                                  .=46
000046  034760                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
000052                                  .=52
000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
000204                                  .=$SVPC                 ;; RESTORE PC
                                .SBTTL  APT PARAMETER BLOCK

                                ;;*****************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*****************************************************************
000204                                  .$X=.   ;;SAVE CURRENT LOCATION
000024                                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
```

```
                                        200     ;;FOR APT START UP
                                        .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
                                        $APTHDR ;;POINT TO APT HEADER BLOCK
                                        .=.$X   ;;RESET LOCATION COUNTER
                                ;;**************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

000204                          $APTHD:
000204  000000                 $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
000206  001226                 $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
000210  000010                 $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
000212  000020                 $PASTM: .WORD   20      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
000214  000005                 $UNITM: .WORD   5       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
000216  000052                         .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```



```
                                .SBTTL  COMMON TAGS

                                ;;**************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD  0
001102     000          $TSTNM: .BYTE  0                ;;CONTAINS THE TEST NUMBER
001103     000          $ERFLG: .BYTE  0                ;;CONTAINS ERROR FLAG
001104  000000          $ICNT:  .WORD  0                ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          $LPADR: .WORD  0                ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          $LPERR: .WORD  0                ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          $ERTTL: .WORD  0                ;;CONTAINS TOTAL ERRORS DETECTED
001114     000          $ITEMB: .BYTE  0                ;;CONTAINS ITEM CONTROL BYTE
001115     001          $ERMAX: .BYTE  1                ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          $ERRPC: .WORD  0                ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          $GDADR: .WORD  0                ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          $BDADR: .WORD  0                ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          $GDDAT: .WORD  0                ;;CONTAINS 'GOOD' DATA
001126  000000          $BDDAT: .WORD  0                ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD  0                ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD  0
001134     000          $AUTOB: .BYTE  0                ;;AUTOMATIC MODE INDICATOR
001135     000          $INTAG: .BYTE  0                ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD  0
001140  177570          SWR:    .WORD  DSWR             ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY: .WORD DDISP            ;;ADDRESS OF DISPLAY REGISTER
001144  177560          $TKS:   177560                  ;;TTY KBD STATUS
001146  177562          $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154     000          $NULL:  .BYTE  0                ;;CONTAINS NULL CHARACTER FOR FILLS
001155     002          $FILLS: .BYTE  2                ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156     012          $FILLC: .BYTE  12               ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157     000          $TPFLG: .BYTE  0                ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000          $REGAD: .WORD  0                ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000          $REG0:  .WORD  0                ;;CONTAINS (($REGAD)+0)
001164  000000          $REG1:  .WORD  0                ;;CONTAINS (($REGAD)+2)
001166  000000          $REG2:  .WORD  0                ;;CONTAINS (($REGAD)+4)
001170  000000          $REG3:  .WORD  0                ;;CONTAINS (($REGAD)+6)
001172  000000          $REG4:  .WORD  0                ;;CONTAINS (($REGAD)+10)
001174  000000          $REG5:  .WORD  0                ;;CONTAINS (($REGAD)+12)
001176  000000          $TMP0:  .WORD  0                ;;USER DEFINED
001200  000000          $TMP1:  .WORD  0                ;;USER DEFINED
001202  000000          $TMP2:  .WORD  0                ;;USER DEFINED
001204  000000          $TMP3:  .WORD  0                ;;USER DEFINED
001206  000000          $TMP4:  .WORD  0                ;;USER DEFINED
001210  000000          $TMP5:  .WORD  0                ;;USER DEFINED
001212  000000          $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
001214  000000          $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
001216  177607  000377   $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001222     077          $QUES:  .ASCII  /?/             ;;QUESTION MARK
001223     015          $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
```

```
 810  001224  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
 811                                ;;*************************************************************
 812                                .SBTTL  APT MAILBOX-ETABLE
 813
 814                                ;;*************************************************************
 815                                .EVEN
 816  001226                        $MAIL:                  ;;APT MAILBOX
 817  001226  000000                $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
 818  001230  000000                $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
 819  001232  000000                $TESTN: .WORD   ATESTN  ;;TEST NUMBER
 820  001234  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
 821  001236  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
 822  001240  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
 823  001242  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
 824  001244  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
 825  001246                        $ETABLE:                ;;APT ENVIRONMENT TABLE
 826  001246      000               $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
 827  001247      000               $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
 828  001250  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
 829  001252  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
 830  001254  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
 831                                ;*                      BITS 15-11=CPU TYPE
 832                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
 833                                ;*                              11/70=06,PDQ=07,Q=10
 834                                ;*                      BIT 10=REAL TIME CLOCK
 835                                ;*                      BIT  9=FLOATING POINT PROCESSOR
 836                                ;*                      BIT  8=MEMORY MANAGEMENT
 837  001256      000               $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
 838  001257      000               $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
 839                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
 840                                ;*                              900 NSEC CORE=001
 841                                ;*                              300 NSEC BIPOLAR=002
 842                                ;*                              500 NSEC MOS=003
 843  001260  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
 844                                ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
 845  001262      000               $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
 846  001263      000               $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
 847  001264  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
 848  001266      000               $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
 849  001267      000               $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
 850  001270  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
 851  001272      000               $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
 852  001273      000               $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
 853  001274  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
 854  001276  000000                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
 855  001300  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
 856  001302  000000                $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
 857  001304  000000                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
 858  001306  000000                $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
 859  001310  000000                $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
 860  001312  000000                $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
 861  001314  000000                $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
 862  001316  000000                $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
 863  001320  000000                $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
 864  001322  000000                $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
 865  001324  000000                $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
```



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 866  001326  000000                $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
 867  001330  000000                $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
 868  001332  000000                $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
 869  001334  000000                $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
 870  001336  000000                $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
 871  001340  000000                $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
 872  001342  000000                $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
 873  001344  000000                $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
 874  001346  000000                $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
 875  001350  000000                $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
 876
 877
 878  001352                        $ETEND:
 879
 880
 881  001352  000000                TESTNO: .WORD   0               ;HOLDS TEST NUMBER FOR TYPEOUTS
 882  001354  000000                WASR6:  .WORD   0               ;USED TO STORE THE STACK POINTER AFTER A TRAP
 883  001356  000000                TRAPPC: .WORD   0               ;USED TO STORE THE PC OF A TRAP OR ABORT
 884  001360  000000                TRAPPS: .WORD   0               ;USED TO STORE THE PS OF A TRAP OR ABORT
 885  001362  000000                CORSR0: .WORD   0       ;+USED TO STORE THE CORRECT SR0
 886  001364  000000                CORSR2: .WORD   0               ;+USED TO STORE THE CORRECT SR2
 887  001366  000000                WASSR0: .WORD   0               ;USED TO STORE CONTENTS OF SR0
 888  001370  000000                WASSR2: .WORD   0               ;USED TO STORE CONTENTS OR SR2
 889  001372  000000                TBITPS: .WORD   0               ;SAVES THE PSW THAT MAY HAVE ITS T-BIT ON
 890  001374  000000                ANDADR: .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING AND-ED
 891  001376  000000                ORADR:  .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING OR-ED
 892  001400  000000                TONUM:  .WORD   0               ;HOLDS NUMBER OF TIME-OUTS
 893  001402  000000                VIRT1:  .WORD   0               ;HOLDS VIRTUAL ADDRESS TO BE CONVERTED
 894  001404  000000                VIRT2:  .WORD   0               ;   "       "       "
 895  001406  000000                PBALO:  .WORD   0               ;HOLDS BITS <15:00> OF PHYSICAL ADDRESS
 896  001410  000000                PBAHI:  .WORD   0               ;HOLDS BITS <17:16> OF PHYSICAL ADDRESS
```

```
                                .SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT


001412                          $ERRTB:

                                ;*ITEM 1
001412  041616                          EM1             ;UNEXPECTED CPU TRAP TO LOC. 004
001414  045620                          DH1             ;OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC
001416  051220                          DT1             ;TRAPPC, TRAPPS, WASR6, TESTNO, $ERPPC, 0
001420  052112                          DF1             ;0,0,0,0,0

                                ;*ITEM 2
001422  041656                          EM2             ;UNEXPECTED MEM. MGMT. TRAP TO LOC. 250
001424  045670                          DH2             ;OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC
001426  051234                          DT2             ;TRAPPC, TRAPPS, WASR6, WASSR0, WASSR2, TESTNO, $ERRPC,
001430  052117                          DF2             ;0,0,0,0,0,0,0

                                ;*ITEM 3
001432  041725                          EM3             ;PRIORITY BITS SET WRONG IN PSW
001434  045760                          DH3             ;WROTE   READ    TESTNO  ERRORPC
001436  051254                          DT3             ;$REG0,$REG1,TESTNO,$ERRPC,0
001440  052126                          DF3             ;0,0,0,0

                                ;*ITEM 4
001442  041764                          EM4             ;MODE BITS SET WRONG IN PSW
001444  045760                          DH3             ;WROTE   READ    TESTNO  ERRORPC
001446  051254                          DT3             ;$REG0,$REG1,TESTNO,$ERRPC,0
001450  052126                          DF3             ;0,0,0,0

                                ;*ITEM 5
001452  042017                          EM5             ;DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW
001454  045760                          DH3             ;WROTE   READ    TESTNO  ERRORPC
001456  051254                          DT3             ;$REG0,$REG1,TESTNO,$ERRPC,0
001460  052126                          DF3             ;0,0,0,0

                                ;*ITEM 6
001462  042072                          EM6             ;KERNEL R6 CHANGED BY WRITING USER R6
001464  045760                          DH3             ;WROTE   READ    TESTNO  ERRORPC
001466  051254                          DT3             ;$REG0,$REG1,TESTNO,$ERRPC,0
001470  052126                          DF3             ;0,0,0,0

                                ;*ITEM 7
001472  042137                          EM7             ;A MEMORY MGMT. REG. TIMED OUT
001474  046020                          DH7             ;ADDRESS TESTNO  ERRORPC
001476  051266                          DT7             ;$REG0,TESTNO,$ERRPC,0
```



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001500  052132                          DF7             ;0,0,0

                                ;*ITEM 10
001502  042175                          EM10            ;SUMMARY OF MEM. MGMT. REG. TIMEOUTS
001504  046050                          DH10            ;REGISTER-ADDRS  NUM. OF
                                                        ;AND-ED  OR-ED   TIMOUTS TESTNO ERRORPC
001506  051276                          DT10            ;ANDADR,ORADR,TONUM,TESTNO,$ERRPC,0
001510  052135                          DF10            ;0,0,1,0,0

                                ;*ITEM 11
001512  042241                          EM11            ;MEM. MGMT. REG. WOULD NOT CLEAR
001514  046150                          DH11            ;REGISTR READ    READ-(BINARY)
                                                        ;ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC
001516  051312                          DT11            ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
001520  052142                          DF11            ;0,0,2,0,0

                                ;*ITEM 12
001522  042301                          EM12            ;MEM. MGMT. REG. BITS NOT SET CORRECTLY
001524  046270                          DH12            ;REGISTR WROTE   READ    READ
                                                        ;ADDRESS (OCTAL) (OCTAL) (BINARY) TESTNO ERRORPC
001526  051326                          DT12            ;$REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
001530  052147                          DF12            ;0,0,0,2,0,0

                                ;*ITEM 13
001532  042350                          EM13            ;SR0 EFFECTED BY WRITE TO PSW
001534  046430                          DH13            ;READ    TESTNO  ERRORPC
001536  051344                          DT13            ;$REG0,TESTNO,$ERRPC,0
001540  052155                          DF13            ;0,0,0

                                ;*ITEM 14
001542  042405                          EM14            ;SR1 DID NOT READ ALL ZEROS
001544  046430                          DH13            ;READ    TESTNO  ERRORPC
001546  051344                          DT13            ;$REG0,TESTNO,$ERRPC,0
001550  052155                          DF13            ;0,0,0

                                ;*ITEM 15
001552  042440                          EM15            ;DUAL ADDRESSING BETWEEN BYTES OF PAR OR PDR
001554  046270                          DH12            ;REGISTER WROTE   READ    READ
                                                        ;ADDRESS (OCTAL) (OCTAL) (BINARY) TESTNO  ERRORPC
001556  051326                          DT12            ;$REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
001560  052147                          DF12            ;0,0,0,2,0,0

                                ;*ITEM 16
001562  042514                          EM16            ;DUAL ADDRESSING BETWEEN PAR-PDR'S
001564  046460                          DH16            ;PAR-PDR PAR-PDR
                                                        ;CLEARED EFFECTD EXPECTD RECEIVD TESTNO ERRORPC
001566  051354                          DT16            ;$REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
001570  052160                          DF16            ;0,0,0,0,0,0

                                ;*ITEM 17
001572  042556                          EM17            ;PHYS. ADDR. FORMED READ WRONG IN MAINT. MODE
001574  046560                          DH17            ;PHYSICAL VIRTUAL
                                                        ;ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC
001576  051372                          DT17            ;PBALO,VIRT1,$REG4,TESTNO,$ERRPC,0
001600  052166                          DF17            ;3,0,0,0,0
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1009                                    ;*ITEM 20
1010  001602  042626                          EM20            ;PHYS. ADDR. FORMED READ WRONG IN RELOCATE MODE
1011  001604  046550                          DH20            ;PHYSICL PAR 4   PAR 5
                                                              ;ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO
1012
1013  001606  051406                          DT20            ;PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
1014  001610  052173                          DF20            ;3,0,0,0,0,0,0,0
1015
1016                                    ;*ITEM 21
1017  001612  042700                          EM21            ;W-BIT DID NOT GET SET IN PDR
1018  001614  046776                          DH21            ;PDR     VIRTUAL
                                                              ;TESTED  ADDRESS TESTNO  ERRORPC
1019
1020  001616  051430                          DT21            ;$REG5,$REG3,TESTNO,$ERRPC,0
1021  001620  052203                          DF21            ;0,0,0,0
1022
1023                                    ;*ITEM 22
1024  001622  042735                          EM22            ;W-BIT SET IN MORE THAN ONE PDR
1025  001624  047056                          DH22            ;PDR IN  PDR     VIRTUAL
                                                              ;ERROR   TESTED  ADDRESS TESTNO  ERRORPC
1026
1027  001626  051442                          DT22            ;$REG0,$REG5,$REG3,TESTNO,$ERRPC,0
1028  001630  052207                          DF22            ;0,0,0,0,0
1029
1030                                    ;*ITEM 23
1031  001632  042774                          EM23            ;W-BIT NOT CLEARED BY WRITING TO PDR
1032  001634  047155                          DH23            ;PDR     TESTNO  ERRORPC
1033  001636  051456                          DT23            ;$REG5,TESTNO,$ERRPC,0
1034  001640  052214                          DF23            ;0,0,0
1035
1036                                    ;*ITEM 24
1037  001642  043040                          EM24            ;WRITING SR0 SET W-BIT IN KIPDR7
1038  001644  047205                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
1039  001646  051466                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
1040  001650  052217                          DF24            ;0,0,0,0
1041
1042                                    ;*ITEM 25
1043  001652  043100                          EM25            ;W-BIT GOT SET DURING ODD ADDR. ABORT
1044  001654  047205                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
1045  001656  051466                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
1046  001660  052217                          DF24            ;0,0,0,0
1047
1048                                    ;*ITEM 26
1049  001662  043145                          EM26            ;MEMORY MGMT. ACCESS ABORT DID NOT OCCUR
1050  001664  047245                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
1051  001666  051500                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
1052  001670  052217                          DF24            ;0,0,0,0
1053
1054                                    ;*ITEM 27
1055  001672  043215                          EM27            ;ACCESS ERROR DID NOT ABORT INSTRUCTION
1056  001674  047245                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
1057  001676  051500                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
1058  001700  052217                          DF24            ;0,0,0,0
1059
1060                                    ;*ITEM 30
1061  001702  043264                          EM30            ;SR0 DID NOT REPORT ACCESS ERROR CORRECTLY
1062  001704  047305                          DH30            ;SR0 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
1063  001706  051512                          DT30            ;WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
1064  001710  052223                          DF30            ;0,0,0,0,0,0
```



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1065
1066                                    ;*ITEM 31
1067  001712  043336                          EM31            ;SR2 DID NOT LOCKUP CORRECT VIRTUAL ADDR.
1068  001714  047365                          DH31            ;SR2 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
1069  001716  051530                          DT31            ;WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
1070  001720  052223                          DF30            ;0,0,0,0,0,0
1071
1072                                    ;*ITEM 32
1073  001722  043403                          EM32            ;PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE
1074  001724  047445                          DH32            ;V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC
1075  001726  051546                          DT32            ;$REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
1076  001730  052223                          DF30            ;0,0,0,0,0,0
1077
1078                                    ;*ITEM 33
1079  001732  043464                          EM33            ;PAGE LGTH. ABORT DID NOT OCCUR WHEN IT SHOULD HAVE
1080  001734  047525                          DH33            ;V.B.A.  KIPDR4  TESTNO  ERRORPC
1081  001736  051564                          DT33            ;$REG0,$REG4,TESTNO,$ERRPC,0
1082  001740  052217                          DF24            ;0,0,0,0
1083
1084                                    ;*ITEM 34
1085  001742  043547                          EM34            ;SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY
1086  001744  047565                          DH34            ;V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC
1087  001746  051576                          DT34            ;$REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
1088  001750  052223                          DF30            ;0,0,0,0,0,0
1089                                    ;*ITEM 35
1090  001752  043336                          EM31            ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
1091  001754  047645                          DH35            ;V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC
1092  001756  051614                          DT35            ;$REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
1093  001760  052223                          DF30            ;0,0,0,0,0,0
1094
1095                                    ;*ITEM 36
1096  001762  043336                          EM31            ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
1097  001764  047725                          DH36            ;SR2 WAS EXPECTD TESTNO  ERRORPC
1098  001766  051632                          DT36            ;WASSR2,$REG1,TESTNO,$ERRPC,0
1099  001770  052217                          DF24            ;0,0,0,0
1100
1101                                    ;*ITEM 37
1102  001772  043625                          EM37            ;SR0 OR SR2 CHANGED BY A SECOND ABORT
1103  001774  047765                          DH37            ;FIRST ABORT     SECOND ABORT
                                                              ;SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC
1104
1105  001776  051644                          DT37            ;$TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
1106  002000  052223                          DF30            ;0,0,0,0,0,0
1107
1108                                    ;*ITEM 40
1109  002002  043672                          EM40            ;SR0 OR SR2 WAS NOT "RESET" BY A RESET
1110  002004  050102                          DH40            ;SR0 WAS SR2 WAS TESTNO  ERRORPC
1111  002006  051662                          DT40            ;WASSR0,WASSR2,TESTNO,$ERRPC,0
1112  002010  052217                          DF24            ;0,0,0,0
1113
1114                                    ;*ITEM 41
1115  002012  043741                          EM41            ;SR2 NOT TRACKING CORRECTLY
1116  002014  047725                          DH36            ;SR2 WAS EXPECTD TESTNO  ERROPC
1117  002016  051632                          DT36            ;WASSR2,$REG1,TESTNO,$ERRPC,0
1118  002020  052217                          DF24            ;0,0,0,0
1119
1120                                    ;*ITEM 42
```

```
1121  002022  043774                    EM42            ;DID NOT TRAP THRU KERNEL SPACE
1122  002024  050142                    DH42            ;PSW WAS R6 WAS  TESTNO  ERRORPC
1123  002026  051674                    DT42            ;$REG1,$REG2,TESTNO,$ERRPC,0
1124  002030  052217                    DF24            ;0,0,0,0
1125
1126                                  ;*ITEM 43
1127  002032  044033                    EM43            ;KT ERROR SERVICED ON ODD ADDR. ERROR
1128  002034  047155                    DH23            ;PDR     TESTNO  ERRORPC
1129  002036  051456                    DT23            ;$REG5,TESTNO,$ERRPC,0
1130  002040  052214                    DF23            ;0,0,0
1131
1132                                  ;*ITEM 44
1133  002042  044100                    EM44            ;SR0 OR SR2 CHANGED BY ODD ADDR. ERROR
1134  002044  050202                    DH44            ;EXPECTED        RECEIVED
1135                                                    ;SR0     SR2     SR0 WAS SR2 WAS TESTNO  ERRORPC
1136  002046  051706                    DT44            ;$REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
1137  002050  052223                    DF30            ;0,0,0,0,0,0
1138
1139                                  ;*ITEM 45
1140  002052  044146                    EM45            ;ERROR DURING "DOUBLE ERROR" (KT & ODD ADDR.)
1141  002054  050314                    DH45            ;EXPECTED:
1142                                                    ;PSW     PC       SR0     SR2
1143                                                    ;170017  (3$+4)  020147  (3$)
1144                                                    ;RECEIVED
1145                                                    ;PSW     PC       SR0     SR2     TESTNO  ERRORPC
1146  002056  051724                    DT45            ;$REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
1147  002060  052223                    DF30            ;0,0,0,0,0,0
1148
1149                                  ;*ITEM 46
1150  002062  044223                    EM46            ;MFPI INSTRUCTION PUSHED WRONG DATA
1151  002064  050511                    DH46            ;DATA    DATA
1152                                                    ;EXPECTD RECEIVD TESTNO  ERRORPC
1153  002066  051742                    DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
1154  002070  052231                    DF46            ;0,0,0,0
1155
1156                                  ;*ITEM 47
1157  002072  044266                    EM47            ;MTPI INSTRUCTION LOADED WRONG DATA
1158  002074  050511                    DH46            ;DATA    DATA
1159                                                    ;EXPECTD RECEIVD TESTNO  ERRORPC
1160  002076  051742                    DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
1161  002100  052231                    DF46            ;0,0,0,0
1162
1163                                  ;*ITEM 50
1164  002102  044331                    EM50            ;STACK NOT PUSHED BY MFPI-MTPI
1165  002104  050566                    DH50            ;TESTNO  ERRORPC
1166  002106  051754                    DT50            ;TESTNO,$ERRPC,0
1167  002110  052235                    DF50            ;0,0
1168
1169                                  ;*ITEM 51
1170  002112  044367                    EM51            ;KERNEL PAGE ACCESSED INSTEAD OF USER: MFPI-MTPI
1171  002114  050606                    DH51            ;SR0 WAS SR2 WAS TESTNO  ERRORPC
1172  002116  051762                    DT51            ;WASSR0,WASSR2,TESTNO,$ERRPC,0
1173  002120  052237                    DF51            ;0,0,0,0
1174
1175                                  ;*ITEM 52
1176  002122  044445                    EM52            ;WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE
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1177  002124  050546                    DH52            ;PHYSICL PAR 4
1178                                                    ;ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW    TESTNO
1179  002126  051774                    DT52            ;PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
1180  002130  052243                    DF52            ;3,0,0,0,0,0,0,0
1181                                  ;*ITEM 53
1182  002132  044523                    EM53            ;MFPD INSTRUCTION PUSHED WRONG DATA
1183  002134  050511                    DH46            ;DATA    DATA
1184                                                    ;EXPECTD RECEIVD TESTNO  ERRORPC
1185  002136  051742                    DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
1186  002140  052231                    DF46            ;0,0,0,0
1187
1188                                  ;*ITEM 54
1189  002142  044566                    EM54            ;STACK NOT PUSHED BY MFPD-MTPD
1190  002144  050566                    DH50            ;TESTNO  ERRORPC
1191  002146  051754                    DT50            ;TESTNO,$ERRPC,0
1192  002150  052235                    DF50            ;0,0
1193
1194                                  ;*ITEM 55
1195  002152  044624                    EM55            ;PAR OR PDR WAS CHANGED BY A RESET
1196  002154  046150                    DH11            ;REGISTR READ    READ-(BINARY)
1197                                                    ;ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC
1198  002156  051312                    DT11            ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
1199  002160  052142                    DF11            ;0,0,2,0,0
1200
1201                                  ;*ITEM 56
1202  002162  044662                    EM56            ;ILLEGAL MODE 01 NOT ABORTED
1203  002164  050566                    DH50            ;TESTNO  ERRORPC
1204  002166  051754                    DT50            ;TESTNO,$ERRPC,0
1205  002170  052235                    DF50            ;0,0
1206
1207                                  ;*ITEM 57
1208  002172  044716                    EM57            ;SR0 DID NOT REPORT ILLEGAL MODE 01 CORRECTLY
1209  002174  050764                    DH57            ;SR0 WAS EXPECTD TESTNO  ERRORPC
1210  002176  052016                    DT57            ;WASSR0,$REG1,TESTNO,$ERRPC,0
1211  002200  052253                    DF57            ;0,0,0,0
1212
1213                                  ;*ITEM 60
1214  002202  044773                    EM60            ;PSW CHANGED BY AN RTI IN USER MODE
1215  002204  051024                    DH60            ;PSW WAS EXPECTD TESTNO  ERRORPC
1216  002206  052030                    DT60            ;$REG1,$REG2,TESTNO,$ERRPC,0
1217  002210  052257                    DF60            ;0,0,0,0
1218
1219                                  ;*ITEM 61
1220  002212  045036                    EM61            ;MAINT MODE (SR0<8>) NOT DISABLED BY A RESET
1221  002214  050566                    DH50            ;TESTNO  ERRORPC
1222  002216  051754                    DT50            ;TESTNO,$ERRPC,0
1223  002220  052235                    DF50            ;0,0
1224
1225                                  ;*ITEM 62
1226  002222  045114                    EM62            ;DATA INCORRECT AFTER A MAINT. MODE WRITE
1227  002224  045760                    DH3             ;WROTE   READ    TESTNO  ERRORPC
1228  002226  051254                    DT3             ;$REG0,$REG1,TESTNO,$ERRPC,0
1229  002230  052126                    DF3             ;0,0,0,0
1230
1231                                  ;*ITEM 63
1232  002232  045165                    EM63            ;SOURCE RELOCATED IN MAINT. MODE
```

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1233  002234  045670                          DH2                     ;OLD PC  OLD PSW R6 WAS  SR0     SR2    TESTNO  ERRORPC
1234  002236  051234                          DT2                     ;TRAPPC,TRAPPS,WASR6,WASSR0,WASSR2,TESTNO,$ERRPC,0
1235  002240  052117                          DF2                     ;0,0,0,0,0,0,0
1236
1237                                  ;*ITEM 64
1238  002242  043336                          EM31                    ;SR2 DIDNOT LOCKUP CORRECT VIRTUAL ADDR.
1239  002244  047725                          DH36                    ;SR2 WAS EXPECTD TESTNO  ERRORPC
1240  002246  052042                          DT64                    ;WASSR2,$REG4,TESTNO,$ERRPC,0
1241  002250  052217                          DF24                    ;0,0,0,0
1242
1243                                  ;*ITEM 65
1244  002252  045225                          EM64                    ;+NON RESIDENT ABORT DID NOT OCCUR
1245  002254  051064                          DH61                    ;+SR0       SR2     TESTNO   ERRORPC
1246  002256  052054                          DT65                    ;+WASSR0,WASSR2,TESTNO,$ERRORPC
1247  002260  052263                          DF61                    ;+0,0,0,0
1248
1249                                  ;*ITEM 66
1250  002262  045266                          EM65                    ;+ERROR FLAG FOR KR ABORT DID NOT SET
1251  002264  051064                          DH61                    ;+SR0         SR2   TESTNO  ERRORPC
1252  002266  052054                          DT65                    ;+WASSR0,WASSR2,TESTNO,$ERRPC
1253  002270  052263                          DF61                    ;+0,0,0,0
1254
1255
1256                                  ;*ITEM67
1257  002272  045351                          EM66                    ;+SR2 DID NOT FREEZE THE VIRTUAL ADRS OF ABORT
1258  002274  051064                          DH61                    ;+SR0       SR2  TESTNO  ERRORPC
1259  002276  052054                          DT65                    ;+WASSR0,WASSR2,TESTNO,$ERRPC
1260  002300  052263                          DF61                    ;+0,0,0,0
1261
1262
1263                                  ;*ITEM 70
1264  002302  045441                          EM67                    ;+2ND NON RESIDENT ABORT DID NOT OCCUR
1265  002304  051064                          DH61                    ;+SR0       SR2  TESTNO  ERRORPC
1266  002306  052054                          DT65                    ;+WASSR0,WASSR2,TESTNO,$ERRPC
1267  002310  052263                          DF61                    ;+0,0,0,0
1268
1269                                  ;*ITEM 71
1270  002312  045506                          EM70                    ;+2ND NR ABORT CHANGED SR2
1271  002314  051122                          DH62                    ;+SR2 EXPT SR2 RECD TESTNO ERRORPC
1272  002316  052066                          DT66                    ;+CORSR0,WASSR2,TESTNO,$ERRPC
1273  002320  052263                          DF61                    ;+0,0,0,0
1274
1275                                  ;*ITEM 72
1276  002322  045562                          EM71                    ;+SR0 WAS NOT CLEARED BY INIT
1277  002324  051161                          DH63                    ;+SR0 EXPT SR0 RECD TESTNO ERRORPC
1278  002326  052100                          DT67                    ;+CORSR0,WASSR0,TESTNO,ERRORPC
1279  002330  052263                          DF61                    ;+0,0,0,0
1280
```



```
1281                                  .SBTTL  *****   TRAP HANDLING ROUTINES  *****
1282
1283                                  .SBTTL  CPU TRAP HANDLER ROUTINE
1284                                  ;;*************************************************************
1285                                  ;*
1286                                  ;*      THIS SUBROUTINE WILL HANDLE ALL CPU TRAPS AND ABORTS THRU
1287                                  ;*      "ERRVEC" (LOC. 004).  IF THIS SUBROUTINE IS ENTERED BY A
1288                                  ;*      SECOND TRAP BEFORE THE FIRST HAS BEEN SERVICED, A HALT IS
1289                                  ;*      EXECUTED.
1290                                  ;*
1291                                  ;;*************************************************************
1292  002332  005227                  TIMERR: INC     (PC)+           ;MAKE FLAG ZERO IF FIRST TIME THRU
1293  002334  177777                  TIMFLG: .WORD   -1              ;NEGATIVE ONE FOR "HAVE ENTERED" FLAG
1294  002336  001401                          BEQ     1$              ;BRANCH IF FIRST TIME IN
1295  002340  000000                          HALT                    ;STOP! - I'VE ENTERED THIS ROUTINE
1296                                                                  ;A SECOND TIME BEFORE I FINISHED
1297                                                                  ;REPORTING THE FIRST ERROR.  THE
1298                                                                  ;SECOND ENTRY ADDRESS SHOULD BE ON
1299                                                                  ;THE KERNEL STACK.
1300  002342  012637  001356          1$:     MOV     (KSP)+,TRAPPC   ;SAVE PC+2 AT TIME OF ABORT
1301  002346  012637  001360                  MOV     (KSP)+,TRAPPS   ;SAVE PS AT TIME OF ABORT
1302  002352  010637  001354                  MOV     KSP,WASR6       ;SAVE STACK POINTER VALUE
1303  002356  104001                          ERROR   1               ;UNEXPECTED TRAP OR ABORT TO LOC. 4
1304  002360  012737  177777  002334          MOV     #-1,TIMFLG      ;MAKE FLAG NEGATIVE ONE FOR NEXT TIME
1305  002366  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
1306  002372  013746  001356                  MOV     TRAPPC,-(KSP)
1307  002376  000006                          RTT                     ;RETURN FROM INTERRUPT OR ABORT
1308
1309
1310                                  .SBTTL  MEMORY MANAGEMENT TRAP HANDLER ROUTINE
1311                                  ;;*************************************************************
1312                                  ;*
1313                                  ;*      THIS SUBROUTINE WILL HANDLE ALL UNEXPECTED MEMORY MANAGEMENT
1314                                  ;*      TRAPS AND ABORTS THRU "MMVEC" (LOC. 250).  IF THIS SUBROUTINE IS
1315                                  ;*      ENTERED BY A SECOND TRAP BEFORE THE FIRST HAS BEEN SERVICED, A
1316                                  ;*      HALT IS EXECUTED.
1317                                  ;*
1318                                  ;;*************************************************************
1319  002400  005227                  MGMERR: INC     (PC)+           ;MAKE FLAG ZERO IF FIRST TIME THRU
1320  002402  177777                  MGMFLG: .WORD   -1              ;NEGATIVE ONE FOR "HAVE ENTERED" FLAG
1321  002404  001401                          BEQ     1$              ;BRANCH IF FIRST TIME IN
1322  002406  000000                          HALT                    ;STOP! - I'VE ENTERED THIS ROUTINE
1323                                                                  ;A SECOND TIME BEFORE I FINISHED
1324                                                                  ;REPORTING THE FIRST ERROR.  THE
1325                                                                  ;SECOND ENTRY ADDRESS SHOULD BE ON
1326                                                                  ;THE KERNEL STACK.
1327  002410  012637  001356          1$:     MOV     (KSP)+,TRAPPC   ;SAVE PC+2 AT TIME OF ABORT
1328  002414  012637  001360                  MOV     (KSP)+,TRAPPS   ;SAVE PS AT TIME OF ABORT
1329  002420  010637  001354                  MOV     KSP,WASR6       ;SAVE STACK POINTER VALUE
1330  002424  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE CONTENTS OF KT STATUS REG. 0
1331  002432  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE CONTENTS OF KT STATUS REG. 2
1332  002440  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN STATUS REG 0
1333  002446  104002                          ERROR   2               ;UNEXPECTED TRAP OR ABORT TO LOC. 250
1334  002450  012737  177777  002402          MOV     #-1,MGMFLG      ;MAKE FLAG NEGATIVE ONE FOR NEXT TIME
1335  002456  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
1336  002462  013746  001356                  MOV     TRAPPC,-(KSP)
```

```
 1337  002466  000006                          RTT                     ;RETURN FROM INTERRUPT OR ABORT.
 1338
```



```
 1339                                                   .SBTTL
 1340                                                   .SBTTL  *****   STARTING POINT OF TEST  *****
 1341                                                   .SBTTL  *****   STARTING ADDRESS OF 200 *****
 1342            020000                                 .=20000
 1343
 1344  020000                                 START:
 1345                                         .SBTTL  INITIALIZE THE COMMON TAGS
 1346                                         ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
 1347  020000  012706  001100                         MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
 1348  020004  005026                                 CLR     (R6)+           ;;CLEAR MEMORY LOCATION
 1349  020006  022706  001140                         CMP     #SWR,R6 ;;DONE?
 1350  020012  001374                                 BNE     .-6             ;;LOOP BACK IF NO
 1351  020014  012706  001100                         MOV     #STACK,SP       ;;SETUP THE STACK POINTER
 1352                                         ;;INITIALIZE A FEW VECTORS
 1353  020020  012737  035040  000020                 MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
 1354  020026  012737  000340  000022                 MOV     #340,@#IOTVEC+2 ;;LEVEL 7
 1355  020034  012737  035320  000030                 MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
 1356  020042  012737  000340  000032                 MOV     #340,@#EMTVEC+2 ;;LEVEL 7
 1357  020050  012737  041302  000034                 MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
 1358  020056  012737  000340  000036                 MOV     #340,@#TRAPVEC+2;LEVEL 7
 1359  020064  012737  041370  000024                 MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
 1360  020072  012737  000340  000026                 MOV     #340,@#PWRVEC+2 ;;LEVEL 7
 1361  020100  013737  034606  034600                 MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
 1362  020106  005037  001212                         CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
 1363  020112  005037  001214                         CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
 1364  020116  112737  000001  001115                 MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
 1365                                         ;;INITIALIZE THE "T-BIT" TRAP VECTOR. THEN LOAD LOCATION "$RTRN", IN
 1366                                         ;;THE "END-OF-PASS" ($EOP) ROUTINE, WITH A "RTI" OR "RTT".
 1367  020124  012737  035024  000014                 MOV     #$RTRN,@#TBITVEC ;;SET "T" BIT VECTOR TO $RTRN
 1368  020132  012737  000340  000016                 MOV     #340,@#TBITVEC+2 ;;LEVEL 7
 1369  020140  012737  000002  035024                 MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
 1370  020146  012737  020174  000010                 MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
 1371  020154  005046                                 CLR     -(SP)           ;;DUMMY PS
 1372  020156  012746  020164                         MOV     #64$,-(SP)      ;;AND PC
 1373  020162  000006                                 RTT                     ;;TRY THE RTT
 1374  020164  012737  000006  035024  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
 1375  020172  000402                                 BR      66$
 1376  020174  062706  000010                 65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
 1377  020200  012737  000012  000010         66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
 1378  020206  005037  035032                         CLR     $TBIT           ;;CLEAR "T" BIT SWITCH
 1379  020212  012737  020212  001106                 MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
 1380  020220  012737  020220  001110                 MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
 1381                                         ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
 1382                                         ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
 1383  020226  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
 1384  020232  012737  020266  000004                 MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
 1385  020240  012737  177570  001140                 MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
 1386  020246  012737  177570  001142                 MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
 1387  020254  022777  177777  160656                 CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
 1388  020262  001012                                 BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
 1389                                                                         ;;AND  THE HARDWARE SWR IS NOT = -1
 1390  020264  000403                                 BR      68$             ;;BRANCH IF NO TIMEOUT
 1391  020266  012716  020274         67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
 1392  020272  000002                                 RTI
 1393  020274  012737  000176  001140 68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
 1394  020302  012737  000174  001142                 MOV     #DISPREG,DISPLAY
```

```
1395  020310  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1396
1397  020314  005037  001234                  CLR     $PASS           ;;CLEAR PASS COUNT
1398  020320  132737  000200  001247          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1399  020326  001403                          BEQ     70$             ;;YES,USE NON-APT SWITCH
1400  020330  012737  001250  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1401  020336                                  70$:
1402                                          .SBTTL  TYPE PROGRAM NAME
1403                                          ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
1404  020336  005227  177777                  INC     #-1             ;;FIRST TIME?
1405  020342  001051                          BNE     71$             ;;BRANCH IF NO
1406  020344  022737  034760  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
1407  020352  001445                          BEQ     71$             ;;BRANCH IF YES
1408  020354  104401  020422                  TYPE    ,72$            ;;TYPE ASCIZ STRING
1409                                          .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
1410  020360  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
1411  020364  001012                          BNE     73$             ;;BRANCH IF YES
1412  020366  123727  001246  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
1413  020374  001406                          BEQ     73$             ;;BRANCH IF YES
1414  020376  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
1415  020404  001005                          BNE     74$             ;;BRANCH IF NO
1416  020406  104407                          GTSWR                   ;;GET SOFT-SWR SETTINGS
1417  020410  000403                          BR      74$
1418  020412  112737  000001  001134  73$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
1419  020420                                  74$:
1420  020420  000422                          BR      71$             ;;GET OVER THE ASCIZ
1421                                          ;;72$:  .ASCIZ  <CRLF>#CFKTHB0  11/34 MEMORY MGMT. DIAG.#<CRLF>
1422  020466                                  71$:
1423
1424  020466                                  LOOP:
1425  020466  012706  001100                  MOV     #STACK,KSP      ;INITIALIZE THE STACK POINTER
1426  020472  012737  002332  000004          MOV     #TIMERR,ERRVEC  ;LOAD CPU SERVICE ROUTINE INTO TRAP VECTOR
1427  020500  012737  000340  000006          MOV     #340,ERRVEC+2   ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
1428  020506  012737  002400  000250          MOV     #MGMERR,MMVEC   ;LOAD MEMORY MANAGENT ROUTINE INTO VECTOR
1429  020514  012737  000340  000252          MOV     #340,MMVEC+2    ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
1430  020522  012700  177777                  MOV     #-1,R0          ;PUT -1 INTO R0 TO INITIALIZE FLAGS
1431  020526  010037  002334                  MOV     R0,TIMFLG       ;INITIALIZE CPU ERROR FLAG
1432  020532  010037  002402                  MOV     R0,MGMFLG       ;INITIALIZE MEMORY MANAGEMENT ERROR FLAG
1433  020536  012737  000340  001372          MOV     #340,TBITPS     ;INITIALIZE LOG THAT HOLDS T-BIT PSW
1434  020544  005037  177572                  CLR     SR0             ;BE SURE MEM. MGMT IS OFF TO START WITH
1435
```



```
1436
1437
1438                                    ;;*****************************************************************
1439                                    ;*TEST 1        PSW PRIORITY BIT TEST
1440                                    ;*
1441                                    ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <7:5> "PRIORITY BITS"
1442                                    ;*      TO SEE THAT SOME OF THE BASIC "DATA PATH" LOGIC IS WORKING.
1443                                    ;*
1444                                    ;;*****************************************************************
1445  020550  000004                    TST1:   SCOPE
1446  020552  012737  020562  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1447  020560  005000                            CLR     R0              ;INITIALIZE R0 WITH PRIORITY=0 DATA
1448  020562  005001                    2$:     CLR     R1              ;PREPARE R1 TO ACCEPT DATA READ
1449  020564  106400                            MTPS    R0              ;WRITE PRIORITY BITS IN THE PSW
1450  020566  106701                            MFPS    R1              ;READ BACK THE LOW BYTE OF PSW
1451  020570  042701  177437                  BIC     #177437,R1      ;MASK OFF EVERYTHING EXCEPT PRIORITY BITS
1452  020574  020001                            CMP     R0,R1           ;WAS CORRECT PRIORITY SET IN THE PSW?
1453  020576  001401                            BEQ     3$              ;BRANCH IF YES
1454  020600  104003                            ERROR   3               ;PRIORITY BITS SET WRONG IN PSW
1455                                                                    ;FOR TIGHTER SCOPE LOOP
1456                                                                    ;REPLACE ERROR CALL WITH
1457                                                                    ;"BR 2$" = 000770
1458  020602  062700  000040            3$:     ADD     #40,R0          ;CHANGE DATA TO NEXT PRIORITY
1459  020606  022700  000400                    CMP     #400,R0         ;HAVE PRIORITIES 0-7 ALL BEEN CHECKED?
1460  020612  001363                            BNE     2$              ;BRANCH IF NO
1461  020614  012737  020552  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1462
1463                                    ;;*****************************************************************
1464                                    ;*TEST 2        PSW MODE BIT TEST
1465                                    ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <15:12> "MODE BITS"
1466                                    ;*      TO FURTHER CHECK THE BASIC CPU DATA PATHS
1467                                    ;*
1468                                    ;;*****************************************************************
1469  020622  000004                    TST2:   SCOPE
1470  020624  012737  020634  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1471  020632  005000                            CLR     R0              ;INITIALIZE R0 WITH MODE BITS = 0000
1472  020634  005037  177776            2$:     CLR     PSW             ;INITIALIZE PSW
1473  020640  050037  177776                    BIS     R0,PSW          ;BIT SET THE PSW MODE BITS WITH R0
1474  020644  013701  177776                    MOV     PSW,R1          ;READ BACK THE CONTENTS OF THE PSW
1475  020650  042701  007777                    BIC     #007777,R1      ;MASK OFF EVERYTHING EXCEPT THE MODE BITS
1476  020654  020001                            CMP     R0,R1           ;WERE THE MODE BITS SET CORRECTLY?
1477  020656  001403                            BEQ     3$              ;BRANCH IF YES
1478  020660  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1479  020664  104004                            ERROR   4               ;MODE BITS SET WRONG IN PSW
1480                                                                    ;FOR TIGHTER SCOPE LOOP
1481                                                                    ;REPLACE ERROR CALL WITH
1482                                                                    ;"BR 2$" = 000763
1483  020666  062700  010000            3$:     ADD     #10000,R0       ;CHANGE MODE BIT DATA
1484  020672  001360                            BNE     2$              ;BRANCH IF STILL MORE COMBINATIONS
1485  020674  012737  020624  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1486  020702  005037  177776                  CLR     PSW             ;RESET PSW BEFORE LEAVING
1487
1488                                    ;;*****************************************************************
1489                                    ;*TEST 3        BYTE ADDRESSING TEST FOR PSW
1490                                    ;*
1491                                    ;*      THIS TEST WRITES THE HIGH AND LOW BYTES OF THE PROCESSOR STATUS WORD
```

```
1492                                    ;*      AND READS THEM BACK TO BE SURE THEY CAN BE WRITTEN INDEPENDENTLY.
1493                                    ;*      THIS CHECKS THE PSW PORTION OF THE ADDRESS DETECTION LOGIC.
1494                                    ;*
1495                                    ;;*************************************************************
1496  020706  000004                    TST3:   SCOPE
1497  020710  012737  020716  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1498  020716  005037  177776            2$:     CLR     PSW             ;CLEAR THE PSW
1499  020722  012700  000360                    MOV     #360,R0         ;PUT THE HIGH BYTE DATA INTO R0
1500  020726  110037  177777                    MOVB    R0,PSW+1        ;WRITE THE HIGH BYTE OF THE PSW
1501  020732  013701  177776                    MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
1502  020736  042701  007437                    BIC     #007437,R1      ;MASK OFF THE T & CC BITS
1503  020742  000300                            SWAB    R0              ;GET DATA WRITTEN IN HIGH BYTE OF R0
1504  020744  020001                            CMP     R0,R1           ;WAS THE PSW WRITTEN TO CORRECTLY
1505  020746  001403                            BEQ     3$              ;BRANCH IF YES
1506  020750  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1507  020754  104005                            ERROR   5               ;LOW BYTE EFFECTED BY WRITE TO HIGH BYTE OF PSW
1508                                                                    ;FOR TIGHTER SCOPE LOOP
1509                                                                    ;REPLACE ERROR CALL WITH
1510                                                                    ;"BR 2$" = 000760
1511  020756  012737  020764  001110    3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
1512  020764  005037  177776            4$:     CLR     PSW             ;CLEAR THE PSW
1513  020770  012700  000340                    MOV     #340,R0         ;PUT THE LOW BYTE DATA INTO R0
1514  020774  110037  177776                    MOVB    R0,PSW          ;WRITE THE LOW BYTE OF THE PSW
1515  021000  013701  177776                    MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
1516  021004  042701  007437                    BIC     #007437,R1      ;MASK OFF THE T&CC BITS
1517  021010  020001                            CMP     R0,R1           ;WAS PSW WRITTEN TO CORRECTLY
1518  021012  001403                            BEQ     5$              ;BRANCH IF YES
1519  021014  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1520  021020  104005                            ERROR   5               ;HIGH BYTE EFFECTED BY WRITE TO LOW BYTE OF PSW
1521                                                                    ;FOR TIGHTER SCOPE LOOP
1522                                                                    ;REPLACE ERROR CALL WITH
1523                                                                    ;"BR 2$" = 000736
1524  021022  012737  020710  001110    5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1525
1526                                    ;;*************************************************************
1527                                    ;*TEST 4         TEST AND SETUP OF STACK POINTERS
1528                                    ;*
1529                                    ;*      THIS TEST SETS THE USER AND KERNEL STACK POINTERS FOR THE
1530                                    ;*      REST OF THE PROGRAM AND MAKES SURE THEY ARE INDEPENDENT OF
1531                                    ;*      EACH OTHER.  KERNEL R6 IS SET TO 1100, USER R6 IS SET TO 700, THEN
1532                                    ;*      KERNEL R6 IS READ TO BE SURE ITS STILL 1100.
1533                                    ;*
1534                                    ;;*************************************************************
1535  021030  000004                    TST4:   SCOPE
1536  021032  005037  177776                    CLR     PSW             ;GO TO KERNEL MODE
1537  021036  012706  001100                    MOV     #KERSTK,KSP     ;SET KERNEL STACK POINTER TO 1100
1538  021042  012737  140000  177776            MOV     #140000,PSW     ;GO TO USER MODE
1539  021050  012706  000700                    MOV     #USESTK,USP     ;SET USER STACK POINTER TO 700
1540  021054  005037  177776                    CLR     PSW             ;BACK TO KERNEL MODE
1541  021060  022706  001100                    CMP     #KERSTK,KSP     ;IS KERNEL R6 STILL 1100?
1542  021064  001404                            BEQ     TST5            ;;BRANCH IF KERNEL R6 IS OKAY
1543  021066  012700  001100                    MOV     #KERSTK,R0      ;SAVE DATA WRITTEN FOR ERROR REPORT
1544  021072  010601                            MOV     KSP,R1          ;SAVE DATA READ AFTER USER R6 WAS WRITTEN
1545  021074  104006                            ERROR   6               ;KERNEL R6 CHANGED BY WRITING USER R6
1546                                                                    ;FOR TIGHTER SCOPE LOOP
1547                                                                    ;REPLACE ERROR CALL WITH
```



```
1548                                                                    ;000756
1549
1550                                    ;;*************************************************************
1551                                    ;*
1552                                    ;*      THE NEXT FIVE (5) TESTS WILL TRY TO ADDRESS ALL OF THE
1553                                    ;*      MEMORY MANAGEMENT REGISTERS (SR0,SR1,SR2,KERNEL & USER PAR/PDR'S).
1554                                    ;*      EVERY TIME A REGISTER TIMES OUT ITS ADDRESS WILL BE REPORTED.
1555                                    ;*      AT THE END OF EACH TEST A SUMMARY OF THE ADDRESSES THAT TIMED
1556                                    ;*      OUT DURING THAT TEST IS GIVEN.  THE RESULTS OF "AND-ING" AND "OR-ING"
1557                                    ;*      THEIR ADDRESSES IS GIVEN TO SHOW WHICH ADDRESS LINES MAY BE
1558                                    ;*      STUCK AT 0 OR 1.  THE PAR/PDR ADDRESS AND KT MUX'S ARE THE
1559                                    ;*      THINGS BEING CHECKED.
1560                                    ;*
1561                                    ;;*************************************************************
1562
1563
1564                                    ;;*************************************************************
1565                                    ;*TEST 5         SR0,SR1,SR2 TIMEOUT TEST
1566                                    ;*
1567                                    ;*      THIS TEST ADDRESSES THE MEMORY MANAGEMENT STATUS REGISTERS
1568                                    ;*      0,1, AND 2.  STATUS REG. 1 IS NOT USED BUT SHOULD STILL
1569                                    ;*      RESPOND TO ITS UNIBUS ADDRESS.  DATA WILL BE WRITTEN OR READ
1570                                    ;*      FROM THESE REGISTERS IN LATER TESTS, THIS TEST JUST CHECK
1571                                    ;*      FOR A RESPONSE.
1572                                    ;*
1573                                    ;;*************************************************************
1574  021076  000004                    TST5:   SCOPE
1575
1576  021100  012737  021142  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1577  021106  012737  021200  000004            MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
1578  021114  012700  177572                    MOV     #SR0,R0         ;LOAD R0 WITH ADDRESS OF FIRST REG.
1579  021120  012701  000003                    MOV     #3,R1           ;LOAD R1 WITH THE LOOP COUNT
1580  021124  012737  177777  001374            MOV     #-1,ANDADR      ;INITIALIZE "AND" OF ADDRS. LOC.
1581  021132  005037  001376                    CLR     ORADR           ;INITIALIZE "OR" OF ADDRS. LOC.
1582  021136  005037  001400                    CLR     TONUM           ;INITIALIZE "TIMEOUTS" COUNTER
1583  021142  005710                    2$:     TST     (R0)            ;TRY ADDRESSING A STATUS REGISTER
1584                                                                    ;IF IT TIMES OUT GO TO 5$
1585  021144  062700  000002            3$:     ADD     #2,R0           ;PUT NEXT ADDRESS IN R0
1586  021150  077104                            SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
1587  021152  012737  021100  001110            MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1588  021160  005737  001400                    TST     TONUM           ;DID ANY OF THE STATUS REG.S TIMEOUT?
1589  021164  001401                            BEQ     4$              ;BRANCH IF NO
1590  021166  104010                            ERROR   10              ;SUMMARY OF STATUS REG. TIMEOUTS
1591  021170  012737  002332  000004    4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
1592  021176  000414                            BR      TST6            ;;GO TO NEXT TEST
1593
1594  021200  062706  000004            5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
1595  021204  104007                            ERROR   7               ;ONE OF THE STATUS REGS. TIMED OUT
1596                                                                    ;FOR TIGHTER SCOPE LOOP
1597                                                                    ;REPLACE ERROR CALL WITH
1598                                                                    ;"BR 2$" = 000756
1599  021206  010002                            MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
1600  021210  050237  001376                    BIS     R2,ORADR        ;"OR" IT WITH OTHER ADDRS. THAT TIMED OUT
1601  021214  005102                            COM     R2              ;"AND" IT WITH OTHER ADDRS. THAT TIMED OUT
1602  021216  040237  001374                    BIC     R2,ANDADR
1603  021222  005237  001400                    INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
```

```
 1604  021226  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT ADDR.
 1605
 1606                                  ;;*****************************************************************
 1607                                  ;*TEST 6         KERNEL PAR'S TIMEOUT TEST
 1608                                  ;*
 1609                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE ADDRESS
 1610                                  ;*      REGISTERS (KIPAR0-KIPAR7) AND CHECKS THAT SOMETHING
 1611                                  ;*      RESPONDS TO THEIR ADDRESSES.
 1612                                  ;*
 1613                                  ;;*****************************************************************
 1614  021230  000004                  TST6:   SCOPE
 1615
 1616  021232  012737  021274  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 1617  021240  012737  021332  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
 1618  021246  012700  172340                  MOV     #KIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
 1619  021252  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
 1620  021256  012737  177777  001374          MOV     #-1,ANDADR      ;INITIALIZE "AND" OF ADDR. LOC
 1621  021264  005037  001376                  CLR     ORADR           ;INITIALIZE "OR" OF ADDR. LOC.
 1622  021270  005037  001400                  CLR     TONUM           ;INITIALIZE "TIMEOUTS" COUNTER
 1623  021274  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPAR
 1624                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
 1625  021276  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPAR ADDRESS IN R0
 1626  021302  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
 1627  021304  012737  021232  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1628  021312  005737  001400                  TST     TONUM           ;DID ANY OF THE KIPARS TIME OUT?
 1629  021316  001401                          BEQ     4$              ;BRANCH IF NO
 1630  021320  104010                          ERROR   10              ;SUMMARY OF KIPAR TIMEOUTS
 1631  021322  012737  002332  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
 1632  021330  000414                          BR      TST7            ;;GO TO NEXT TEST
 1633
 1634  021332  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
 1635  021336  104007                          ERROR   7               ;ONE OF THE KIPARS TIMED OUT
 1636                                                                  ;FOR TIGHTER SCOPE LOOP
 1637                                                                  ;REPLACE ERROR CALL WITH
 1638                                                                  ;"BR 2$" = 000756
 1639  021340  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
 1640  021342  050237  001376                  BIS     R2,ORADR        ;"OR" IT WITH OTHER ADDRS. THAT TIMED OUT
 1641  021346  005102                          COM     R2              ;"AND" IT WITH OTHER ADDRS. THAT TIMED OUT
 1642  021350  040237  001374                  BIC     R2,ANDADR
 1643  021354  005237  001400                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
 1644  021360  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPAR
 1645
 1646                                  ;;*****************************************************************
 1647                                  ;*TEST 7         KERNEL PDR'S TIMEOUT TEST
 1648                                  ;*
 1649                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE DESCRIPTOR
 1650                                  ;*      REGISTERS (KIPDR0-KIPDR7) AND CHECKS THAT SOMETHING
 1651                                  ;*      RESPONDS TO THEIR ADDRESSES.
 1652                                  ;*
 1653                                  ;;*****************************************************************
 1654  021362  000004                  TST7:   SCOPE
 1655
 1656  021364  012737  021426  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 1657  021372  012737  021464  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
 1658  021400  012700  172300                  MOV     #KIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
 1659  021404  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
```



```
 1660  021410  012737  177777  001374          MOV     #-1,ANDADR      ;INITIALIZE "AND" OF ADDR. LOC
 1661  021416  005037  001376                  CLR     ORADR           ;INITIALIZE "OR" OF ADDR. LOC.
 1662  021422  005037  001400                  CLR     TONUM           ;INITIALIZE "TIMEOUTS" COUNTER
 1663  021426  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPDR
 1664                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
 1665  021430  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPDR ADDRESS IN R0
 1666  021434  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
 1667  021436  012737  021364  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1668  021444  005737  001400                  TST     TONUM           ;DID ANY OF THE KIPDRS TIME OUT?
 1669  021450  001401                          BEQ     4$              ;BRANCH IF NO
 1670  021452  104010                          ERROR   10              ;SUMMARY OF KIPDR TIMEOUTS
 1671  021454  012737  002332  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
 1672  021462  000414                          BR      TST10           ;;GO TO NEXT TEST
 1673
 1674  021464  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
 1675  021470  104007                          ERROR   7               ;ONE OF THE KIPDRS TIMED OUT
 1676                                                                  ;FOR TIGHTER SCOPE LOOP
 1677                                                                  ;REPLACE ERROR CALL WITH
 1678                                                                  ;"BR 2$" = 000756
 1679  021472  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
 1680  021474  050237  001376                  BIS     R2,ORADR        ;"OR" IT WITH OTHER ADDRS. THAT TIMED OUT
 1681  021500  005102                          COM     R2              ;"AND" IT WITH OTHER ADDRS. THAT TIMED OUT
 1682  021502  040237  001374                  BIC     R2,ANDADR
 1683  021506  005237  001400                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
 1684  021512  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPDR
 1685
 1686                                  ;;*****************************************************************
 1687                                  ;*TEST 10        USER PAR'S TIMEOUT TEST
 1688                                  ;*
 1689                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE ADDRESS
 1690                                  ;*      REGISTERS (UIPAR0-UIPAR7) AND CHECKS THAT SOMETHING
 1691                                  ;*      RESPONDS TO THEIR ADDRESSES.
 1692                                  ;*
 1693                                  ;;*****************************************************************
 1694  021514  000004                  TST10:  SCOPE
 1695
 1696  021516  012737  021560  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 1697  021524  012737  021616  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
 1698  021532  012700  177640                  MOV     #UIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
 1699  021536  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
 1700  021542  012737  177777  001374          MOV     #-1,ANDADR      ;INITIALIZE "AND" OF ADDR. LOC
 1701  021550  005037  001376                  CLR     ORADR           ;INITIALIZE "OR" OF ADDR. LOC.
 1702  021554  005037  001400                  CLR     TONUM           ;INITIALIZE "TIMEOUTS" COUNTER
 1703  021560  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A UIPAR
 1704                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
 1705  021562  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT UIPAR ADDRESS IN R0
 1706  021566  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
 1707  021570  012737  021516  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1708  021576  005737  001400                  TST     TONUM           ;DID ANY OF THE UIPARS TIME OUT?
 1709  021602  001401                          BEQ     4$              ;BRANCH IF NO
 1710  021604  104010                          ERROR   10              ;SUMMARY OF UIPAR TIMEOUTS
 1711  021606  012737  002332  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
 1712  021614  000414                          BR      TST11           ;;GO TO NEXT TEST
 1713
 1714  021616  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
 1715  021622  104007                          ERROR   7               ;ONE OF THE UIPARS TIMED OUT
```

```
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000756
021624  010002                    MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
021626  050237  001376              BIS     R2,ORADR        ;"OR" IT WITH OTHER ADDRS. THAT TIMED OUT
021632  005102                    COM     R2              ;"AND" IT WITH OTHER ADDRS. THAT TIMED OUT
021634  040237  001374              BIC     R2,ANDADR
021640  005237  001400              INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
021644  000746                    BR      3$              ;BRANCH BACK TO TEST THE NEXT UIPAR

                        ;;*************************************************************
                        ;*TEST 11        USER PDR'S TIMEOUT TEST
                        ;*
                        ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE DESCRIPTOR
                        ;*      REGISTERS (UIPDR0-UIPDR7) AND CHECKS THAT SOMETHING
                        ;*      RESPONDS TO THEIR ADDRESSES.
                        ;*
                        ;;*************************************************************
021646  000004          TST11:  SCOPE

021650  012737  021712  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
021656  012737  021750  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
021664  012700  177600                  MOV     #UIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
021670  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
021674  012737  177777  001374          MOV     #-1,ANDADR      ;INITIALIZE "AND" OF ADDR. LOC
021702  005037  001376                  CLR     ORADR           ;INITIALIZE "OR" OF ADDR. LOC.
021706  005037  001400                  CLR     TONUM           ;INITIALIZE "TIMEOUTS" COUNTER
021712  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A UIPDR
                                                                ;IF IT TIMES OUT, WILL GO TO 5$
021714  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT UIPDR ADDRESS IN R0
021720  077104                  SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
021722  012737  021650  001110        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
021730  005737  001400                  TST     TONUM           ;DID ANY OF THE UIPDRS TIME OUT?
021734  001401                  BEQ     4$              ;BRANCH IF NO
021736  104010                  ERROR   10              ;SUMMARY OF UIPDR TIMEOUTS
021740  012737  002332  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
021746  000414                  BR      TST12           ;;GO TO NEXT TEST

021750  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
021754  104007                  ERROR   7               ;ONE OF THE UIPDRS TIMED OUT
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000756
021756  010002                  MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
021760  050237  001376              BIS     R2,ORADR        ;"OR" IT WITH OTHER ADDRS. THAT TIMED OUT
021764  005102                  COM     R2              ;"AND" IT WITH OTHER ADDRS. THAT TIMED OUT
021766  040237  001374              BIC     R2,ANDADR
021772  005237  001400              INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
021776  000746                  BR      3$              ;BRANCH BACK TO TEST THE NEXT UIPDR

                        ;;*************************************************************
                        ;*TEST 12        SR0(15:13) BIT TEST & SR2 TEST
                        ;*
                        ;*      THIS TEST CHECKS BITS <15:13> OF STATUS REGISTER 0 TO SEE
                        ;*      THAT EACH CAN BE SET AND CLEARED AND THAT A "RESET" WILL
                        ;*      CLEAR ALL OF THEM.  A TEST OF THESE THREE ERROR BITS CHECKS
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                        ;*      PART OF SR0, THE SR0 MUX AND THE KTMUX.  THE REST OF THE
                        ;*      BITS IN SR0 WILL BE CHECKED LATER.
                        ;*      ALSO CHECK THAT SR2 IS TRACKING WITH MEM. MGMT.
                        ;*      OFF BUT LOCKS UP WHEN ANY OF SR0 ERROR BITS SET.
                        ;*
                        ;;*************************************************************
022000  000004          TST12:  SCOPE

022002  012700  177572  1$:     MOV     #SR0,R0         ;LOAD ADDRESS OF SR0 INTO R0
022006  012710  160000          MOV     #160000,(R0)    ;SET BITS <15:13> IN SR0 (ERROR BITS)
022012  000005                  RESET                   ;ISSUE AND "INIT" SIGNAL
022014  011001                  MOV     (R0),R1         ;READ SR0 INTO R1 TO SEE IF CLEAR
022016  001404                  BEQ     2$              ;BRANCH IF SR0<15:13> CLEARED BY "INIT"
022020  104011                  ERROR   11              ;SR0<15:13> NOT CLEARED BY A "RESET"
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 1$" = 000770
022022  012737  022030  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
022030  013737  177576  001370  2$:     MOV     SR2,WASSR2      ;READ CONTENTS OF SR2
022036  012701  022030                  MOV     #2$,R1          ;LOAD EXPECTED CONTENTS INTO R1
022042  020137  001370                  CMP     R1,WASSR2       ;IS SR2 TRACKING?
022046  001401                  BEQ     3$              ;BRANCH IF YES
022050  104041                  ERROR   41              ;SR2 NOT "TRACKING" VIRTUAL ADDRESSES
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000767
022052  012737  022070  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
022060  012701  100000          MOV     #BIT15,R1       ;PUT DATA TO BE WRITTEN IN R1
022064  012703  000003          MOV     #3,R3           ;SETUP R3 AS A LOOP COUNTER
022070  005010          4$:     CLR     (R0)            ;CLEAR SR0
022072  050110          5$:     BIS     R1,(R0)         ;SET ONE OF THE ERROR BITS IN SR0
022074  011002                  MOV     (R0),R2         ;READ SR0 INTO R2
022076  020102                  CMP     R1,R2           ;DID RIGHT ERROR BIT GET SET?
022100  001401                  BEQ     6$              ;BRANCH IF YES
022102  104012                  ERROR   12              ;BITS WERE SET WRONG IN SR0
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 4$" = 000772
022104  012704  022072  6$:     MOV     #5$,R4          ;LOAD EXPECTED CONTENTS OF SR2 IN R4
022110  013737  177576  001370          MOV     SR2,WASSR2      ;READ SR2
022116  020437  001370                  CMP     R4,WASSR2       ;DID SR2 LOCK UP WHEN ERROR
                                                        ;BIT SET IN SR1?
022122  001401                  BEQ     7$              ;BRANCH IF YES
022124  104064                  ERROR   54              ;SR2 DID NOT LOCK UP
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 4$" = 000761
022126  006001  7$:     ROR     R1              ;CHANGE DATA TO CHECK NEXT ERROR BIT
022130  077321                  SOB     R3,4$           ;LOOP BACK UNTIL <15:13> ALL TESTED
022132  005010                  CLR     (R0)            ;CLEAR SR0 BEFORE LEAVING
022134  012737  022002  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$

                        ;;*************************************************************
                        ;*TEST 13        SR0 & PSW DUAL ADDRESSING TEST
                        ;*
                        ;*      THIS TEST CHECKS MORE OF THE ADDRESS DETECTION LOGIC BY
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                                ;*      VERIFYING THAT STATUS REGISTER 0 IS NOT EFFECTED BY WRITING
                                ;*      TO THE PSW AND THAT THE LOW BYTE OF STATUS REGISTER 0
                                ;*      IS NOT EFFECTED BY WRITING TO ITS HIGH BYTE.  THIS IS TO
                                ;*      SEE IF ADJACENT OUTPUTS ARE SHORTED ON THE ADDRESS DET. LOGIC.
                                ;*
                                ;;*****************************************************************
022142  000004                  TST13:  SCOPE
                                
022144  005037  177776          1$:     CLR     PSW             ;CLEAR THE PSW
022150  005037  177572                  CLR     SR0             ;CLEAR STATUS REGISTER 0
022154  106427  000340                  MTPS    #340            ;SET PRIORITY 7 IN LOW BYTE OF PSW
022160  013700  177572                  MOV     SR0,R0          ;READ STATUS REGISTER 0
022164  001401                          BEQ     2$              ;BRANCH IF IT WAS STILL 0
022166  104013                          ERROR   13              ;SR0 EFFECTED BY A WRITE TO THE PSW
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 1$" = 000767
022170  005037  177572          2$:     CLR     SR0             ;BE SURE SR0 IS 0 BEFORE LEAVING
022174  005037  177776                  CLR     PSW             ;BE SURE PSW IS 0 BEFORE LEAVING
                                
                                ;;*****************************************************************
                                ;*TEST 14        TEST THAT SR1 READS ALL ZEROS
                                ;*
                                ;*      THIS TEST CHECKS THAT EVEN THOUGH STATUS REGISTER 1
                                ;*      IS NON-EXISTENT, ITS ADDRESS SHOULD RESPOND WITH ALL ZEROS,
                                ;*      THEREBY CHECK ANOTHER PORTION OF THE ADDRESS DETECTION LOGIC.
                                ;*
                                ;;*****************************************************************
022200  000004                  TST14:  SCOPE
022202  012700  177777                  MOV     #-1,R0          ;FILL R0 WITH ALL ONES
022206  013700  177574                  MOV     SR1,R0          ;READ SR1 INTO R0
022212  001401                          BEQ     TST15           ;;BRANCH IF SR1 READS ALL ZEROS
022214  104014                          ERROR   14              ;SR1 DID NOT READ ALL ZEROS
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;000772
                                
                                ;;*****************************************************************
                                ;*TEST 15        BIT TEST OF KERNEL & USER PAR'S
                                ;*
                                ;*      THE FOLLOWING TEST CHECKS THE BITS <11:00> OF BOTH THE KERNEL
                                ;*      AND USER PAGE ADDRESS REGISTERS.  A "0" IS ROTATED THRU
                                ;*      THE REGISTERS FROM LEFT TO RIGHT.  THIS CHECKS THE OPERATION
                                ;*      OF THE PAR/PDR ADDRESS MUX, THE KT MUX, AND THE PAR
                                ;*      OUTPUT DATA LINES.
                                ;*
                                ;;*****************************************************************
022216  000004                  TST15:  SCOPE
                                
022220  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR IN R0
022224  012703  000010          2$:     MOV     #10,R3          ;SETUP R3 TO COUNT 8 PAR'S
022230  012737  022236  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022236  005010                  3$:     CLR     (R0)            ;CLEAR THE PAR
022240  011001                          MOV     (R0),R1         ;READ THE PAR INTO R1
022242  001401                          BEQ     4$              ;BRANCH IF PAR CLEARED OK
022244  104011                          ERROR   11              ;PAR WOULD NOT CLEAR
```



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                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 3$" = 000774
022246  012704  167777          4$:     MOV     #167777,R4      ;LOAD "WALKING 0" TEST PATTERN IN R4
022252  012737  022260  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
022260  005010                  5$:     CLR     (R0)            ;CLEAR THE PAR BEFORE LOADING DATA
022262  010401                          MOV     R4,R1           ;LOAD DATA INTO R1
022264  042701  170000                  BIC     #170000,R1      ;MASK UNUSED BITS OUT OF THE DATA
022270  050110                          BIS     R1,(R0)         ;BIT SET THE TEST PATTERN INTO THE PAR
022272  011002                          MOV     (R0),R2         ;READ THE PAR INTO R2
022274  020102                          CMP     R1,R2           ;DOES DATA WRITTEN=DATA READ?
022276  001401                          BEQ     6$              ;BRANCH IF YES
022300  104012                          ERROR   12              ;PAR BITS DID NOT SET CORRECTLY
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000767
022302  000261                  6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
022304  006004                          ROR     R4              ;ROTATE THE TEST PATTERN IN R4
022306  103764                          BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
022310  062700  000002                  ADD     #2,R0           ;GET NEXT PAR ADDRESS IN R0
022314  077330                          SOB     R3,3$           ;BRANCH BACK UNTIL ALL PAR'S TESTED
022316  022700  177660                  CMP     #UIPAR7+2,R0    ;HAVE USER PAR'S BEEN TESTED
022322  103003                          BHIS    7$              ;BRANCH IF YES
022324  012700  177640                  MOV     #UIPAR0,R0      ;LOAD FIRST USER PAR ADDR. IN R0
022330  000735                          BR      2$              ;BRANCH BACK TO TEST USER PAR'S
022332  012737  022220  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP OR ERROR POINTER TO 1$
                                                                ;LEAVE TEST WITH BITS <11:1>=1 IN ALL PAR'S
```

```
                                        ;;*****************************************************************
                                        ;*TEST 16       BIT TEST OF KERNEL & USER PDR'S
                                        ;*
                                        ;*      THE FOLLOWING TEST CHECKS THE BITS <14:8> AND <3:1> OF BOTH THE
                                        ;*      KERNEL AND USER PAGE DESCRIPTOR REGISTERS.  A "0" IS ROTATED
                                        ;*      THRU THE REGISTERS FROM LEFT TO RIGHT.  SOME TEST PATTERNS WILL
                                        ;*      BE LOADED MORE THAN ONCE DUE TO THE UNUSED BITS IN THE PDR'S.
                                        ;*      THE PAR/PDR ADDRESS MUX, KTMUX, AND PDR OUTPUT DATA LINES
                                        ;*      ARE BEING CHECKED.
                                        ;*
                                        ;;*****************************************************************
022340  000004                          TST16:  SCOPE

022342  012700  172300                  1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR IN R0
022346  012703  000010                  2$:     MOV     #10,R3          ;SETUP R3 TO COUNT 8 PDR'S
022352  012737  022360  001110                  MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022360  005010                          3$:     CLR     (R0)            ;CLEAR THE PDR
022362  011001                                  MOV     (R0),R1         ;READ THE PDR INTO R1
022364  001401                                  BEQ     4$              ;BRANCH IF PDR CLEARED OK
022366  104011                                  ERROR   11              ;PDR WOULD NOT CLEAR
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 3$" = 000774
022370  012704  077777                  4$:     MOV     #077777,R4      ;LOAD "WALKING "0" TEST PATTERN IN R4
022374  012737  022402  001110                  MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
022402  005010                          5$:     CLR     (R0)            ;CLEAR THE PDR BEFORE LOADING DATA
022404  010401                                  MOV     R4,R1           ;LOAD DATA INTO R1
022406  042701  100361                          BIC     #100361,R1      ;MASK UNUSED BITS OUT OF THE DATA
022412  050110                                  BIS     R1,(R0)         ;BIT SET THE TEST PATTERN INTO THE PDR
022414  011002                                  MOV     (R0),R2         ;READ THE PDR INTO R2
022416  020102                                  CMP     R1,R2           ;DOES DATA WRITTEN=DATA READ?
022420  001401                                  BEQ     6$              ;BRANCH IF YES
022422  104012                                  ERROR   12              ;PDR BITS DID NOT SET CORRECTLY
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 5$" = 000767
022424  000261                          6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
022426  006004                                  ROR     R4              ;ROTATE THE TEST PATTERN IN R4
022430  103764                                  BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
022432  062700  000002                          ADD     #2,R0           ;GET NEXT PDR ADDRESS IN R0
022436  077330                                  SOB     R3,3$           ;BRANCH BACK UNTIL ALL PDR'S TESTED
022440  022700  177620                          CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
022444  103003                                  BHIS    7$              ;BRANCH IF YES
022446  012700  177600                          MOV     #UIPDR0,R0      ;LOAD FIRST USER PDR ADDR. IN R0
022452  000735                                  BR      2$              ;BRANCH BACK TO TEST USER PDR'S
022454  012737  022342  001110          7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
                                                                        ;LEAVE TEST WITH ALL WRITEABLE BITS IN
                                                                        ;ALL PDR'S = 1

                                        ;;*****************************************************************
                                        ;*TEST 17       TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PAR'S
                                        ;*
                                        ;*      THE FOLLOWING TEST WRITES TO BOTH BYTES OF THE KERNEL & USER
                                        ;*      PAR'S SEPERATELY TO SEE THAT WRITING TO ONE DOES NOT EFFECT
                                        ;*      THE OTHER.  THIS FURTHER VERIFIES THE OPERATION OF THE PAR/PDR
                                        ;*      ADDR. MUX AND THE ADDR. DETECTION LOGIC.
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                                        ;*
                                        ;;*****************************************************************
022462  000004                          TST17:  SCOPE
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 1970
 1971  022464  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR INTO R0
 1972  022470  012737  022502  001110  2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 1973  022476  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PAR'S
 1974  022502  012701  177777          3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
 1975  022506  005010                          CLR     (R0)            ;CLEAR THE PAR
```



```
 1976  022510  110110                          MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PAR
 1977  022512  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
 1978  022514  042701  177400                  BIC     #177400,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF THE DATA
 1979  022520  020102                          CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO
 1980  022522  001401                          BEQ     4$              ;BRANCH IF YES
 1981  022524  104015                          ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PAR
 1982                                                                  ;FOR TIGHTER SCOPE LOOP
 1983                                                                  ;REPLACE ERROR CALL WITH
 1984                                                                  ;"BR 3$" = 000766
 1985  022526  012737  022534  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
 1986  022534  005010                  5$:     CLR     (R0)            ;CLEAR THE PAR
 1987  022536  012701  177777                  MOV     #-1,R1          ;LOAD TEST, PATTERN INTO R1
 1988  022542  110160  000001                  MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PAR
 1989  022546  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
 1990  022550  042701  170377                  BIC     #170377,R1      ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
 1991  022554  020102                          CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
 1992  022556  001401                          BEQ     6$              ;BRANCH IF YES
 1993  022560  104015                          ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PAR
 1994                                                                  ;FOR TIGHTER SCOPE LOOP
 1995                                                                  ;REPLACE ERROR CALL WITH
 1996                                                                  ;"BR 5" = 000765
 1997  022562  062700  000002          6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PAR IN R0
 1998  022566  077333                          SOB     R3,3$           ;BRANCH BACK UNTIL 8 PAR'S TESTED
 1999  022570  022700  177660                  CMP     #UIPAR7+2,R0    ;HAVE USER PAR'S BEEN TESTED
 2000  022574  103003                          BHIS    7$              ;BRANCH IF YES
 2001  022576  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
 2002  022602  000732                          BR      2$              ;BRANCH BACK TO TEST USER PAR'S
 2003  022604  012737  022464  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 2004
```

```
                                ;;*****************************************************************
                                ;*TEST 20        TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PDR'S
                                ;*
                                ;*      THE FOLLOWING TEST WRITES TO BOTH BYTES OF THE KERNEL & USER
                                ;*      PDR'S SEPERATELY TO SEE THAT WRITING TO ONE DOES NOT EFFECT
                                ;*      THE OTHER.  THIS FURTHER VERIFIES THE OPERATION OF THE PAR/PDR
                                ;*      ADDR. MUX AND THE ADDR. DETECTION LOGIC.
                                ;*
                                ;;*****************************************************************
022612  000004                  TST20:  SCOPE
022614  012700  172300          1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR INTO R0
022620  012737  022632  001110  2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022626  012703  000010          3$:     MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PDR'S
022632  012701  177777          3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
022636  005010                  4$:     CLR     (R0)            ;CLEAR THE PDR
022640  110110                          MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PDR
022642  011002                          MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
022644  042701  177761                  BIC     #177761,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF DATA
022650  020102                          CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO?
022652  001401                          BEQ     4$              ;BRANCH IF YES
022654  104015                          ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PDR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 3$" = 000766
022656  012737  022664  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
022664  005010                  5$:     CLR     (R0)            ;CLEAR THE PDR
022666  012701  177777                  MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
022672  110160  000001                  MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PDR
022676  011002                          MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
022700  042701  100377                  BIC     #100377,R1      ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
022704  020102                          CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
022706  001401                          BEQ     6$              ;BRANCH IF YES
022710  104015                          ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PDR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000765
022712  062700  000002          6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PDR IN R0
022716  077333                          SOB     R3,3$           ;BRANCH BACK UNTIL 8 PDR'S TESTED
022720  022700  177620                  CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
022724  103003                          BHIS    7$              ;BRANCH IF YES
022726  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
022732  000732                          BR      2$              ;BRANCH BACK TO TEST USER PDR'S
022734  012737  022614  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
```



```
                                ;;*****************************************************************
                                ;*TEST 21:       PAR-PDR DUAL ADDRESSING TEST
                                ;*
                                ;*      THE FOLLOWING TEST SETS ALL OF THE WRITEABLE BITS TO 1
                                ;*      IN THE SIXTEEN (16) PAR'S AND PDR'S USING THE "SETREG"
                                ;*      SUBROUTINE AND THEN CLEARS JUST ONE OF THEM.  THE "CMPREG"
                                ;*      SUBROUTINE IS USED TO READ ALL OF THE PAR'S AND PDR'S TO SEE
                                ;*      THAT ONLY ONE REGISTER WAS CLEARED IN RESPONSE TO THAT ONE
                                ;*      PAR OR PDR ADDRESS.  THE "CMPREG" SUBROUTINE REPORTS THE
                                ;*      ADDRESS OF ANY REGISTER WHOSE BITS DID NOT REMAIN SET WHEN
                                ;*      ANOTHER REGISTER WAS CLEARED.
                                ;*
                                ;*      THE PAR AND PDR CHIPS, PAR/PDR ADDR. MUX, AND ADDR. DETECTION
                                ;*      LOGIC ARE CHECKED.
                                ;*
                                ;;*****************************************************************
022742  000004                  TST21:  SCOPE
022744  012737  022762  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER 2$
022752  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
022756  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR AND R0
022762  012706  001100          2$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
022766  004737  036070                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S IN PDR'S
022772  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PDR'S
022774  004737  036162                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023000  062700  000002                  ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PDR TO CLEAR
023004  077312                          SOB     R3,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
023006  012737  023024  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
023014  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023020  012700  172340                  MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
023024  012706  001100          3$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023030  004737  036070                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
023034  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PAR'S
023036  004737  036162                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023042  062700  000002                  ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PAR TO CLEAR
023046  077312                          SOB     R3,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
023050  012737  023066  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
023056  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023062  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
023066  012706  001100          4$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023072  004737  036070                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
023076  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PDR'S
023100  004737  036162                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023104  062700  000002                  ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PDR TO CLEAR
023110  077312                          SOB     R3,4$           ;LOOP TO 4$ UNTIL ALL USER PDR'S CHECKED
023112  012737  023130  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
023120  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023124  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
023130  012706  001100          5$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023134  004737  036070                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
023140  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PAR'S
023142  004737  036162                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
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2106  023146  062700  000002          ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PAR TO CLEAR
2107  023152  077312                  SOB     R3,5$           ;LOOP TO 5$ UNTIL ALL USER PAR'S CHECKED
2108  023154  012737  022744  001110  MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
2109
2110                                  ;;*****************************************************************
2111                                  ;*TEST 22       TEST THAT PAR-PDR'S NOT AFFECTED BY RESET
2112                                  ;*
2113                                  ;*      THIS TEST CHECKS TO SEE THAT THE KERNEL OR USER PAR/PDR'S ARE
2114                                  ;*      NOT AFFECTED BY THE EXECUTION OF A "RESET" INSTRUCTION.  THE
2115                                  ;*      "SETREG" SUBROUTINE IS USED TO SET ALL WRITEABLE BITS TO A "1" IN
2116                                  ;*      THE PAR/PDR'S.  THEN THEY ARE READ TO SEE THAT THEY REMAINED
2117                                  ;*      UNCHANGED
2118                                  ;*
2119                                  ;;*****************************************************************
2120  023162  000004                  TST22:  SCOPE
2121
2122
2123  023164  004737  036070          1$:     JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
2124  023170  000005                          RESET                   ;ISSUE AN "INIT" BY EXECUTING A RESET
2125  023172  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
2126  023176  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2127  023202  011001                  2$:     MOV     (R0),R1         ;READ A KERNEL PDR INTO R1
2128  023204  022701  077416                  CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
2129  023210  001401                          BEQ     3$              ;BRANCH IF YES
2130  023212  104055                          ERROR   55              ;KERNEL PDR AFFECTED BY A RESET
2131                                                                  ;FOR TIGHTER SCOPE LOOP
2132                                                                  ;REPLACE ERROR CALL WITH
2133                                                                  ;"BR 2$" = 000773
2134  023214  062700  000002          3$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PDR
2135  023220  077410                          SOB     R4,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
2136  023222  012700  172340                  MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
2137  023226  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2138  023232  011001                  4$:     MOV     (R0),R1         ;READ A KERNEL PAR INTO R1
2139  023234  022701  007777                  CMP     #7777,R1        ;ARE ALL THE BITS STILL SET?
2140  023240  001401                          BEQ     5$              ;BRANCH IF YES
2141  023242  104055                          ERROR   55              ;KERNEL PAR AFFECTED BY A RESET
2142                                                                  ;FOR TIGHTER SCOPE LOOP
2143                                                                  ;REPLACE ERROR CALL WITH
2144                                                                  ;"BR 4$" = 000773
2145  023244  062700  000002          5$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PAR
2146  023250  077410                          SOB     R4,4$           ;LOOP TO 4$ UNTIL ALL KERNEL PAR'S CHECKED
2147  023252  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
2148  023256  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2149  023262  011001                  6$:     MOV     (R0),R1         ;READ A USER PDR INTO R1
2150  023264  022701  077416                  CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
2151  023270  001401                          BEQ     7$              ;BRANCH IF YES
2152  023272  104055                          ERROR   55              ;USER PDR AFFECTED BY A RESET
2153                                                                  ;FOR TIGHTER SCOPE LOOP
2154                                                                  ;REPLACE ERROR CALL WITH
2155                                                                  ;"BR 6$" = 000773
2156  023274  062700  000002          7$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PDR
2157  023300  077410                          SOB     R4,6$           ;LOOP TO 6$ UNTIL ALL USER PDR'S CHECKED
2158
2159  023302  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
2160  023306  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2161  023312  011001                  8$:     MOV     (R0),R1         ;READ A USER PAR INTO R1
```



```
2162  023314  022701  007777          9$:     CMP     #7777,R1        ;ARE ALL THE BITS STILL SET?
2163  023320  001401                          BEQ     9$              ;BRANCH IF YES
2164  023322  104055                          ERROR   55              ;USER PAR AFFECTED BY A RESET
2165                                                                  ;FOR TIGHTER SCOPE LOOP
2166                                                                  ;REPLACE ERROR CALL WITH
2167                                                                  ;"BR 8$" = 000773
2168  023324  062700  000002                  ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PAR
2169  023330  077410                          SOB     R4,8$           ;LOOP TO 8$ UNTIL ALL USER PAR'S CHECKED
2170
2171
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2180
2181
2182                                  ;;*****************************************************************
2183                                  ;*TEST 23       INSTRUCTION FETCH NOT RELOCATED IN MAINT. MODE
2184                                  ;*
2185                                  ;*      THIS TEST CHECKS TO SEE THAT WHEN MEMORY MANAGEMENT IS IN
2186                                  ;*      MAINTENANCE MODE (DESTINATION-ONLY-RELOCATION), AN INSTRUCTION
2187                                  ;*      FETCH IS NOT RELOCATED AND A RESET CLEARS THE MAINTENANCE BIT
2188                                  ;*      (BIT 08) IN SR0.  IF THE "FETCH" IS RELOCATED, A PG.LENGTH ABORT
2189                                  ;*      SHOULD OCCUR, CAUSING A HALT SINCE TRAP CATCHER IS PLACED IN VECTOR 250
2190                                  ;*
2191                                  ;*
2192                                  ;*      NOTE:   A HALT MAY OCCUR IF MAINT. MODE NOT DISABLED BY RESET
2193                                  ;*
2194                                  ;;*****************************************************************
2195  023332  000004                  TST23:  SCOPE
2196  023334  004737  036002          1$:     JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2197  023340  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR INTO R0
2198  023344  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2199  023350  005020                  2$:     CLR     (R0)+           ;CLEAR PDR - MAPPING PAGE NON-RES, 0 BLKS.
2200  023352  077402                          SOB     R4,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CLEARED
2201  023354  012737  000252  000250          MOV     #MMVEC+2,MMVEC  ;LOAD TRAP CATCHER INTO MEM MGM. VECTOR
2202  023362  005037  000252                  CLR     MMVEC+2         ;
2203                                                                  ;A HALT WILL OCCUR IF RESET FAILS
2204                                                                  ;TO DISABLE DEST.-ONLY RELOCATION
2205  023366  012737  001006  172300          MOV     #1006,KIPDR0    ;MAP KERNEL PG 0 R/W, 3 BLOCKS LONG.
2206  023374  012737  023402  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2207  023402  012737  000400  177572  3$:     MOV     #BIT8,SR0       ;TURN ON DEST-ONLY-RELOCATION
2208  023410  000005                          RESET                   ;SHOULD CLEAR MAINT. BIT - WILL ABORT IF RELOCATED
2209  023412  032737  000400  177572          BIT     #BIT8,SR0       ;WAS MAINT. BIT (BIT 8) OF SR0 CLEARED?
2210  023420  001403                          BEQ     4$              ;BRANCH IF YES
2211  023422  005037  177572                  CLR     SR0             ;CLEAR SR0 SO ERROR CAN BE REPORTED
2212  023426  104061                          ERROR   61              ;MAINT. MODE NOT DISABLED BY A RESET
2213                                                                  ;FOR A TIGHTER SCOPE LOOP
2214                                                                  ;REPLACE ERROR CALL WITH
2215                                                                  ;"BR 3$" = 000765
2216  023430  012706  001100          4$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
2217  023434  005037  177572                  CLR     SR0             ;BE SURE SR0 IS CLEAR
```

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2218  023440  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE MEM. MGMT. TRAP VECTOR
2219  023446  012737  000340  000252          MOV     #340,MMVEC+2    ;RESTORE MEM. MGMT VECTOR+2
2220  023454  012737  023334  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2221  023462  004737  036036                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
2222
2223
2224
2225
2226
2227
2228
2229
2230
2231
2232
2233
2234
2235                                  ;;*****************************************************************
2236                                  ;*TEST 24       TEST THAT SOURCE NOT RELOCATED IN MAINTENANCE MODE
2237                                  ;*
2238                                  ;*      THIS TEST CHECKS TO SEE THAT WHEN MEMORY MANAGEMENT IS IN
2239                                  ;*      MAINTENANCE MODE, THE SOURCE IS NOT RELOCATED.  ONLY THE
2240                                  ;*      DESTINATION IS RELOCATED.  KERNEL PAR'S 3 & 4 ARE MAPPED TO
2241                                  ;*      PHYSICAL ADDRESS 60000-77776.  PDR4 IS SET TO ALLOW FULL READ/WRITE
2242                                  ;*      BUT PDR3 IS CLEAR ALLOWING TO ACCESS.  VIRTUAL ADDRESSES REFERENCING
2243                                  ;*      PAR/PDR'S 4 & 3 ARE USED IN AS DESTINATION AND SOURCE RESPECTIVELY.
2244                                  ;*      IF THE SOURCE IS RELOCATED IN MAINTENANCE A MEM. MGMT. TRAP WILL
2245                                  ;*      OCCUR AND THE ERROR WILL BE REPORTED.  KERNEL PG. 7 IS MAPPED R/W.
2246                                  ;*
2247                                  ;;*****************************************************************
2248  023466  000004                  TST24:  SCOPE
2249  023470  004737  036002          1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
2250  023474  012737  023564  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2251  023502  012737  000600  172348          MOV     #600,KIPAR3     ;MAP KERNAL PAGE 3 TO 12-16K
2252  023510  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNAL PAGE 4 TO 12-16K
2253  023516  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNAL PAGE 7 TO THE I/O PAGE
2254  023524  005037  172306                  CLR     KIPDR3          ;MAP KERNAL PAGE 3 "NO ACCESS"
2255  023530  012737  077406  172310          MOV     #77406,KIPDR4   ;MAP KERNAL PAGE 4 R/W, 128 BLKS
2256  023536  012737  077406  172316          MOV     #77406,KIPDR7   ;MAP KERNAL PAGE 7 R/W, 128 BLKS
2257  023544  012737  023644  000250          MOV     #4$,MMVEC       ;SET M.M. VECTOR TO 4$ IN CASE OF ABORT
2258  023552  012737  000377  060000          MOV     #377,@#60000    ;LOAD ALL 1'S IN LOW BYTE OF TEST LOC.
2259  023560  012700  177777                  MOV     #-1,R0          ;LOAD EXPECTED CONTENTS OF TEST LOC. IN R0
2260  023564  052737  000400  177572  2$:     BIS     #BIT8,SR0       ;TURN ON DEST.-ONLY-RELOCATION
2261  023572  113737  060000  100001          MOVB    @#60000,@#100001;LOAD HI BYTE OF TEST LOC.-ABORT IF SOURCE RELOCATED
2262  023600  000005                          RESET                   ;TURN OFF DEST.-ONLY-RELOCATION
2263  023602  013701  060000                  MOV     @#60000,R1      ;READ CONTENTS OF TEST LOC.
2264  023606  020001                          CMP     R0,R1           ;WAS TEST LOCATION LOADED PROPERLY?
2265  023610  001401                          BEQ     3$              ;BRANCH IF YES
2266  023612  104062                          ERROR   62              ;TEST LOC. NOT LOADED - INST. WAS ABORTED
2267                                                                  ;WHEN SOURCE WAS RELOCATED
2268                                                                  ;FOR TIGHTER SCOPE LOOP REPLACE
2269                                                                  ;ERROR CALL WITH
2270                                                                  ;"BR 2$" = 000764
2271  023614  012737  002400  000250  3$:     MOV     #MGMERR,MMVEC   ;RESTORE MEM. MGMT. VECTOR
2272  023622  012737  077406  172306          MOV     #77406,KIPDR3   ;MAP KERNAL PAGE 3 R/W, 128 BLKS
2273  023630  012737  023470  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
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2274  023636  004737  036036                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
2275  023642  000430                          BR      TST25           ;;SKIP TO NEXT TEST
2276                                  ;*  IF THE PROGRAM TRIES TO RELOCATE THE SOURCE, IT SHOULD TRAP TO 4$
2277
2278  023644  042737  000400  177572  4$:     BIC     #BIT8,SR0       ;TURN OFF DEST.-ONLY-RELOCATION THRU PAR/PDR 7
2279  023652  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE REST OF SR0 CONTENTS
2280  023660  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2
2281  023666  010637  001354                  MOV     SP,WASR6        ;SAVE VALUE OF THE STACK POINTER
2282  023672  012637  001356                  MOV     (SP)+,TRAPPC    ;SAVE PC OF TRAP
2283  023676  012637  001360                  MOV     (SP)+,TRAPPS    ;SAVE PSW OF TRAP
2284  023702  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR1
2285  023710  104063                          ERROR   63              ;SOURCE APPARENTLY RELOCATED IN MAINT. MODE
2286                                                                  ;FOR TIGHTER SCOPE LOOP
2287                                                                  ;REPLACE ERROR CALL WITH A
2288                                                                  ;"NOP" = 000240
2289  023712  013746  001360                  MOV     TRAPPS,-(SP)    ;PUT PSW OF TRAP BACK ON THE STACK
2290  023716  013746  001356                  MOV     TRAPPC,-(SP)    ;PUT PC OF TRAP BACK ON THE STACK
2291  023722  000002                          RTI                     ;RETURN TO TEST
2292
2293
2294
2295
2296
2297
2298
2299
2300
2301
2302
2303
2304
2305                                  ;;*****************************************************************
2306                                  ;*TEST 25       RELOCATION & ADDER TEST (NO CARRIES)
2307                                  ;*
2308                                  ;*      THE FOLLOWING TEST SETS UP THE KERNEL PAR'S AND PDR'S
2309                                  ;*      FOR THE REST OF THE PROGRAM.  IT THEN USES DIFFERENT
2310                                  ;*      VIRTUAL ADDRESSES AND DIFFERENT VALUES FOR KERNEL PAR 4
2311                                  ;*      TO PUT DIFFERENT PATTERNS AT THE INPUTS OF THE THREE
2312                                  ;*      MEMORY MANAGEMENT ADDER CHIPS.  THE VALUES ARE SUCH
2313                                  ;*      THAT NO CARRIES ARE GENERATED OUT OF ANY OF THE ADDER CHIPS.
2314                                  ;*
2315                                  ;*      THE METHOD USED TO SEE THAT THE RIGHT PHYSICAL BUS ADDRESS
2316                                  ;*      IS FORMED BY THE ADDERS IS TO WRITE A PATTERN TO VIRTUAL
2317                                  ;*      LOCATION WITH MEMORY MGMT. IN THE MAINTENANCE MODE, AND
2318                                  ;*      THEN READ THAT LOCATION USING THE PHYSICAL ADDRESS THAT SHOULD
2319                                  ;*      HAVE BEEN FORMED TO SEE IF THE TEST PATTERN GOT THEIR.
2320                                  ;*
2321                                  ;;*****************************************************************
2322  023724  000004                  TST25:  SCOPE
2323
2324  023726  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
2325  023732  005001                          CLR     R1              ;CLEAR R1
2326  023734  012702  000007                  MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
2327  023740  010120                  2$:     MOV     R1,(R0)+        ;MAP KERNEL PAR'S TO PAGES 0-6 (4K EACH)
2328  023742  062701  000200                  ADD     #200,R1
2329  023746  077204                          SOB     R2,2$           ;LOOP UNTIL KIPAR0 - KIPAR6 ARE LOADED
```

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2330  023750  012710  007600                    MOV     #7600,(R0)      ;MAP KIPAR7 TO THE I/O PAGE
2331  023754  012700  172300                    MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
2332  023760  012701  077406                    MOV     #77406,R1       ;LOAD PDR DATA INTO R1
2333  023764  012702  000010                    MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
2334  023770  010120                 3$:        MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
2335  023772  077202                             SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
2336
2337  023774  012737  023774  001110 4$:        MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
2338  024002  012700  067776                    MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2339  024006  012701  107776                    MOV     #107776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2340  024012  012702  125250                    MOV     #125250,R2      ;LOAD TEST PATTERN INTO R2
2341  024016  012704  000600                    MOV     #600,R4 ;LOAD R4 WITH PAR VALUE
2342  024022  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
2343  024026  011037  001176                    MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2344  024032  052737  000400  177572            BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
2345  024040  010211                            MOV     R2,(R1)         ;LOAD 125250 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
2346  024042  011003                            MOV     (R0),R3         ;READ 125250 BACK WITHOUT USING MEM. MGMT.
2347  024044  000005                            RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
2348  024046  013710  001176                    MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2349  024052  020203                            CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2350                                                                    ;WRITTEN USING "DEST-ONLY-RELOC."?
2351  024054  001405                            BEQ     5$              ;BRANCH IF YES
2352  024056  010137  001402                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2353  024062  004737  036354                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
2354  024066  104017                            ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
2355                                                                    ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2356                                                                    ;APPARENTLY PHYSICAL ADDR. WAS
2357                                                                    ;FORMED WRONG BY ADDERS USING
2358                                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2359                                                                    ;FOR TIGHTER SCOPE LOOP
2360                                                                    ;REPLACE ERROR CALL WITH
2361                                                                    ;"BR 4$" = 000742
2362  024070                       5$:
2363  024070  012737  024070  001110 6$:        MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
2364  024076  012700  067776                    MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2365  024102  012701  102576                    MOV     #102576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2366  024106  012702  125251                    MOV     #125251,R2      ;LOAD TEST PATTERN INTO R2
2367  024112  012704  000652                    MOV     #652,R4 ;LOAD R4 WITH PAR VALUE
2368  024116  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
2369  024122  011037  001176                    MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2370  024126  052737  000400  177572            BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
2371  024134  010211                            MOV     R2,(R1)         ;LOAD 125251 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
2372  024136  011003                            MOV     (R0),R3         ;READ 125251 BACK WITHOUT USING MEM. MGMT.
2373  024140  000005                            RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
2374  024142  013710  001176                    MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2375  024146  020203                            CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2376                                                                    ;WRITTEN USING "DEST-ONLY-RELOC."?
2377  024150  001405                            BEQ     7$              ;BRANCH IF YES
2378  024152  010137  001402                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2379  024156  004737  036354                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
2380  024162  104017                            ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
2381                                                                    ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2382                                                                    ;APPARENTLY PHYSICAL ADDR. WAS
2383                                                                    ;FORMED WRONG BY ADDERS USING
2384                                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2385                                                                    ;FOR TIGHTER SCOPE LOOP
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2386                                                                    ;REPLACE ERROR CALL WITH
2387                                                                    ;"BR 6$" = 000742
2388  024164                       7$:
2389  024164  012737  024164  001110 8$:        MOV     #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
2390  024172  012700  067776                    MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2391  024176  012701  105276                    MOV     #105276,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2392  024202  012702  125252                    MOV     #125252,R2      ;LOAD TEST PATTERN INTO R2
2393  024206  012704  000625                    MOV     #625,R4 ;LOAD R4 WITH PAR VALUE
2394  024212  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
2395  024216  011037  001176                    MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2396  024222  052737  000400  177572            BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
2397  024230  010211                            MOV     R2,(R1)         ;LOAD 125252 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
2398  024232  011003                            MOV     (R0),R3         ;READ 125252 BACK WITHOUT USING MEM. MGMT.
2399  024234  000005                            RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
2400  024236  013710  001176                    MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2401  024242  020203                            CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2402                                                                    ;WRITTEN USING "DEST-ONLY-RELOC."?
2403  024244  001405                            BEQ     9$              ;BRANCH IF YES
2404  024246  010137  001402                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2405  024252  004737  036354                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
2406  024256  104017                            ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
2407                                                                    ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2408                                                                    ;APPARENTLY PHYSICAL ADDR. WAS
2409                                                                    ;FORMED WRONG BY ADDERS USING
2410                                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2411                                                                    ;FOR TIGHTER SCOPE LOOP
2412                                                                    ;REPLACE ERROR CALL WITH
2413                                                                    ;"BR 8$" = 000742
2414  024260                       9$:
2415
2416  024260  012737  024260  001110 10$:       MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
2417  024266  012700  177776                    MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
2418  024272  012701  100076                    MOV     #100076,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
2419  024276  012702  030340                    MOV     #030340,R2      ;LOAD DATA FOR PSW IN R2
2420  024302  012704  007777                    MOV     #7777,R4        ;LOAD R4 WITH PAR VALUE
2421  024306  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
2422  024312  005010                            CLR     (R0)            ;CLEAR THE PSW
2423  024314  052737  000400  177572            BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
2424  024322  010211                            MOV     R2,(R1)         ;LOAD PSW USING ADDER CHIPS (PAR4 + VIRT ADDR.)
2425  024324  011003                            MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
2426  024326  000005                            RESET                   ;TURN OFF MEM. MGMT MAINT. MODE
2427  024330  005010                            CLR     (R0)            ;CLEAR THE PSW
2428  024332  042703  000037                    BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
2429  024336  020203                            CMP     R2,R3           ;WAS PSW WRITTEN WHILE IN MAINT. MODE?
2430  024340  001405                            BEQ     11$             ;BRANCH IF YES
2431  024342  010137  001402                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2432  024346  004737  036354                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDR. FOR TYPING
2433  024352  104017                            ERROR   17              ;PSW DID NOT HAVE DATA THAT IT SHOULD HAVE,
2434                                                                    ;APPARENTLY PHYS. ADDR. OF PSW WAS
2435                                                                    ;NOT FORMED BY ADDERS USING THE
2436                                                                    ;VIRTUAL ADDR. AND KIPAR4
2437                                                                    ;FOR TIGHTER SCOPE LOOP
2438                                                                    ;REPLACE ERROR CALL WITH
2439                                                                    ;"BR 10$" = 000742
2440  024354  012737  024354  001110 11$:       MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
2441  024362  012700  177776                    MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
```

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 2442  024366  012701  117776          MOV     #117776,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
 2443  024372  012702  030240          MOV     #030240,R2      ;LOAD DATA FOR PSW IN R2
 2444  024376  012704  007600          MOV     #7600,R4        ;LOAD R4 WITH PAR VALUE
 2445  024402  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 2446  024406  052737  000400  177572  BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
 2447  024414  010211                  MOV     R2,(R1)         ;LOAD PSW USING ADDER CHIPS (PAR4 + VIRT. ADDR.)
 2448  024416  011003                  MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
 2449  024420  000005                  RESET                   ;TURN OFF MEM. MGMT. MAINT. MODE
 2450  024422  005010                  CLR     (R0)            ;CLEAR THE PSW
 2451  024424  042703  000037          BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
 2452  024430  020203                  CMP     R2,R3           ;WAS PSW WRITTEN WHILE IN MAINT. MODE?
 2453  024432  001405                  BEQ     12$             ;BRANCH IF YES
 2454  024434  010137  001402          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYSICAL ADDR.
 2455  024440  004737  036354          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDR. FOR TYPING
 2456  024444  104017                  ERROR   17              ;PSW DID NOT HAVE DATA THAT IT SHOULD
 2457                                                          ;HAVE, APPARENTLY PHYS. ADDR. OF PSW WAS
 2458                                                          ;NOT FORMED BY ADDERS USING THE
 2459                                                          ;VIRTUAL ADDR. AND KIPAR4
 2460                                                          ;FOR TIGHTER SCOPE LOOP
 2461                                                          ;REPLACE ERROR CALL WITH
 2462                                                          ;"BR 11$" = 000743
 2463  024446  012737  023726  001110  12$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 2464
 2465                                  ;;*************************************************************
 2466                                  ;*TEST 26       RELOCATION & ADDER TEST (WITH CARRIES)
 2467                                  ;*
 2468                                  ;*      THE FOLLOWING TEST USES THE SAME METHOD AS THE PREVIOUS
 2469                                  ;*      TEST TO VERIFY MEMORY MANAGEMENTS ABILITY TO CONSTRUCT
 2470                                  ;*      PHYSICAL BUS ADDRESSES USING A VIRTUAL BUS ADDRESS AND THE
 2471                                  ;*      CONTENTS OF A PAGE ADDRESS REGISTER.  HOWEVER, THE VALUES
 2472                                  ;*      AND PATTERNS USED IN THIS TEST WILL GENERATE CARRIES FROM
 2473                                  ;*      CHIP TO CHIP AND CHECK "WRAPAROUND" TO ADDRESS 000000 BY
 2474                                  ;*      USING VIRTUAL ADDR. 100100 AND KIPAR4 = 7777.
 2475                                  ;*
 2476                                  ;;*************************************************************
 2477  024454  000004                  TST26:  SCOPE
 2478
 2479  024456                          1$:                             ;KERNEL PAR'S AND PDR'S HAVE BEEN
 2480                                                                  ;SETUP BY THE PREVIOUS TEST
 2481  024456  012737  024456  001110  2$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 2482  024464  012700  064276          MOV     #64276,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 2483  024470  012701  102176          MOV     #102176,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 2484  024474  012702  125253          MOV     #125253,R2      ;LOAD TEST PATTERN INTO R2
 2485  024500  012704  000621          MOV     #621,R4 ;LOAD R4 WITH PAR VALUE
 2486  024504  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 2487  024510  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 2488  024514  052737  000400  177572  BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
 2489  024522  010211                  MOV     R2,(R1)         ;LOAD 125253 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
 2490  024524  011003                  MOV     (R0),R3         ;READ 125253 BACK WITHOUT USING MEM. MGMT.
 2491  024526  000005                  RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
 2492  024530  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 2493  024534  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 2494                                                          ;WRITTEN USING "DEST-ONLY-RELOC."?
 2495  024536  001405                  BEQ     3$              ;BRANCH IF YES
 2496  024540  010137  001402          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 2497  024544  004737  036354          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
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 2498  024550  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
 2499                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 2500                                                          ;APPARENTLY PHYSICAL ADDR. WAS
 2501                                                          ;FORMED WRONG BY ADDERS USING
 2502                                                          ;THE VIRTUAL ADDR. AND KIPAR4
 2503                                                          ;FOR TIGHTER SCOPE LOOP
 2504                                                          ;REPLACE ERROR CALL WITH
 2505                                                          ;"BR 2$" = 000742
 2506  024552                          3$:
 2507  024552  012737  024552  001110  4$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
 2508  024560  012700  064476          MOV     #64476,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 2509  024564  012701  112376          MOV     #112376,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 2510  024570  012702  125254          MOV     #125254,R2      ;LOAD TEST PATTERN INTO R2
 2511  024574  012704  000521          MOV     #521,R4 ;LOAD R4 WITH PAR VALUE
 2512  024600  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 2513  024604  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 2514  024610  052737  000400  177572  BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
 2515  024616  010211                  MOV     R2,(R1)         ;LOAD 125254 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
 2516  024620  011003                  MOV     (R0),R3         ;READ 125254 BACK WITHOUT USING MEM. MGMT.
 2517  024622  000005                  RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
 2518  024624  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 2519  024630  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 2520                                                          ;WRITTEN USING "DEST-ONLY-RELOC."?
 2521  024632  001405                  BEQ     5$              ;BRANCH IF YES
 2522  024634  010137  001402          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 2523  024640  004737  036354          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
 2524  024644  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
 2525                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 2526                                                          ;APPARENTLY PHYSICAL ADDR. WAS
 2527                                                          ;FORMED WRONG BY ADDERS USING
 2528                                                          ;THE VIRTUAL ADDR. AND KIPAR4
 2529                                                          ;FOR TIGHTER SCOPE LOOP
 2530                                                          ;REPLACE ERROR CALL WITH
 2531                                                          ;"BR 4$" = 000742
 2532  024646                          5$:
 2533  024646  012737  024646  001110  6$:     MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
 2534  024654  012700  061076          MOV     #61076,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 2535  024660  012701  106776          MOV     #106776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 2536  024664  012702  125255          MOV     #125255,R2      ;LOAD TEST PATTERN INTO R2
 2537  024670  012704  000521          MOV     #521,R4 ;LOAD R4 WITH PAR VALUE
 2538  024674  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
 2539  024700  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 2540  024704  052737  000400  177572  BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
 2541  024712  010211                  MOV     R2,(R1)         ;LOAD 125255 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
 2542  024714  011003                  MOV     (R0),R3         ;READ 125255 BACK WITHOUT USING MEM. MGMT.
 2543  024716  000005                  RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
 2544  024720  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 2545  024724  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 2546                                                          ;WRITTEN USING "DEST-ONLY-RELOC."?
 2547  024726  001405                  BEQ     7$              ;BRANCH IF YES
 2548  024730  010137  001402          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 2549  024734  004737  036354          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
 2550  024740  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
 2551                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 2552                                                          ;APPARENTLY PHYSICAL ADDR. WAS
 2553                                                          ;FORMED WRONG BY ADDERS USING
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                                                        ;THE VIRTUAL ADDR. AND KIPAR4
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 6$" = 000742
024742                                          7$:
024742  012737  024742  001110                8$:     MOV     #8$,$LPERR      ;SET LOO  ON ERROR POINTER TO 8$
024750  012700  060076                                MOV     #60076,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
024754  012701  107776                                MOV     #107776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
024760  012702  125256                                MOV     #125256,R2      ;LOAD TEST PATTERN INTO R2
024764  012704  000501                                MOV     #501,R4 ;LOAD R4 WITH PAR VALUE
024770  010437  172350                                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
024774  011037  001176                                MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
025000  052737  000400  177572                      BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
025006  010211                                      MOV     R2,(R1)         ;LOAD 125256 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
025010  011003                                      MOV     (R0),R3         ;READ 125256 BACK WITHOUT USING MEM. MGMT.
025012  000005                                      RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
025014  013710  001176                            MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
025020  020203                                      CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
                                                        ;WRITTEN USING "DEST-ONLY-RELOC."?
025022  001405                                      BEQ     9$              ;BRANCH IF YES
025024  010137  001402                            MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
025030  004737  036354                            JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
025034  104017                                      ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
                                                        ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
                                                        ;APPARENTLY PHYSICAL ADDR. WAS
                                                        ;FORMED WRONG BY ADDERS USING
                                                        ;THE VIRTUAL ADDR. AND KIPAR4
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 8$" = 000742
025036                                          9$:
025036  012737  025036  001110                10$:    MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
025044  012700  000000                                MOV     #000000,R0      ;LOAD PHYSICAL ADDR. PBA INTO R0
025050  012701  100100                                MOV     #100100,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
025054  012702  125257                                MOV     #125257,R2      ;LOAD TEST PATTERN INTO R2
025060  012704  007777                                MOV     #7777,R4        ;LOAD R4 WITH PAR VALUE
025064  010437  172350                                MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
025070  011037  001176                                MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
025074  052737  000400  177572                      BIS     #BIT8,SR0       ;TURN ON "DESTINATION-ONLY-RELOCATION"
025102  010211                                      MOV     R2,(R1)         ;LOAD 125257 USING ADDER CHIPS (PAR4 + VIRT ADDR.)
025104  011003                                      MOV     (R0),R3         ;READ 125257 BACK WITHOUT USING MEM. MGMT.
025106  000005                                      RESET                   ;TURN OFF MEMORY MGMT. MAINT. MODE
025110  013710  001176                            MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
025114  020203                                      CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
                                                        ;WRITTEN USING "DEST-ONLY-RELOC."?
025116  001405                                      BEQ     11$             ;BRANCH IF YES
025120  010137  001402                            MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
025124  004737  036354                            JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
025130  104017                                      ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
                                                        ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
                                                        ;APPARENTLY PHYSICAL ADDR. WAS
                                                        ;FORMED WRONG BY ADDERS USING
                                                        ;THE VIRTUAL ADDR. AND KIPAR4
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 10$" = 000742
```



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025132                                          11$:
025132  012737  024456  001110                        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$

                                                ;;*****************************************************************
                                                ;*TEST 27       READ AND WRITE WHILE IN RELOCATE MODE
                                                ;*
                                                ;*      THE FOLLOWING TEST TURNS ON MEMORY MANAGEMENT AND THEN
                                                ;*      READS AND WRITES LOCATIONS BETWEEN PHYSICAL ADDRESSES
                                                ;*      060000-067600.  ONE LOCATION IN EVERY BLOCK (32. WORDS)
                                                ;*      IS WRITTEN USING PAR4 AND READ USING PAR5.  THIS IS
                                                ;*      DONE IN BOTH USER AND KERNEL MODES.  THE USER PAR/PDR'S
                                                ;*      ARE SETUP AT THE BEGINNING OF THE TEST AND ONCE MEMORY
                                                ;*      MANAGEMENT IS TURNED ON IT IS LEFT ON FOR THE REST OF THE
                                                ;*      OF THE PROGRAM.  THE "MODE" INPUT TO THE PAR/PDR ADDRESS MUX
                                                ;*      IS CHECKED BY READING AND WRITING IN USER MODE.  REMEMBER
                                                ;*      ALSO, THAT SINCE MEMORY MANAGEMENT IS ON (IN RELOCATE
                                                ;*      MODE) THE PROGRAM ITSELF IS USING ITS VIRTUAL ADDRESSES AND
                                                ;*      THE PAR/PDR'S TO EXECUTE.
                                                ;*
                                                ;*      WHILE TESTING IN KERNEL MODE, USER PAGES 4 & 5 ARE MAPPED
                                                ;*      NON-RESIDENT WITH DIFFERENT PAR VALUES THAN THE KERNEL
                                                ;*      PAR'S TO BE SURE THAT THE KERNEL PAR'S AND PDR'S ARE BEING
                                                ;*      USED WHEN IN KERNEL MODE (AND VICE VERSA WHILE TESTING IN
                                                ;*      USER MODE).  IF A MEM. MGMT. TRAP OCCURS, THE PROGRAM GOES
                                                ;*      TO 8$ WHERE THE TRAP IS REPORTED.
                                                ;*
                                                ;*****************************************************************
025140  000004                                  TST27:  SCOPE

025142  005037  177776                          1$:     CLR     PSW             ;START IN KERNEL MODE
025146  012704  000577                                  MOV     #577,R4         ;LOAD R4 WITH VALUE FOR PAR4
025152  012705  000600                                  MOV     #600,R5         ;LOAD R5 WITH VALUE FOR PAR5
025156  010437  172350                                  MOV     R4,KIPAR4       ;LOAD KERNEL PAR4
025162  010537  172352                                  MOV     R5,KIPAR5       ;LOAD KERNEL PAR5
025166  012700  177640                                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
025172  005001                                          CLR     R1              ;CLEAR R1
025174  012702  000007                                  MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
025200  010120                                  2$:     MOV     R1,(R0)+        ;MAP USER PAR'S TO PAGES 0-6 (4K EACH)
025202  062701  000200                                  ADD     #200,R1
025206  077204                                          SOB     R2,2$           ;LOOP UNTIL UIPAR0-UIPAR6 ARE LOADED
025210  012710  007600                                  MOV     #7600,(R0)      ;MAP USER PAR7 TO THE I/O PAGE
025214  012700  177600                                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
025220  012701  077406                                  MOV     #77406,R1       ;LOAD PDR DATA INTO R1
025224  012702  000010                                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
025230  010120                                  3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
025232  077202                                          SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
025234  105037  177610                                  CLRB    UIPDR4          ;MAP USER SPACE NON-RESIDENT WHILE
025240  105037  177612                                  CLRB    UIPDR5          ;       TESTING KERNEL SPACE
025244  010537  177650                                  MOV     R5,UIPAR4       ;MAP USER PAR'S OPPOSITE OF KIPAR'S
025250  010437  177652                                  MOV     R4,UIPAR5
025254  012737  000001  177572                        MOV     #1,SR0          ;TURN ON MEMORY MANAGEMENT (RELOCATE MODE)
025262  012737  025314  001110                        MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
025270  012737  025526  000250                        MOV     #8$,MMVEC       ;SET M. M. TRAP VECTOR TO 8$
025276  013737  177776  001176            4$:     MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
025304  012700  100100                                MOV     #100100,R0      ;PUT VIRTUAL ADDR. THAT USER PAR4 IN R0
025310  012701  120000                                MOV     #120000,R1      ;PUT VIRTUAL ADDR. THAT USES PAR5 IN R1
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2666  025314  010010                  5$:     MOV     R0,(R0)         ;WRITE TO TEST LOC. USING PAR4
2667  025316  011102                          MOV     (R1),R2         ;READ THE SAME LOC., BUT USING PAR5
2668  025320  020002                          CMP     R0,R2           ;DID WE READ WHAT WE WROTE?
2669  025322  001411                          BEQ     6$              ;BRANCH IF YES
2670  025324  010137  001404                  MOV     R1,VIRT2        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR5
2671  025330  010037  001402                  MOV     R0,VIRT1        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR4
2672  025334  004737  036354                  JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS  BEING USED
2673  025340  104020                          ERROR   20              ;READING LOC. USING PAR5 AND A VIRT.
2674                                                                  ;ADDR. DID NOT FIND DATA WRITTEN WHEN USING
2675                                                                  ;PAR4 AND VIRT. ADDRESS.
2676                                                                  ;FOR TIGHTER SCOPE LOOP
2677                                                                  ;REPLACE ERROR CALL WITH
2678                                                                  ;"BR 5$" = 000765
2679  025342  013700  001402                  MOV     VIRT1,R0        ;RESTORE VBA IN R0
2680  025346  062700  000100          6$:     ADD     #100,R0         ;CHANGE VIRTUAL ADDRS. TO POINT TO NEXT BLOCK
2681  025352  062701  000100                  ADD     #100,R1
2682  025356  020127  127700                  CMP     R1,#127700      ;WERE BLOCKS FROM 60000-676000 ALL TRIED?
2683  025362  001354                          BNE     5$              ;BRANCH IF NO
2684  025364  032737  140000  177776          BIT     #140000,PSW     ;HAVE WE DONE TEST IN USER MODE YET?
2685  025372  001026                          BNE     7$              ;BRANCH IF YES
2686  025374  010437  177650                  MOV     R4,UIPAR4       ;LOAD USER PAR4
2687  025400  010537  177652                  MOV     R5,UIPAR5       ;LOAD USER PAR5
2688  025404  112737  000006  177610          MOVB    #6,UIPDR4       ;MAP USER SPACE R/W TO TEST IT
2689  025412  112737  000006  177612          MOVB    #6,UIPDR5
2690  025420  105037  172310                  CLRB    KIPDR4          ;MAP  KERNEL SPACE NON-RESIDENT WHILE
2691  025424  105037  172312                  CLRB    KIPDR5          ;       TESTING USER SPACE
2692  025430  010537  172350                  MOV     R5,KIPAR4       ;MAP KERNEL PAR'S OPPOSITE UIPAR'S
2693  025434  010437  172352                  MOV     R4,KIPAR5
2694  025440  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
2695  025446  000713                          BR      4$              ;GO BACK AND READ/WRITE IN USER MODE
2696  025450  005037  177776          7$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
2697  025454  012737  077406  172310          MOV     #77406,KIPDR4   ;REMAP KERNEL PAGES READ/WRITE
2698  025462  012737  077406  172312          MOV     #77406,KIPDR5
2699  025470  010537  172350                  MOV     R5,KIPAR4       ;MAP KERNEL  AND USER PAR'S 4 & 5
2700  025474  010537  172352                  MOV     R5,KIPAR5       ;  BACK TO 12-16K
2701  025500  010537  177650                  MOV     R5,UIPAR4
2702  025504  010537  177652                  MOV     R5,UIPAR5
2703  025510  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDR. OF NORMAL M.M. TRAP ROUTINE
2704  025516  012737  025142  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2705  025524  000427                          BR      TST30           ;;GO TO NEXT TEST
2706
2707  025526  012637  001356          8$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2708  025532  012637  001360                  MOV     (KSP)+,TRAPPS
2709                                                                  ;PROGRAM WILL TRAP TO HERE IF TRY
2710                                                                  ;TO USE USER PDR'S WHEN IN KERNEL MODE
2711                                                                  ;OR KERNEL PDR'S WHEN IN USER MODE
2712  025536  010037  001402                  MOV     R0,VIRT1        ;SAVE VIRTUAL ADDRESS FOR ERROR REPORT
2713  025542  004737  036354                  JSR     PC,FORMPA       ;GO FORM THE PHYSICAL ADDRESS  BEING USED
2714  025546  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE SR0 & SR2  FOR ERROR REPORT
2715  025554  013737  177576  001370          MOV     SR2,WASSR2
2716  025562  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2717  025570  104052                          ERROR   52              ;M.M. TRAP WHILE IN RELOCATE MODE -
2718                                                                  ;REFERENCED WRONG SET OF PDR'S
2719                                                                  ;FOR TIGHTER SCOPE LOOP
2720                                                                  ;REPLACE ERROR CALL WITH
2721                                                                  ;A "NOP" = 000240
```



```
2722  025572  013746  001360                          MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2723  025576  013746  001356                          MOV     TRAPPC,-(KSP)
2724  025602  000002                                  RTI                     ;RETURN TO TEST
2725
2726
2727                                          ;;*************************************************************
2728                                          ;*TEST 30       W-BIT LOGIC TEST, KERNEL PDR'S
2729                                          ;*
2730                                          ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
2731                                          ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
2732                                          ;*      & PBA'S CONSTRUCTED = 17776,37776,57776,77776,77776,
2733                                          ;*      77776,77776, & 777776 RESPECTIVELY).
2734                                          ;*      WHICH SHOULD CAUSE THE "W-BIT" TO SET IN EACH OF THE
2735                                          ;*      EIGHT (8) KERNEL PAGE DESCRIPTOR REGISTERS.  THE PDR'S
2736                                          ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
2737                                          ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
2738                                          ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  KERNEL PDR'S 3,4,5,6
2739                                          ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
2740                                          ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
2741                                          ;*      W-BIT PORTION OF THE PDR'S AND THE PAR/PDR ADRS MUX
2742                                          ;*      ARE BEING CHECKED.
2743                                          ;;*************************************************************
2744  025604  000004                  TST30:  SCOPE
2745  025606                          1$:
2746  025606  004737  036002                  JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2747  025612  012702  000004                  MOV     #4,R2           ;SET LOOP COUNTER TO 4
2748  025616  012700  172346                  MOV     #KIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
2749  025622  012701  000600                  MOV     #600,R1         ;LOAD "12-16K" PAR VALUE INTO R1
2750  025626  010120                  2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
2751  025630  077202                          SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
2752  025632  012705  172300                  MOV     #KIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
2753  025636  012704  000010                  MOV     #10,R4          ;SET LOOP COUNTER TO 8
2754  025642  012703  017776                  MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
2755  025646  012737  025654  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2756  025654  012700  172300          3$:     MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
2757  025660  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
2758  025664  012701  077406                  MOV     #77406,R1       ;PUT "W-BIT OFF DATA" INTO R1
2759  025670  010120                  4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
2760  025672  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
2761  025674  011313                          MOV     (R3),(R3)       ;DO "DATO" TO VIRTUAL ADDR.-SETTING A W-BIT
2762  025676  031527  000100                  BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
2763  025702  001002                          BNE     5$              ;BRANCH IF YES
2764  025704  104021                          ERROR   21              ;W-BIT DID NOT GET SET IN PDR
2765                                                                  ;FOR TIGHTER SCOPE LOOP
2766                                                                  ;REPLACE ERROR CALL WITH
2767                                                                  ;"BR 3$" = 000763
2768  025706  000422                          BR      8$              ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
2769  025710  012702  000010          5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
2770  025714  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
2771  025720  031027  000100          6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
2772  025724  001403                          BEQ     7$              ;BRANCH IF YES
2773  025726  020500                          CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
2774  025730  001401                          BEQ     7$              ;BRANCH IF YES
2775  025732  104022                          ERROR   22              ;W-BIT GOT SET IN MORE THAN ONE PDR
2776                                                                  ;FOR TIGHTER SCOPE LOOP
2777                                                                  ;REPLACE ERROR CALL WITH
```

```
2778                                                    ;"BR 3$" = 000750
2779  025734  062700  000002          7$:     ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
2780  025740  077211                          SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
2781  025742  010115                          MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
2782  025744  031527  000100                  BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
2783  025750  001401                          BEQ     8$              ;BRANCH IF YES
2784  025752  104023                          ERROR   23              ;W-BIT DID NOT CLEAR BY WRITING THE PDR
2785                                                                  ;FOR TIGHTER SCOPE LOOP
2786                                                                  ;REPLACE ERROR CALL WITH
2787                                                                  ;"BR 3$" = 000740
2788  025754  062705  000002          8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
2789  025760  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
2790  025764  077445                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
2791  025766  012737  025606  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2792  025774  004737  036036                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
2793
2794                                          ;;*****************************************************************
2795                                          ;*TEST 31        W-BIT LOGIC TEST, USER PDR'S
2796                                          ;*
2797                                          ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
2798                                          ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
2799                                          ;*      & PBA'S CONSTRUCTED = 17776,37776,57776,77776,77776,
2800                                          ;*      77776,77776, & 777776 RESPECTIVELY).
2801                                          ;*      WHICH SHOULD CAUSE THE "W-BIT" TO SET IN EACH OF THE
2802                                          ;*      EIGHT (8) USER PAGE DESCRIPTOR REGISTERS.  THE PDR'S
2803                                          ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
2804                                          ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
2805                                          ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  USER PDR'S 3,4,5,6
2806                                          ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
2807                                          ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
2808                                          ;*      W-BIT PORTION OF THE PDR'S AND THE PAR/PDR ADRS MUX
2809                                          ;*      ARE BEING CHECKED.
2810                                          ;;*****************************************************************
2811  026000  000004                  TST31:  SCOPE
2812  026002  012737  140000  177776  1$:     MOV     #140000,PSW     ;GO TO USER MODE FOR THIS TEST
2813  026010  004737  036002                  JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2814  026014  012702  000004                  MOV     #4,R2           ;SET LOOP COUNTER TO 4
2815  026020  012700  177646                  MOV     #UIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
2816  026024  012701  000600                  MOV     #600,R1         ;LOAD "12-16K" PAR VALUE INTO R1
2817  026030  010120                  2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
2818  026032  077202                          SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
2819  026034  012705  177600                  MOV     #UIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
2820  026040  012704  000010                  MOV     #10,R4          ;SET LOOP COUNTER TO 8
2821  026044  012703  017776                  MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
2822  026050  012737  026056  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2823  026056  012700  177600          3$:     MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
2824  026062  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
2825  026066  012701  077406                  MOV     #77406,R1       ;PUT "W-BIT OFF DATA" INTO R1
2826  026072  010120                  4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
2827  026074  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
2828  026076  011313                          MOV     (R3),(R3)       ;DO "DATO" TO VIRTUAL ADDR.-SETTING A W-BIT
2829  026100  031527  000100                  BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
2830  026104  001002                          BNE     5$              ;BRANCH IF YES
2831  026106  104021                          ERROR   21              ;W-BIT DID NOT GET SET IN PDR
2832                                                                  ;FOR TIGHTER SCOPE LOOP
2833                                                                  ;REPLACE ERROR CALL WITH
```



```
2834                                                    ;"BR 3$" = 000763
2835  026110  000422                          BR      8$              ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
2836  026112  012702  000010          5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
2837  026116  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
2838  026122  031027  000100          6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
2839  026126  001403                          BEQ     7$              ;BRANCH IF YES
2840  026130  020500                          CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
2841  026132  001401                          BEQ     7$              ;BRANCH IF YES
2842  026134  104022                          ERROR   22              ;W-BIT GOT SET IN MORE THAN ONE PDR
2843                                                                  ;FOR TIGHTER SCOPE LOOP
2844                                                                  ;REPLACE ERROR CALL WITH
2845                                                                  ;"BR 3$" = 000750
2846  026136  062700  000002          7$:     ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
2847  026142  077211                          SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
2848  026144  010115                          MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
2849  026146  031527  000100                  BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
2850  026152  001401                          BEQ     8$              ;BRANCH IF YES
2851  026154  104023                          ERROR   23              ;W-BIT DID NOT CLEAR BY WRITING THE PDR
2852                                                                  ;FOR TIGHTER SCOPE LOOP
2853                                                                  ;REPLACE ERROR CALL WITH
2854                                                                  ;"BR 3$" = 000740
2855  026156  062705  000002          8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
2856  026162  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
2857  026166  077445                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
2858  026170  012737  026002  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2859  026176  004737  036036                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
2860  026202  005037  177776                  CLR     PSW             ;BACK TO KERNEL MODE BEFORE LEAVING
2861
2862                                          ;;*****************************************************************
2863                                          ;*TEST 32        TEST "W-BIT NOT SET" CASES
2864                                          ;*
2865                                          ;*      THIS TEST CHECKS TWO SPECIAL CASES WHERE THE W-BIT DOES
2866                                          ;*      NOT GET SET ON A WRITE.  FIRST CASE IS THAT THE W-BIT
2867                                          ;*      SHOULD NOT SET IN PAGE DESCRIPTOR REG. 7 WHEN WRITING TO
2868                                          ;*      STATUS REG SR0 (KERNEL PDR 7 IS USED).  SECOND CASE IS THAT
2869                                          ;*      THE W-BIT IS NOT SET IF THE "DATO" IS ABORTED DUE TO AN
2870                                          ;*      ODD ADDRESS ERROR (KERNEL PDR3 & VIRTUAL ADDR 60001 ARE USED).
2871                                          ;*
2872                                          ;;*****************************************************************
2873  026206  000004                  TST32:  SCOPE
2874
2875  026210  004737  036002          1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
2876  026214  012701  077406                  MOV     #77406,R1       ;PUT "W-BIT OFF" VALUE FOR PDR IN R1
2877  026220  012737  026226  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2878  026226  010137  172316          2$:     MOV     R1,KIPDR7       ;LOAD KERNEL PDR 7 TO CLEAR W-BIT
2879  026232  013700  177572                  MOV     SR0,R0          ;READ PRESENT CONTENTS OF STATUS REG. 0
2880  026236  010037  177572                  MOV     R0,SR0          ;WRITE PRESENT CONTENTS OF SR0 BACK TO ITSELF
2881  026242  013702  172316                  MOV     KIPDR7,R2       ;READ CONTENTS OF KIPDR7 INTO R2
2882  026246  020102                          CMP     R1,R2           ;WAS W-BIT LEFT CLEARED?
2883  026250  001401                          BEQ     3$              ;BRANCH IF YES
2884  026252  104024                          ERROR   24              ;W-BIT IN KIPDR7 SET WHEN SR0 WAS WRITTEN TO
2885                                                                  ;FOR TIGHTER SCOPE LOOP
2886                                                                  ;REPLACE ERROR CALL WITH
2887                                                                  ;"BR 2$" = 000765
2888  026254  012737  026254  001110  3$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2889  026262  010137  172306                  MOV     R1,KIPDR3       ;LOAD KERNEL PDR3 WITH 77406 TO CLEAR W-BIT
```

```
2890  026266  012737  026300  000004          MOV     #4$,ERRVEC      ;SET UP LOC. 4 TO 4$ FOR ODD ADDR. ABORT
2891  026274  005237  060001                  INC     60001           ;CAUSE ODD ADDRESS ABORT THRU LOC. 4
2892  026300  012706  001100          4$:     MOV     #KERSTK,KSP     ;RESTORE THE STACK POINTER
2893  026304  013702  172306                  MOV     @#KIPDR3,R2     ;READ KIPDR3 INTO R2
2894  026310  020102                          CMP     R1,R2           ;WAS W-BIT LEFT CLEARED?
2895  026312  001401                          BEQ     5$              ;BRANCH IF YES
2896  026314  104025                          ERROR   25              ;W-BIT GOT SET DURING AN ODD ADDR. ABORT
2897                                                                  ;FOR TIGHTER SCOPE LOOP
2898                                                                  ;REPLACE ERROR CALL WITH
2899                                                                  ;"BR 3$" = 000757
2900  026316  012737  002332  000004  5$:     MOV     #TIMERR,ERRVEC  ;RESTORE NORMAL CPU TRAP ROUTINE TO LOC.4
2901  026324  012737  026210  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2902  026332  004737  036036                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
2903
2904                                  ;;*****************************************************************
2905                                  ;*
2906                                  ;*      THE NEXT THREE (3) TESTS CAUSE MEMORY MANAGEMENT ERRORS
2907                                  ;*      TO CHECK THE ABILITY OF STATUS REGISTER 0 TO RECORD KT
2908                                  ;*      ERRORS AND THE ABILITY OF STATUS REGISTER 2 TO LOCK UP THE
2909                                  ;*      VIRTUAL ADDR. OF THE INSTRUCTION THAT CAUSED THE ERROR.
2910                                  ;*      THE BITS OF SR2 ARE CHECKED AND BITS <15:13>, <6:5>, AND <3:0>
2911                                  ;*      ARE CHECKED IN SR0.  SO THE SR0 AND SR2 LOGIC AND THE
2912                                  ;*      KT ERROR LOGIC ARE CHECKED.
2913                                  ;*
2914                                  ;;*****************************************************************
2915
2916                                  ;;*****************************************************************
2917                                  ;*TEST 33       NON-RESIDENT ABORT TEST (ACF=0&4)
2918                                  ;*
2919                                  ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
2920                                  ;*      LOGIC BY CAUSING NON-RESIDENT ABORTS IN BOTH KERNEL AND
2921                                  ;*      USER MODES.  PDR 4 IS LOADED WITH ACF'S = 0&4 AND
2922                                  ;*      THEN PHYSICAL ADDR. 60000 IS ACCESSED TO CAUSE THE ABORT.
2923                                  ;*
2924                                  ;;*****************************************************************
2925  026336  000004                  TST33:  SCOPE
2926
2927  026340  012700  000600          1$:     MOV     #600,R0         ;LOAD DATA FOR PAR'S INTO R0
2928  026344  010037  172346                  MOV     R0,@#KIPAR3     ;MAP KERNEL PAR'S 3&4 TO 12-16K
2929  026350  010037  172350                  MOV     R0,@#KIPAR4
2930  026354  010037  177646                  MOV     R0,@#UIPAR3     ;MAP USER PAR'S 3&4 TO 12-16K
2931  026360  010037  177650                  MOV     R0,@#UIPAR4
2932  026364  012737  077406  172306          MOV     #77406,@#KIPDR3 ;MAP KERNEL PDR 3  128 BLKS, READ-WRITE
2933  026372  012737  077406  177606          MOV     #77406,@#UIPDR3 ;MAP USER PDR 3  128 BLKS, READ-WRITE
2934  026400  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
2935  026404  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
2936  026410  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., KERNEL, PG.4
2937  026414  012702  077400                  MOV     #77400,R2       ;LOAD ACF=0 (NON-RESIDENT) PDR VALUE IN R2
2938  026420  012737  026462  000250  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
2939  026426  010237  172310                  MOV     R2,@#KIPDR4     ;LOAD ACF TEST VALUE INTO KIPDR4
2940  026432  010237  177610                  MOV     R2,@#UIPDR4     ;LOAD ACF TEST VALUE INTO UIPDR4
2941  026436  012737  026444  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2942  026444  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
2943  026446  013737  177776  001176          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
2944  026454  005211                  4$:     INC     (R1)            ;TRY TO REF. IT USING PDR4 - SHOULD TRAP TO 5$
2945  026456  104026                          ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
```



```
2946                                                                  ;FOR TIGHTER SCOPE LOOP
2947                                                                  ;REPLACE ERROR CALL WITH
2948                                                                  ;"BR 3$" = 000772
2949  026460  000425                          BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
2950  026462  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
2951  026466  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
2952  026470  001401                          BEQ     6$              ;BRANCH IF YES
2953  026472  104027                          ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
2954                                                                  ;FOR TIGHTER SCOPE LOOP
2955                                                                  ;REPLACE ERROR CALL WITH
2956                                                                  ;"BR 3$" = 000764
2957  026474  013737  177572  001366  6$:     MOV     @#SR0,WASSR0    ;READ STATUS REGISTER 0
2958  026502  013737  177576  001370          MOV     @#SR2,WASSR2    ;READ STATUS REGISTER 2
2959  026510  020337  001366                  CMP     R3,WASSR0       ;DID SR0 REPORT NON-RESIDENT ERROR CORRECTLY?
2960  026514  001401                          BEQ     7$              ;BRANCH IF YES
2961  026516  104030                          ERROR   30              ;SR0 DID NOT REPORT NON-RES. ERROR CORRECTLY
2962                                                                  ;FOR TIGHTER SCOPE LOOP
2963                                                                  ;REPLACE ERROR CALL WITH
2964                                                                  ;"BR 3$" = 000752
2965  026520  012704  026454          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
2966  026524  020437  001370                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
2967  026530  001401                          BEQ     8$              ;BRANCH IF YES
2968  026532  104031                          ERROR   31              ;SR2 DID NOT LOCK VIRTUAL ADDR. OF NON-RES. ERROR
2969                                                                  ;FOR TIGHTER SCOPE LOOP
2970                                                                  ;REPLACE ERROR CALL WITH
2971                                                                  ;"BR 3$" = 000744
2972  026534  042737  160000  177572  8$:     BIC     #160000,@#SR0   ;CLEAR THE ERROR BITS IN SR0
2973  026542  032737  140000  001176          BIT     #140000,$TMP0   ;HAS ACF=0&4 BEEN TESTED IN USER YET
2974  026550  001006                          BNE     9$              ;BRANCH IF YES
2975  026552  012703  100151                  MOV     #100151,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., USER, PG.4
2976  026556  012737  140000  177776          MOV     #140000,@#PSW   ;GO TO USER MODE
2977  026564  000715                          BR      2$              ;REPEAT TEST IN USER MODE
2978  026566  022702  077404          9$:     CMP     #77404,R2       ;HAS ACF=4 BEEN TESTED YET?
2979  026572  001407                          BEQ     10$             ;BRANCH IF YES
2980  026574  012702  077404                  MOV     #77404,R2       ;THEN LOAD ACF=4 (NON-RES) PDR VALUE IN R2
2981  026600  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ-N.R.,KERNEL,PG. 4
2982  026604  005037  177776                  CLR     @#PSW           ;GO BACK TO KERNEL MODE
2983  026610  000703                          BR      2$              ;GO BACK & TEST ACF=4 IN SAME MODE
2984  026612  005037  177776          10$:    CLR     @#PSW           ;GO BACK TO KERNEL MODE BEFORE LEAVING
2985  026616  012737  026340  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2986  026624  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
2987                                                                  ;MANAGEMENT ERROR ROUTINE TO MMVEC
2988
2989                                  ;;*****************************************************************
2990                                  ;*TEST 34       READ-ONLY ABORT TEST (ACF=2)
2991                                  ;*
2992                                  ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
2993                                  ;*      LOGIC BY CAUSING READ-ONLY ABORTS IN BOTH KERNEL AND
2994                                  ;*      USER MODES.  PDR 4 IS LOAD WITH ACF=2 AND THEN
2995                                  ;*      PHYSICAL ADDR. 60000 IS WRITTEN TO CAUSE THE ABORT.
2996                                  ;*
2997                                  ;;*****************************************************************
2998  026632  000004                  TST34:  SCOPE
2999  026634                          1$:                             ;KERNEL & USER PAR'S 3 & 4 AND PDR 3
3000                                                                  ;ARE SETUP FROM LAST TEST
3001  026634  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
```

```
3002  026640  012701  100000            MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
3003  026644  012703  020011            MOV     #20011,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ - R/O, KERNEL, PG.4
3004  026650  012702  077402            MOV     #77402,R2       ;LOAD ACF=2 (READ-ONLY) PDR VALUE IN R2
3005  026654  012737  026716  000250 2$:  MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
3006  026662  010237  172310            MOV     R2,KIPDR4       ;LOAD ACF=2 INTO KIPDR4
3007  026666  010237  177610            MOV     R2,UIPDR4       ;LOAD ACF=2 INTO UIPDR4
3008  026672  012737  026700  001110    MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
3009  026700  005010              3$:   CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
3010  026702  013737  177776  001176    MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
3011  026710  005211              4$:   INC     (R1)            ;TRY TO WRITE USING PDR4 - SHOULD TRAP TO 5$
3012  026712  104026                    ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
3013                                                            ;FOR TIGHTER SCOPE LOOP
3014                                                            ;REPLACE ERROR CALL WITH
3015                                                            ;"BR 3$" = 000772
3016  026714  000425                    BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
3017  026716  062706  000004      5$:   ADD     #4,SP           ;RESTORE STACK POINTER
3018  026722  005710                    TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
3019  026724  001401                    BEQ     6$              ;BRANCH IF YES
3020  026726  104027                    ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
3021                                                            ;FOR TIGHTER SCOPE LOOP
3022                                                            ;REPLACE ERROR CALL WITH
3023                                                            ;"BR 3$" = 000764
3024  026730  013737  177572  001366 6$:   MOV     SR0,WASSR0      ;READ STATUS REG. 0
3025  026736  013737  177576  001370      MOV     SR2,WASSR2      ;READ STATUS REG. 2
3026  026744  020337  001366              CMP     R3,WASSR0       ;DID SR0 REPORT READ-ONLY ERROR CORRECTLY?
3027  026750  001401                    BEQ     7$              ;BRANCH IF YES
3028  026752  104030                    ERROR   30              ;SR0 DID NOT REPORT R/O ERROR CORRECTLY
3029                                                            ;FOR TIGHTER SCOPE LOOP
3030                                                            ;REPLACE ERROR CALL WITH
3031                                                            ;"BR 3$" = 000752
3032  026754  012704  026710      7$:   MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
3033  026760  020437  001370              CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
3034  026764  001401                    BEQ     8$              ;BRANCH IF YES
3035  026766  104031                    ERROR   31              ;SR2 DID NOT LOCKUP VIRTUAL ADDR. OF R/O ERROR
3036                                                            ;FOR TIGHTER SCOPE LOOP
3037                                                            ;REPLACE ERROR CALL WITH
3038                                                            ;"BR 3$" = 000744
3039  026770  042737  160000  177572 8$:   BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
3040  026776  032737  140000  001176      BIT     #140000,$TMP0   ;HAS ACF=2 BEEN TESTED IN USER MODE?
3041  027004  001006                    BNE     9$              ;BRANCH IF YES
3042  027006  012703  020151              MOV     #20151,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ-R/O, USER, PG.4
3043  027012  012737  140000  177776      MOV     #140000,PSW     ;GO TO USER MODE
3044  027020  000715                    BR      2$              ;REPEAT TEST IN USER MODE
3045  027022  005037  177776      9$:   CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
3046  027026  012737  026634  001110    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3047  027034  012737  002400  000250    MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
3048                                                            ;MANAGEMENT ERROR ROUTINE TO MMVEC.
3049                                ;;**************************************************************
3050                                ;*TEST 35        TEST ILLEGAL MODE "01"
3051                                ;*
3052                                ;*      THIS TEST CHECKS TO SEE THAT A 01 IN THE CURRENT MODE BITS OF THE
3053                                ;*      PSW WHILE MEMORY MANAGEMENT IS ON IS ILLEGAL.  A
3054                                ;*      MEMORY MANAGEMENT ABORT SHOULD OCCUR AND STATUS REGISTER 0
3055                                ;*      SHOULD REPORT NON-RESIDENT ABORT, MODE = 01, PAGE = 1 (100043).  STATUS
3056                                ;*      REGISTER 2 SHOULD LOCKUP THE ADDRESS OF THE INSTRUCTION
3057                                ;*      THAT LOADED THE PSW.
```



```
3058                                ;*
3059                                ;;**************************************************************
3060  027042  000004              TST35:  SCOPE
3061  027044  012737  027060  001110 1$:   MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3062  027052  012737  027074  000250      MOV     #3$,MMVEC       ;LOAD MEM. MGMT. TRAP VECTOR WITH 3$
3063  027060  012737  040000  177776 2$:   MOV     #40000,PSW      ;SET 01 IN PSW CURRENT MODE BITS
3064  027066  000240                    NOP                     ;FETCH OF THIS INSTRUCTION SHOULD CAUSE ABORT
3065  027070  104056                    ERROR   56              ;ILLEGAL MODE 01 NOT ABORTED
3066                                                            ;FOR A TIGHTER SCOPE LOOP
3067                                                            ;REPLACE ERROR CALL WITH
3068                                                            ;"BR 2$" = 000773
3069  027072  000424                    BR      5$              ;BRANCH AROUND SR0 & SR2 CHECKS
3070  027074  012706  001100      3$:   MOV     #KERSTK,SP      ;RESTORE STACK POINTER
3071  027100  012701  100043              MOV     #100043,R1      ;LOAD EXPECTED CONTENTS OR SR0 INTO R1
3072  027104  013737  177572  001366      MOV     SR0,WASSR0      ;READ CONTENTS OF SR0
3073
3074  027112  020137  001366              CMP     R1,WASSR0       ;DID SR0 REPORT ILLEGAL MODE CORRECTLY?
3075  027116  001401                    BEQ     4$              ;BRANCH IF YES
3076  027120  104057                    ERROR   57              ;SR0 DID NOT REPORT NR ABORT, PG=1, MODE=01
3077                                                            ;FOR TIGHTER SCOPE LOOP
3078                                                            ;REPLACE ERROR CALL WITH
3079                                                            ;"BR 2$" = 000757
3080  027122  012701  027060      4$:   MOV     #2$,R1          ;LOAD EXPECTED CONTENTS OF SR2 INTO R1
3081  027126  013737  177576  001370      MOV     SR2,WASSR2      ;READ CONTENTS OF SR2
3082  027134  020137  001370              CMP     R1,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR OF ABORTED INST.
3083  027140  001401                    BEQ     5$              ;BRANCH IF YES
3084  027142  104036                    ERROR   36              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ILL. MODE INST.
3085                                                            ;FOR TIGHTER SCOPE LOOP
3086                                                            ;REPLACE ERROR CALL WITH
3087                                                            ;"BR 2$" = 000746
3088  027144  042737  160000  177572 5$:   BIC     #160000,SR0     ;CLEAR POSSIBLE ERROR BITS IN SR0
3089  027152  012737  002400  000250      MOV     #MGMERR,MMVEC   ;RESTORE MEM. MGMT. ABORT VECTOR
3090  027160  012737  027044  001110      MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3091
3092
3093
3094
3095
3096
3097
3098
3099
3100
3101
3102
3103                                ;;**************************************************************
3104                                ;*
3105                                ;*      THE NEXT TWO (2) TESTS WILL BE CHECKING THE PAGE LENGTH
3106                                ;*      COMPARATORS AND SOME MORE OF THE KT ERROR DETECTION
3107                                ;*      AND STATUS LOGIC.  THE PAGE LENGTH FIELD (PLF) IN KERNEL
3108                                ;*      PDR 4 IS VARIED AND FOR EVERY PLF, THREE (3) VIRTUAL
3109                                ;*      ADDRESSES ARE READ.  WHILE USING BOTH UPWARD & DOWNWARD PAGE
3110                                ;*      EXPANSION, ONE OF THOSE THREE VIRTUAL ADDRESSES WILL CAUSE A
3111                                ;*      "PAGE LENGTH ABORT" WHILE THE OTHER TWO WON'T.
3112                                ;*
3113                                ;*      STATUS REGISTER 0 & 2 ARE CHECKED WHEN THE PAGE LENGTH
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                                        ;*      ABORT DOES OCCUR TO SEE THAT THE ABORT IS REPORTED AND THAT
                                        ;*      THE VIRTUAL ADDRESS OF THE INSTRUCTION THAT CAUSED THE ABORT
                                        ;*      IS LOCKED UP.
                                        ;*
                                        ;;*****************************************************************



                                        ;;*****************************************************************
                                        ;*TEST 36       PAGE LENGTH FAULTS-UPWARD EXPANSION
                                        ;*
                                        ;*      THIS TEST VARIES THE PAGE LENGTH FIELD (PLF) IN KERNEL PDR 4
                                        ;*      FROM 1 TO 177 AND FOR EACH PLF, THREE VIRTUAL ADDRESSES (VBA'S)
                                        ;*      ARE ACCESSED.  WHEN VBA <12:6> IS LESS THAN OR EQUAL TO PDR <14:8>
                                        ;*      NO ABORT SHOULD OCCUR.  WHEN VBA <12:6> IS GREATER THAN PDR <14:8>,
                                        ;*      A PAGE LENGTH ABORT SHOULD OCCUR AND BE REPORTED BY SR0 & SR2.
                                        ;*      THE PAGE EXPANSION DIRECTION IN THIS TEST IS UPWARD, (THE ED BIT
                                        ;*      (BIT 3) OF PDR 4 = 0).
                                        ;*
                                        ;;*****************************************************************
027166  000004                  TST36:  SCOPE
027170  012737  077406  172306  1$:     MOV     #77406,KIPDR3   ;MAKE SURE PDR3 IS DESCRIBED AS R/W
027176  012737  077406  172312          MOV     #77406,KIPDR5   ;MAKE SURE PDR5 IS DESCRIBED AS R/W
027204  012700  100000                  MOV     #100000,R0      ;LOAD VIRTUAL ADDR. TO SELECT PDR4 INTO R0
027210  012704  000406                  MOV     #406,R4         ;LOAD FIRST PDR VALUE IN R4 (PLF=1, ACF=6)
027214  012737  027406  000250  2$:     MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
027222  010437  172310                  MOV     R4,KIPDR4       ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
027226  012737  027234  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
027234  012706  001100          3$:     MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
027240  011001                          MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA < PLF - NO ABORT)
027242  062700  000100                  ADD     #100,R0         ;FORM NEXT VIRTUAL ADDRESS IN R0
027246  012737  027254  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
027254  012706  001100          4$:     MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
027260  011001                          MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA=PLF - NO ABORT)
027262  062700  000100                  ADD     #100,R0         ;FORM NEXT VIRTUAL ADDR IN R0
027266  020027  117700                  CMP     R0,#117700      ;HAVE ALL PLF'S BEEN TESTED YET?
027272  001470                          BEQ     10$             ;BRANCH IF ALL VBA'S & PLF'S HAVE BEEN USED
027274  012737  027310  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
027302  012737  027316  000250          MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
027310  011001                  5$:     MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA > PLF - ABORT TO 6$)
027312  104033                          ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000776
027314  000424                          BR      8$              ;BRANCH AROUND ABORT CHECKS
027316  012706  001100          6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
027322  013737  177572  001366          MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
027330  013737  177576  001370          MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
027336  012702  040011                  MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
027342  020237  001366                  CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
027346  001401                          BEQ     7$              ;BRANCH IF YES
027350  104034                          ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000757
027352  012703  027310          7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
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027356  020337  001370                  CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
027362  001401                          BEQ     8$              ;BRANCH IF YES
027364  104035                          ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000751
027366  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
027374  062704  000400                  ADD     #400,R4         ;FORM NEXT PLF VALUE FOR KIPDR4
027400  162700  000100                  SUB     #100,R0         ;FORM FIRST VIRT. ADDR FOR THAT PLF VALUE
027404  000703                          BR      2$              ;BRANCH BACK AND ACCESS 3 VBA'S FOR
                                                                ;THE PLF VALUE JUST FORMED
027406  012637  001356          9$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
027412  012637  001360                  MOV     (KSP)+,TRAPPS
027416  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
027424  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
027432  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
027440  104032                          ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;A "NOP" = 000240
027442  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
027446  013746  001356                  MOV     TRAPPC,-(KSP)
027452  000002                          RTI                     ;RETURN FROM UNEXPECTED ABORT

027454  012737  027170  001110  10$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
027462  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
                                                                ;ADDRESS TO M.M. TRAP VECTOR



                                        ;;*****************************************************************
                                        ;*TEST 37       PAGE LENGTH FAULTS-DOWNWARD EXPANSION
                                        ;*
                                        ;*      THIS TEST VARIES THE PAGE LENGTH FIELD (PLF) IN KERNEL PDR4
                                        ;*      FROM 176 TO 0 AND FOR EACH PLF, THREE VIRTUAL ADDRESSES (VBA'S)
                                        ;*      ARE ACCESSED.  WHEN VBA <12:6> IS GREATER THAN OR EQUAL TO PDR <14:8>
                                        ;*      NO PAGE ABORT SHOULD OCCUR.  WHEN VBA <12:6> IS LESS THAN PDR <14:8>
                                        ;*      A PAGE LENGTH ABORT SHOULD OCCUR AND BE REPORTED BY SR0 & SR2.
                                        ;*      THE PAGE EXPANSION DIRECTION IN THIS TEST IS DOWNWARD, (THE ED BIT
                                        ;*      (BIT 3) OF PDR4=1).
                                        ;*
                                        ;;*****************************************************************
027470  000004                  TST37:  SCOPE
027472  012700  117700          1$:     MOV     #117700,R0      ;LOAD VIRTUAL ADDR. TO SELECT PDR4 INTO R0
027476  012704  077016                  MOV     #77016,R4       ;LOAD FIRST PDR VALUE IN R4 (PLF=176,ACF=6)
027502  012737  027674  000250  2$:     MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
027510  010437  172310                  MOV     R4,KIPDR4       ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
027514  012737  027522  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
027522  012706  001100          3$:     MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
027526  011001                          MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA > PLF - NO ABORT)
027530  162700  000100                  SUB     #100,R0         ;FORM NEXT VIRTUAL ADDRESS IN R0
027534  012737  027542  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
027542  012706  001100          4$:     MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
027546  011001                          MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA=PLF - NO ABORT)
027550  162700  000100                  SUB     #100,R0         ;FORM NEXT VIRTUAL ADDR. IN R0
027554  020027  100000                  CMP     R0,#100000      ;HAVE ALL PLF'S BEEN TESTED YET?
027560  001470                          BEQ     10$             ;BRANCH IF ALL VBA'S & PLF'S HAVE BEEN USED
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3226  027562  012737  027576  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
3227  027570  012737  027604  000250          MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
3228  027576  011001                  5$:     MOV     (R0),R1         ;ACCESS VIRTUAL ADDR. (VBA < PLF - ABORT TO 6$)
3229  027600  104033                          ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
3230                                                                  ;FOR TIGHTER SCOPE LOOP
3231                                                                  ;REPLACE ERROR CALL WITH
3232                                                                  ;"BR 5$" = 000776
3233  027602  000424                          BR      8$              ;BRANCH AROUND ABORT CHECKS
3234  027604  012706  001100          6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
3235  027610  013737  177572  001366          MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
3236  027616  013737  177576  001370          MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
3237  027624  012702  040011                  MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
3238  027630  020237  001366                  CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PG. 4, KERNEL?
3239  027634  001401                          BEQ     7$              ;BRANCH IF YES
3240  027636  104034                          ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
3241                                                                  ;FOR TIGHTER SCOPE LOOP
3242                                                                  ;REPLACE ERROR CALL WITH
3243                                                                  ;"BR 5$" = 000757
3244  027640  012703  027576          7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
3245  027644  020337  001370                  CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
3246  027650  001401                          BEQ     8$              ;BRANCH IF YES
3247  027652  104035                          ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
3248                                                                  ;FOR TIGHTER SCOPE LOOP
3249                                                                  ;REPLACE ERROR CALL WITH
3250                                                                  ;"BR 5$" = 000751
3251  027654  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3252  027662  162704  000400                  SUB     #400,R4         ;FORM NEXT PLF VALUE FOR KIPDR4
3253  027666  062700  000100                  ADD     #100,R0         ;FORM FIRST VIRT. ADDR. FOR THAT PLF VALUE
3254  027672  000703                          BR      2$              ;BRANCH BACK AND ACCESS 3 VBA'S FOR
3255                                                                  ;THE PLF VALUE JUST FORMED
3256  027674  012637  001356          9$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
3257  027700  012637  001360                  MOV     (KSP)+,TRAPPS
3258  027704  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
3259  027712  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
3260  027720  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3261  027726  104032                          ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
3262                                                                  ;FOR TIGHTER SCOPE LOOP
3263                                                                  ;REPLACE ERROR CALL WITH
3264                                                                  ;A "NOP" = 000240
3265  027730  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
3266  027734  013746  001356                  MOV     TRAPPC,-(KSP)
3267  027740  000002                          RTI                     ;RETURN FROM UNEXPECTED ABORT
3268
3269  027742  012737  027472  001110  10$:   MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3270  027750  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
3271                                                                  ;ADDRESS TO M.M. TRAP VECTOR
3272
3273
3274                                  ;;*****************************************************************
3275                                  ;*TEST 40        SR2 BIT TEST
3276                                  ;*
3277                                  ;*      THIS TEST CHECKS THE BITS IN MEMORY MANAGEMENT REGISTER 2 BY
3278                                  ;*      CAUSING "READ-ONLY ABORTS" AT VIRTUAL ADDRESSES BETWEEN 100000
3279                                  ;*      TO 111000 (PHYSICAL ADDRESSES 060000-071000).  KIPDR4 IS USED TO EXECUTE
3280                                  ;*      THE FOLLOWING FOUR WORDS OF CODE WHICH ARE MOVED THRU MEMORY:
3281                                  ;*      010727  MOV     PC,(PC)+  ;THIS INSTRUCTION SHOULD CAUSE A R/O ABORT
```



```
3282                                  ;*      000000                  ;ITS VIRTUAL ADDR. SHOULD BE LOCKED UP IN SR2
3283                                  ;*      000137  JMP     @#3$    ;THIS INSTRUCTION IS ALSO MOVED THRU MEMORY
3284                                  ;*      (ADDR. OF 3$)           ;IN CASE A R/O ABORT DOES NOT OCCUR,
3285                                  ;*                              ;IN WHICH CASE SR2 WILL NOT CONTAIN CORRECT ADDR.
3286                                  ;*
3287                                  ;;*****************************************************************
3288  027756  000004                  TST40:  SCOPE
3289  027760  012737  000600  172346  1$:     MOV     #600,KIPAR3     ;BE SURE PAR3 IS MAPPED TO 12-16K
3290  027766  012737  000600  172350          MOV     #600,KIPAR4     ;BE SURE PAR4 IS MAPPED TO 12-16K
3291  027774  012737  077406  172306          MOV     #77406,KIPDR3   ;MAP PAGE 3  128 BLOCKS, R/W
3292  030002  012737  077402  172310          MOV     #77402,KIPDR4   ;MAP PAGE 4  128 BLOCKS, READ-ONLY
3293  030010  012700  060000                  MOV     #60000,R0       ;LOAD R0 WITH VIRTUAL ADDR. WHICH USES PDR3
3294  030014  012701  100000                  MOV     #100000,R1      ;LOAD R1 WITH VIRTUAL ADDR. WHICH USES PDR4
3295  030020  012737  030054  000250          MOV     #3$,MMVEC       ;SET M.M. TRAP VECTOR TO 3$
3296  030026  012737  030034  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3297  030034  012720  010727          2$:     MOV     #010727,(R0)+   ;LOAD "MOV PC,(PC)+" INSTRUCTION AT ADDR.
3298  030040  005020                          CLR     (R0)+           ;       REACHED THRU PDR/PAR 4.
3299  030042  012720  000137                  MOV     #000137,(R0)+   ;LOAD "JMP @#3$" INSTRUCTION AT VIRT. ADDR.
3300  030046  012710  030054                  MOV     #3$,(R0)        ;       IN CASE R/O VIOL. DOES NOT ABORT
3301  030052  010107                          MOV     R1,PC           ;TRANSFER PROGRAM EXECUTION TO "PAGE 4 INSTRUCTIONS"
3302  030054  012706  001100          3$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
3303  030060  013737  177576  001370          MOV     SR2,WASSR2      ;READ CONTENTS OF STATUS REG 2
3304  030066  020137  001370                  CMP     R1,WASSR2       ;WAS ADDR. OF "RELOCATED - R/O ABORT" LOCKED UP?
3305  030072  001401                          BEQ     4$              ;BRANCH IF YES
3306  030074  104036                          ERROR   36              ;SR2 DID NOT LOCK UP VIRTUAL ADDR. OF R/O VIOL.
3307                                                                  ;FOR TIGHTER SCOPE LOOP
3308                                                                  ;REPLACE ERROR CALL WITH
3309                                                                  ;"BR 2$" = 000757
3310  030076  042737  160000  177572  4$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
3311  030104  162700  000004                  SUB     #4,R0           ;RESET R0 TO POINT TO NEXT VIRT. ADDR. TO LOAD
3312  030110  062701  000002                  ADD     #2,R1           ;FORM VIRTUAL ADDR. THAT SHOULD BE LOCKED UP NEXT
3313  030114  020127  111002                  CMP     R1,#111002      ;HAVE ALL VBA'S 100000-111000 BEEN TESTED?
3314  030120  103745                          BLO     2$              ;BRANCH IF NO
3315
3316  030122  012737  027760  001110  5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3317  030130  012737  077406  172310          MOV     #77406,KIPDR4   ;RESTORE PDR4 TO R/W ACCESS
3318  030136  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL M.M.
3319                                                                  ;TRAP HANDLER TO M.M. VECTOR
3320
3321
```

```
                                        ;;*****************************************************************
                                        ;*TEST 41        MORE CHECKS OF SR0 & SR2
                                        ;*
                                        ;*      THIS TEST PERFORMS SOME ADDITIONAL CHECKS OF THE SR0 & SR2 LOGIC.
                                        ;*      FIRST IT CHECKS THAT SR2 "TRACKS" ALONG ACTING AS A VIRTUAL ADDRESS
                                        ;*      PROGRAM COUNTER.  ALSO SR0 & SR2 ARE LOCKED UP BY A PAGE LENGTH
                                        ;*      ABORT, THEN WITHOUT CLEARING SR0'S ERROR BITS, A R/O ABORT IS CAUSED.
                                        ;*      SR0 & SR2 SHOULD NOT BE CHANGED BY THE SECOND ABORT AND THE
                                        ;*      INFORMATION ABOUT THE PAGE LENGTH ABORT SOULD STILL BE LOCKED UP.
                                        ;*      IN ADDITION A "RESET" IS EXECUTED TO VERIFY THAT SR0 IS CLEARED
                                        ;*      AND SR2 IS UNLOCKED BY A RESET.  AFTER MEMORY MANAGEMENT IS TURNED BACK ON,
                                        ;*      SR2 IS CHECKED TO SEE THAT IT IS TRACKING AGAIN.
                                        ;*
                                        ;;*****************************************************************
030144  000004                TST41:  SCOPE
030146  012737  000600  172352  1$:    MOV     #600,KIPAR5     ;MAP KERNEL PAGE 5 TO 12-16K
030154  012737  000406  172310        MOV     #406,KIPDR4     ;SETUP PDR4 FOR PAGE LENGTH ABORT
030162  012737  077402  172312        MOV     #77402,KIPDR5   ;SETUP PDR5 FOR R/O ABORT
030170  012737  030176  001110        MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
030176  013737  177576  001370  2$:    MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
030204  012701  030176                MOV     #2$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
030210  020137  001370                CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 2$?
030214  001401                        BEQ     3$              ;BRANCH IF YES
030216  104041                        ERROR   41              ;SR2 NOT TRACKING CORRECTLY
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 2$" = 000767
030220  012737  030226  001110  3$:    MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
030226  013737  177576  001370  4$:    MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
030234  012701  030226                MOV     #4$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
030240  020137  001370                CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 4$
030244  001401                        BEQ     5$              ;BRANCH IF YES
030246  104041                        ERROR   41              ;SR2 NOT TRACKING CORRECTLY
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 4$" = 000767
030250  012737  030256  001110  5$:    MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
030256  012737  030274  000250  6$:    MOV     #7$,MMVEC       ;PUT ADDRESS OF 7$ IN M.M. TRAP VECTOR
030264  005037  001200                CLR     $TMP1           ;CLEAR ERROR INDICATOR
030270  005237  100500                INC     @#100500        ;CAUSE PAGE LENGTH ABORT - TRAP TO 7$
030274  012706  001100        7$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
030300  013737  177572  001176        MOV     SR0,$TMP0       ;SAVE SR0'S INFORMATION ON PG. LGTH. ABORT
030306  013737  177576  001202        MOV     SR2,$TMP2       ;SAVE SR2'S INFORMATION ON PG. LGTH. ABORT
030314  012737  030326  000250        MOV     #8$,MMVEC       ;PUT ADDRESS OF 8$ IN M.M. TRAP VECTOR
030322  005237  120000                INC     @#120000        ;CAUSE R/O ABORT - TRAP TO 8$
030326  012706  001100        8$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
030332  013737  177572  001366        MOV     SR0,WASSR0      ;READ SR0 FOLLWOING SECOND KT ABORT
030340  013737  177576  001370        MOV     SR2,WASSR2      ;READ SR2 FOLLOWING SECOND KT ABORT
030346  023737  001176  001366        CMP     $TMP0,WASSR0    ;IS SR0 STILL HOLDING INFO ON FIRST ABORT?
030354  001402                        BEQ     9$              ;BRANCH IF YES
030356  005237  001200                INC     $TMP1           ;SET ERROR INDICATOR
030362  023737  001202  001370  9$:    CMP     $TMP2,WASSR2    ;DOES SR2 STILL HOLD PC OF FIRST ABORT?
030370  001402                        BEQ     10$             ;BRANCH IF YES
030372  005237  001200                INC     $TMP1           ;SET ERROR INDICATOR
```



```
030376  005737  001200        10$:    TST     $TMP1           ;WERE SR0 OR SR2 CHANGED BY A SECOND ABORT?
030402  001401                        BEQ     11$             ;BRANCH IF NO
030404  104037                        ERROR   37              ;ONE OF STATUS REGS. CHANGED BY SECOND ABORT
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 6$" = 000726
030406  005037  001200        11$:    CLR     $TMP1           ;CLEAR ERROR INDICATOR
030412  000005                        RESET                   ;EXECUTE A RESET, APPLYING AN "INIT"
030414  013737  177572  001366        MOV     SR0,WASSR0      ;READ SR0
030422  005737  001366                TST     WASSR0          ;WAS SR0 CLEARED BY THE RESET?
030426  001402                        BEQ     12$             ;BRANCH IF YES
030430  005237  001200                INC     $TMP1           ;SR0 NOT CLEARED BY A RESET
030434  013737  177576  001370  12$:    MOV     SR2,WASSR2      ;READ SR2
030442  022737  030434  001370        CMP     #12$,WASSR2     ;WAS SR2 UNLOCKED BY A RESET?
030450  001402                        BEQ     13$             ;BRANCH IF YES
030452  005237  001200                INC     $TMP1           ;SR2 NOT UNLOCKED BY A RESET
030456  005737  001200        13$:    TST     $TMP1           ;WERE SR0 & SR2 BOTH "RESET" BY A RESET?
030462  001401                        BEQ     14$             ;BRANCH IF YES
030464  104040                        ERROR   40              ;SR0 OR SR2 NOT "RESET" BY A RESET
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 6$" = 000676
030466  005237  177572        14$:    INC     SR0             ;TURN MEMORY MANAGEMENT BACK ON
030472  013737  177576  001370  15$:    MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING AGAIN
030500  012701  030472                MOV     #15$,R1         ;PUT EXPECTED VIRTUAL PC IN R1
030504  020137  001370                CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 15$
030510  001401                        BEQ     16$             ;BRANCH IF YES
030512  104041                        ERROR   41              ;SR2 NOT TRACKING CORRECTLY
                                                            ;FOR TIGHTER SCOPE LOOP
                                                            ;REPLACE ERROR CALL WITH
                                                            ;"BR 6$" = 000663
                                        ;*********************************************************************
                                        ;       ALL CODE WITH A ';+ ' DESIGNATION IN THE COMMENT INDICATES THAT IT HAS BEEN
                                        ;       ADDED TO THE ORIGINAL REV OF THIS DIAGNOSTIC.THESE ENHANCEMENTS OR CORRECTIONS
                                        ;        ARE MADE BY THE PRODUCT ENHANCEMENT GROUP (DIAGNOSTICS).
                                        ;*********************************************************************
030514  012737  030574  000250  16$:    MOV     #21$,MMVEC      ;+SET UP KTVEC FOR NON-RESIDENT ABORT
030522  012737  077400  172312        MOV     #77400,KIPDR5   ;+SET UP KIPDR5 FOR NR ABORT
030530  012737  030536  001110        MOV     #17$,$LPERR     ;+SET LOOP ON ERROR POINTER
030536  005037  001200        17$:    CLR     $TMP1           ;+CLEAR ERROR INDICATOR
030542  005237  130000        20$:    INC     @#130000        ;+CAUSE A NON-RESIDENT ABORT
030546  005237  001200                INC     $TMP1           ;+SET ERROR INDICATOR
030552  013737  177572  001366        MOV     SR0,WASSR0      ;+READ SR0
030560  013737  177576  001370        MOV     SR2,WASSR2      ;+READ SR2
030566  104065                        ERROR   65              ;+NON-RESIDENT ABORT DID NOT OCCUR
030570  005037  001200                CLR     $TMP1           ;+CLEAR ERROR INDICATOR
030574  012706  001100        21$:    MOV     #KERSTK,KSP     ;+RESTORE KERNEL STACK POINTER
030600  005737  177572        22$:    TST     SR0             ;+TEST FOR THE NR ABORT IN SR0 (BIT 15)
030604  100413                        BMI     23$             ;+IF SET BRANCH
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3434  030606  005237  001200                  INC     $TMP1           ;+SET ERROR INDICATOR
3435  030612  013737  177572  001366          MOV     SR0,WASSR0      ;+READ SR0
3436  030620  013737  177576  001370          MOV     SR2,WASSR2      ;+READ SR2
3437  030626  104066                          ERROR   66              ;+NR ABORT ERROR DID NOT SET IN SR0 (BIT 15)
3438
3439
3440  030630  005037  001200                  CLR     $TMP1           ;+CLEAR ERROR INDICATOR
3441  030634  023727  177576  030542  23$:    CMP     SR2,#20$        ;+TEST THAT SR2 FROZE TO THE VIRTUAL
3442                                                                  ;+ADDRESS OF THE NR ABORT INSTR.
3443  030642  001413                          BEQ     24$             ;+IF EQUAL BRANCH
3444  030644  005237  001200                  INC     $TMP1           ;+ELSE ERROR
3445  030650  013737  177572  001360          MOV     SR0,WASSR0      ;+READ SR0
3446  030656  013737  177576  001370          MOV     SR2,WASSR2      ;+READ SR2
3447  030664  104067                          ERROR   67              ;+SR2 DID NOT CONTAIN THE CORRECT ADDRESS
3448
3449
3450  030666  005037  001200                  CLR     $TMP1           ;+CLEAR ERROR INDICATOR
3451  030672  012737  030732  000250  24$:    MOV     #25$,MMVEC      ;+SET KTVEC FOR 2ND NR ABORT
3452  030700  005237  130000                  INC     @#130000        ;+CAUSE ABORT
3453  030704  005237  001200                  INC     $TMP1           ;+SET ERROR INDICATOR
3454  030710  013737  177572  001366          MOV     SR0,WASSR0      ;+READ SR0
3455  030716  013737  177576  001370          MOV     SR2,WASSR2      ;+READ SR2
3456  030724  104070                          ERROR   70              ;+2ND NR ABORT DID NOT OCCUR
3457
3458
3459  030726  005037  001200                  CLR     $TMP1           ;+CLEAR ERROR INDICATOR
3460  030732  012706  001100          25$:    MOV     #KERSTK,KSP     ;+RESTORE KERNEL STACK
3461  030736  013737  177576  001370          MOV     SR2,WASSR2      ;+READ SR2
3462  030744  023727  001370  030542          CMP     WASSR2,#20$     ;+TEST SR2 FOR VIRTUAL ADDRESS OF
3463                                                                  ;+OF THE FIRST NON-RESIDENT ABORT
3464  030752  001413                          BEQ     26$             ;+IF EQUAL BRANCH
3465                                                                  ;+ELSE ERROR
3466  030754  005237  001200                  INC     $TMP1           ;+SET ERROR INDICATOR
3467  030760  013737  177572  001366          MOV     SR0,WASSR0      ;+READ SR0
3468  030766  012737  030542  001364          MOV     #20$,CORSR2     ;+READ CORRECT SR2 VALUE
3469  030774  104071                          ERROR   71              ;+SR2 DID NOT CONTAIN THE VALUE OF
3470                                                                  ;+THE FIRST NR ABORT
3471
3472
3473  030776  005037  001200                  CLR     $TMP1           ;+CLEAR ERROR INDICATOR
3474  031002  000005                  26$:    RESET                   ;+ISSUE INIT. CONDITIONS
3475  031004  005737  177572                  TST     SR0             ;+SR0 SHOULD BE CLEAR
3476  031010  001412                          BEQ     27$             ;+IF TRUE BRANCH
3477                                                                  ;+ELSE ERROR
3478  031012  005237  001200                  INC     $TMP1           ;+SET ERROR INDICATOR
3479  031016  013737  177572  001366          MOV     SR0,WASSR0      ;+READ SR0
3480  031024  005037  001362                  CLR     CORSR0          ;+SET CORRECT SR0 VALUE FOR ERROR MSG
3481  031030  104072                          ERROR   72              ;+SR0 DID NOT CLEAR AFTER INIT.
3482
3483
3484
3485  031032  005037  001200                  CLR     $TMP1           ;+CLEAR ERROR INDICATOR
3486  031036  005237  177572          27$:    INC     SR0             ;+TURN MEM MANG ON
3487  031042  013737  177576  001370  30$:    MOV     SR2,WASSR2      ;+READ SR2
3488  031050  023727  001370  031042          CMP     WASSR2,#30$     ;+IS SR2 TRACKING AGAIN
3489  031056  001405                          BEQ     31$             ;+YES, BRANCH
```



```
3490                                                                ;+ELSE ERROR
3491  031060  005237  001200                  INC     $TMP1           ;+SET ERROR INDICATOR
3492  031064  012701  031042                  MOV     #30$,R1         ;+SET CORRECT SR2 VALUE FOE ERROR MSG
3493  031070  104041                          ERROR   41              ;+ERROR,SR2 IS NOT TRACKING CORRECTLY
3494
3495
3496  031072  012737  030146  001110  31$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3497  031100  012737  077406  172310          MOV     #77406,KIPDR4   ;RESET PDR4 TO 128 BLKS, R/W
3498  031106  012737  077406  172312          MOV     #77406,KIPDR5   ;RESET PDR5 TO 128 BLKS, R/W
3499  031114  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
3500                                                                ;MANAGEMENT TRAP ROUTINE TO M.M. VECTOR
3501
3502                                  ;;*****************************************************************
3503                                  ;*TEST 42       USER ABORT PICKS UP KERNEL SPACE VECTOR
3504                                  ;*
3505                                  ;*       THIS TEST CHECKS TO BE SURE THAT WHEN AN ABORT OCCURS WHILE IN
3506                                  ;*       USER MODE, THE TRAP VECTOR INFORMATION FETCHED IS TAKEN FROM
3507                                  ;*       KERNEL SPACE.  USER PAGE 0 IS MAPPED TO 12K (60000-77776) SO
3508                                  ;*       THAT IF USER SPACE IS USED INSTEAD OF KERNEL, THE NEW PC THAT
3509                                  ;*       WAS LOADED AT LOC. 060004 IS USED INSTEAD OF THE NEW PC THAT
3510                                  ;*       SHOULD BE PICKED UP FROM LOC. 000004.  AN ODD ADDRESS ERROR IS USED
3511                                  ;*       TO CAUSE A TRAP TO "4".
3512                                  ;*
3513                                  ;*****************************************************************
3514
3515  031122  000004                  TST42:  SCOPE
3516  031124  004737  036002          1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
3517  031130  012737  031136  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3518  031136  005037  177776          2$:     CLR     PSW             ;GO TO KERNEL MODE
3519  031142  012706  001100                  MOV     #KERSTK,KSP     ;SETUP KERNEL STACK PTR.
3520  031146  012737  000600  177640          MOV     #600,UIPAR0     ;MAP USER PAGE 0 TO 12K
3521  031154  012737  031236  000004          MOV     #4$,@#4         ;LOAD KERNEL VECTOR 4 (LOC.4) WITH 4$
3522  031162  012737  000340  000006          MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
3523  031170  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
3524  031176  012706  000700                  MOV     #USESTK,USP     ;SETUP USER STACK PTR.
3525  031202  012737  031222  000004          MOV     #3$,@#4         ;LOAD USER VECTOR 4 (LOC. 60004) WITH 3$
3526  031210  012737  000340  000006          MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
3527  031216  005737  031223                  TST     3$+1            ;CAUSE ODD ADDR. ERROR TRAP TO "4"
3528                                                                  ;SHOULD PICK UP NEW PC=4$ FROM KERNEL
3529                                                                  ;LOC. 4, NOT PC=3$ FROM USER LOC. 4 (=60004)
3530  031222  013701  177776          3$:     MOV     PSW,R1          ;SAVE PSW FOR ERROR
3531  031226  010602                          MOV     SP,R2           ;SAVE VALUE OF STACK POINTER FOR ERROR
3532  031230  005037  177776                  CLR     PSW             ;BE SURE BACK IN KERNEL MODE
3533  031234  104042                          ERROR   42              ;DID NOT TRAP THRU KERNEL SPACE
3534                                                                  ;FOR TIGHTER SCOPE LOOP
```

```
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000740
031236  005037  177776          4$:   CLR     PSW       ;BE SURE BACK IN KERNEL MODE
031242  012706  001100                MOV     #KERSTK,KSP ;RESTORE KERNEL S.P. IN CASE IT CHANGED
031246  005037  177640                CLR     UIPAR0    ;REMAP USER PAGE 0 TO 0-4K
031252  012737  140000  177776        MOV     #140000,PSW ;GO TO USER MODE
031260  012706  000700                MOV     #USESTK,USP ;RESTORE USER STACK POINTER
031264  005037  177776                CLR     PSW       ;GO BACK TO KERNEL MODE
031270  012737  002332  000004        MOV     #TIMERR,@#4 ;RESTORE ADDR. OF NORMAL CPU TRAP HANDLER TO 4
031276  012737  031124  001110        MOV     #1$,$LPERR ;RESET LOOP ON ERROR POINTER TO 1$
031304  004737  036036                JSR     PC,TON    ;TURN T-BIT TRAPPING BACK ON

                                    ;;*****************************************************************
                                    ;*TEST 43       RTI IN USER MODE DOES NOT CHANGE PSW
                                    ;*
                                    ;*      THIS TEST CHECKS TO SEE THAT WHEN AN RTI IS EXECUTED IN USER
                                    ;*      MODE, THE MODE OR PRIORITY BITS OF THE PSW ARE NOT CHANGED.
                                    ;*
                                    ;;*****************************************************************
031310  000004                TST43:  SCOPE

031312  012737  031324  001110  1$:   MOV     #2$,$LPERR ;SET LOOP ON ERROR POINTER TO 2$
031320  012702  170000                MOV     #170000,R2 ;LOAD "PRESENT & EXPECTED" PSW VALUE INTO R2
031324  010237  177776          2$:   MOV     R2,PSW    ;GO TO USER MODE-PRIORITY 0
031330  012746  000340                MOV     #340,-(SP) ;PUT A NEW PSW (PRIORITY=7) ON STACK
031334  012746  031342                MOV     #3$,-(SP) ;PUT NEW PC ON THE STACK
031340  000002                        RTI               ;DO AN RTI FROM USER MODE
031342  013701  177776          3$:   MOV     PSW,R1    ;READ NEW PSW INTO R1
031346  042701  007437                BIC     #7437,R1  ;MASK OFF COND. CODE, T-BIT, AND UNUSED BITS
031352  005037  177776                CLR     PSW       ;GO BACK TO KERNEL MODE
031356  020201                        CMP     R2,R1     ;DID PSW STAY IN USER, PRIORITY=0?
031360  001401                        BEQ     4$        ;BRANCH IF YES
031362  104060                        ERROR   60        ;PSW CHANGED BY AN RTI FROM USER
                                                        ;FOR A TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR=2$" = 000760
031364  012737  031312  001110  4$:   MOV     #1$,$LPERR ;RESET LOOP ON ERROR POINTER TO 1$
```



```
                                    ;;*****************************************************************
                                    ;*TEST 44       KT ERROR NOT SERVICED IF ODD ADDR. ERROR
                                    ;*
                                    ;*      THIS TEST CHECKS TO SEE THAT IF A CERTAIN VIRTUAL ADDRESS THAT
                                    ;*      WOULD CAUSE A MEMORY MANAGEMENT ERROR CAUSES AN ODD ADDRESS
                                    ;*      ERROR FIRST, THE ODD ADDRESS ERROR IS SERVICED BUT THE MEMORY
                                    ;*      MANAGEMENT ERROR ISN'T.  THIS MEANS THAT SR0 AND SR2
                                    ;*      SHOULD NOT REPORT THE ERROR OR LOCK UP ITS VIRTUAL ADDRESS.
                                    ;*      A READ-ONLY VIOLATION IS USED AS THE POTENTIAL MEMORY MANAGEMENT
                                    ;*      ERROR
                                    ;*
                                    ;;*****************************************************************
031372  000004                TST44:  SCOPE
031374  012737  000600  172350  1$:   MOV     #600,KIPAR4 ;MAP KERNEL PAGE 4 TO 12-16K
031402  012705  077402                MOV     #77402,R5 ;LOAD PDR4 DATA INTO R5
031406  010537  172310                MOV     R5,KIPDR4 ;MAP PAGE 4 READ-ONLY
031412  012737  031442  000004        MOV     #4$,@#4   ;SET CPU TRAP VECTOR TO ADDRESS OF 4$
031420  012737  031440  000250        MOV     #3$,@#250 ;SET M.M. TRAP VECTOR TO ADDRESS OF 3$
031426  012737  031434  001110        MOV     #2$,$LPERR ;SET LOOP ON ERROR POINTER TO 2$
031434  005237  060001          2$:   INC     60001     ;CAUSE ODD ADDR. ERROR & POTENTIAL R/O ABORT
031440  104043                  3$:   ERROR   43        ;TRAPPED THRU M.M. VECTOR BUT SHOULDN'T HAVE
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000776
031442  012706  001100          4$:   MOV     #KERSTK,KSP ;RESTORE STACK POINTER AFTER TRAPPING
031446  005037  001200                CLR     $TMP1     ;CLEAR ERROR INDICATOR
031452  013737  177572  001366        MOV     SR0,WASSR0 ;READ STATUS REG. 0
031460  013737  177576  001370  5$:   MOV     SR2,WASSR2 ;READ STATUS REG. 2
031466  012700  000017                MOV     #17,R0    ;LOAD EXPECTED SR0 CONTENTS INTO R0
031472  020037  001366                CMP     R0,WASSR0 ;SR0  ERROR BITS LEFT CLEAR BY TRAPPING?
031476  001402                        BEQ     6$        ;BRANCH IF YES
031500  005237  001200                INC     $TMP1     ;SR0 ERROR BITS SET WHEN ODD ADDR. SERVICED
031504  012701  031460          6$:   MOV     #5$,R1    ;LOAD EXPECTED SR2 CONTENTS INTO R1
031510  020137  001370                CMP     R1,WASSR2 ;WAS SR2 LEFT UNLOCKED BY TRAPPING?
031514  001402                        BEQ     7$        ;BRANCH IF YES
031516  005237  001200                INC     $TMP1     ;SR2 LOCKED UP BY ODD ADDR. ERROR
031522  005737  001200          7$:   TST     $TMP1     ;WHERE SR0 OR SR2 EFFECTED?
031526  001404                        BEQ     8$        ;BRANCH IF NO
031530  104044                        ERROR   44        ;SR0 OR SR2 CHANGED BY ODD ADDR. ERROR
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;"BR 2$" = 000741
031532  042737  160000  177572        BIC     #160000,SR0 ;CLEAR ERROR BITS THAT MAY BE SET IN SR0
031540  012737  002332  000004  8$:   MOV     #TIMERR,@#4 ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
031546  012737  002400  000250        MOV     #MGMERR,@#250 ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
031554  012737  077406  172310        MOV     #77406,KIPDR4 ;REMAP PAGE 4 TO READ/WRITE
031562  012737  031374  001110        MOV     #1$,$LPERR ;RESET LOOP ON ERROR POINTER TO 1$


                                    ;;*****************************************************************
                                    ;*TEST 45       PC & PSW SAVED FOR KT ERROR DURING SERVICE OF ODD ADDR. ERROR
                                    ;*
                                    ;*      THIS TEST CHECKS THF PC AND PROCESSOR STATUS WORD SAVED WHEN
                                    ;*      A KT ERROR OCCURS DURING THE SECOND PUSH ON THE STACK DURING
                                    ;*      SERVICING OF AN ODD ADDR. ERROR.  DURING A "DOUBLE ERROR"
                                    ;*      SEQUENCE SUCH AS THIS, THE PSW SAVED WILL BE THE ONE PICKED UP
```

```
                                        ;*      FROM VECTOR+2 (LOC. 6 IN THIS CASE) AFTER THE FIRST TRAP,
                                        ;*      NOT THE PSW PRESENT BEFORE THE FIRST TRAP.  SR0 AND SR2
                                        ;*      SHOULD RECORD THE KT ERROR (A R/O VIOLATION BY THE USER STACK PTR.)
                                        ;*
                                        ;*      NOTE THAT THE PREVIOUS MODE BITS <13:12> OF THE PSW
                                        ;*      WILL BE SET IN THE PSW THAT IS SAVED.
                                        ;*
                                        ;;*****************************************************************
031570  000004                  TST45:  SCOPE
031572  004737  036002          1$:     JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
031576  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER PAGE 3 TO 12-16K
031604  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER PAGE 4 TO 12-16K
031612  012737  077402  177606          MOV     #77402,UIPDR3   ;MAP USER PAGE 3 READ-ONLY
031620  012737  077406  177610          MOV     #77406,UIPDR4   ;MAP USER PAGE 4 READ/WRITE
031626  012737  031702  000004          MOV     #4$,@#4         ;LOAD ADDRESS OF 4$ IN CPU (ODD ADDR.) VECTOR
031634  012737  140017  000006          MOV     #140017,@#6     ;LOAD PSW THAT SHOULD BE PUT ON STACK IN VECTOR+2
031642  012737  031702  000250          MOV     #4$,@#250       ;LOAD ADDRESS OF 4$ IN M.M. TRAP VECTOR
031650  012737  000340  000252          MOV     #340,@#252      ;LOAD A KERNEL PSW IN MMVEC+2
031656  012737  031664  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
031664  012737  140000  177776  2$:     MOV     #140000,PSW     ;GO TO USER MODE
031672  012706  100002                  MOV     #100002,USP     ;SET USER STACK PTR. SO SECOND PUSH IS IN PG. 3
031676  005237  100005          3$:     INC     100005          ;CAUSE ODD ADDRESS ERROR THAT WILL CAUSE
                                                                ;R/O ERROR WHEN TRY TO SAVE OLD PC
031702  016601  000002          4$:     MOV     2(KSP),R1       ;PUT PSW SAVED ON KERNEL STACK INTO R1
031706  011603                          MOV     (KSP),R3        ;PUT PC SAVED ON KERNEL STACK INTO R3
031710  013737  177572  001366          MOV     SR0,WASSR0      ;READ THE CONTENTS OF M.M. STATUS REG. 0
031716  013737  177576  001370          MOV     SR2,WASSR2      ;READ THE CONTENTS OF M.M. STATUS REG. 2
031724  042737  160000  177572          BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
031732  005037  177776                  CLR     PSW             ;BE SURE IN KERNEL MODE
031736  012706  001100                  MOV     #KERSTK,KSP     ;RESTORE KERNEL STACK POINTER
031742  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
031750  012706  000700                  MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
031754  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
031760  005037  001176                  CLR     $TMP0           ;CLEAR ERROR INDICATOR
031764  020127  170017                  CMP     R1,#170017      ;WAS THE PSW SAVED THE ONE PICKED UP BY THE
                                                                ;ODD ADDR. TRAP FROM ERRVEC+2?
                                                                ;VALUE 170017 = PSW FROM LOC. 6 WITH
                                                                ;PREVIOUS MODE BITS = USER
031770  001402                          BEQ     5$              ;BRANCH IF YES
031772  005237  001176                  INC     $TMP0           ;WRONG PSW SAVED DURING "DOUBLE ERROR" SEQUENCE
```



```
031776  020327  031702          5$:     CMP     R3,#3$+4        ;WAS THE PC AT THE TIME OF THE ODD ADDR. ERROR
                                                                ;SAVED ON THE STACK?
032002  001402                          BEQ     6$              ;BRANCH IF YES
032004  005237  001176                  INC     $TMP0           ;WRONG PC SAVED DURING TRAP SEQUENCE
032010  023727  001366  020147  6$:     CMP     WASSR0,#20147   ;DID SR0 REPORT - USER, PAGE 3, R/O ABORT?
032016  001402                          BEQ     7$              ;BRANCH IF YES
032020  005237  001176                  INC     $TMP0           ;SR0 DID NOT REPORT R/O ABORT
032024  023727  001370  031676  7$:     CMP     WASSR2,#3$      ;DID SR2 LOCK UP VIRTUAL ADDR. OF LAST
                                                                ;INSTRUCTION SUCCESSFULLY FETCHED?
032032  001402                          BEQ     8$              ;BRANCH IF YES
032034  005237  001176                  INC     $TMP0           ;SR2 DID NOT LOCK UP ADDR. OF ODD ADDR. INST.
032040  005737  001176          8$:     TST     $TMP0           ;ANY "ERRORS" DURING TRAP SEQUENCE?
032044  001401                          BEQ     9$              ;BRANCH IF NO
032046  104045                          ERROR   45              ;THE WRONG PC OR PSW WERE SAVED
                                                                ;OR SR0 OR SR2 DID NOT REPORT R/O
                                                                ;ERROR DURING ODD ADDR. - KT TRAP
                                                                ;SEQUENCE
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 2$" = 000710
032050  012737  002332  000004  9$:     MOV     #TIMERR,@#4     ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
032056  012737  000340  000006          MOV     #340,@#6        ;RELOAD ERRVEC+2 WITH KERNEL PSW
032064  012737  002400  000250          MOV     #MGMERR,@#250   ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
032072  012737  077406  177606          MOV     #77406,UIPDR3   ;REMAP USER PAGE 3 READ/WRITE
032100  012737  031572  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
032106  004737  036036                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
                                        ;;*****************************************************************
                                        ;*
                                        ;*      THIS GROUP OF TESTS WILL TEST ALL THE LOGIC ASSOCIATED WITH
                                        ;*      THE "MOVE FROM PREVIOUS" AND MOVE TO PREVIOUS" INSTRUCTIONS.
                                        ;*
                                        ;;*****************************************************************


                                        ;;*****************************************************************
                                        ;*TEST 46       MOVE FROM PREVIOUS (USER) I-SPACE
                                        ;*
                                        ;*      THIS TEST USES THE 'MFPI' INSTRUCTION TO ENSURE THAT THE
                                        ;*      PREVIOUS MODE IS CLOCKED CORRECTLY
                                        ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED.
                                        ;*
                                        ;*
                                        ;*      IF THE CORRECT MODE (USER) IS NOT ENABLED A NON-RESIDENT ABORT
                                        ;*      WILL OCCUR AND TRAP TO 23$, WHERE THE ERRORS ARE REPORTED.
                                        ;*
                                        ;;*****************************************************************
032112  000004                  TST46:  SCOPE
032114  005037  172340          1$:     CLR     KIPAR0          ;MAP KERNEL PAGE 0 TO 0-4K
032120  012737  000200  172342          MOV     #200,KIPAR1     ;MAP KERNEL PAGE 1 TO 4-8K
032126  012737  000400  172344          MOV     #400,KIPAR2     ;MAP KERNEL PAGE 2 TO 8-12K
032134  012737  000600  172346          MOV     #600,KIPAR3     ;MAP KERNEL PAGE 3 TO 12-16K
032142  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL PAGE 4 TO 12-16K
032150  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNEL PAGE 7 TO THE I/O PAGE
032156  012700  077406                  MOV     #77406,R0       ;MAKE ALL KERNEL I-SPACE PAGES RESIDENT
                                                                ;READ/WRITE, LENGTH 200 BLOCKS
032162  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
```

```
 3726  032166  012701  172300                  MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
 3727  032172  010021                  2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
 3728  032174  077202                          SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL PDRS LOADED
 3729  032176  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
 3730  032202  012701  177600                  MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
 3731  032206  010021                  3$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
 3732  032210  077202                          SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL PDRS LOADED
 3733  032212  012737  000000  177640          MOV     #000,UIPAR0     ;MAP USER I PAGE 0 TO 0-4K
 3734  032220  012737  000200  177642          MOV     #200,UIPAR1     ;MAP USER I PAGE 1 TO 4-8K
 3735  032226  012737  000400  177644          MOV     #400,UIPAR2     ;MAP USER I PAGE 2 TO 8-12K
 3736  032234  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER I PAGE 3 TO 12-16K
 3737  032242  012737  007600  17765E          MOV     #7600,UIPAR7    ;MAP USER I PAGE 7 TO THE I/O PAGE
 3738  032250  012737  032256  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR TO 4$
 3739  032256                          4$:
 3740  032256  012737  077406  172310          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
 3741  032264  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
 3742  032272  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
 3743  032300  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
 3744  032304  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
 3745  032310  012737  032712  000250          MOV     #23$,MMVEC      ;SET M.M. VECTOR TO 23$
 3746  032316  105037  172310                  CLRB    KIPDR4          ;MAKE KERNEL I-SPACE PAGE 4 NON-RESIDENT
 3747                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
 3748                                          ;
 3749  032322  012737  032330  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
 3750  032330  012737  030340  177776  5$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3751  032336  006506                  6$:     MFPI    USP             ;PUT USER STACK POINTER ON KERNEL
 3752                                          ;STACK
 3753  032340  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON STACK AT 6$
```



```
 3754  032344  001407                          BEQ     7$              ;BRANCH IF NOTHING WAS PUSHED
 3755  032346  012600                          MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
 3756  032350  012701  000700                  MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
```

```
 3757  032354  020001                          CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
 3758  032356  001403                          BEQ     8$              ;BRANCH IF YOU DID
 3759  032360  104046                          ERROR   46              ;WRONG THING WAS PUSHED ON STACK
 3760                                                                  ;FOR TIGHTER SCOPE LOOP
 3761                                                                  ;REPLACE ERROR CALL WITH
 3762                                                                  ;"BR 5$" = 000763
 3763  032362  000401                          BR      8$              ;BRANCH TO NEXT TRY
 3764  032364  104050                  7$:     ERROR   50              ;NOTHING PUSHED ON STACK
 3765                                                                  ;FOR TIGHTER SCOPE LOOP
 3766                                                                  ;REPLACE ERROR CALL WITH
 3767                                                                  ;"BR 5$" = 000761
 3768  032366                          8$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
 3769  032366  012737  032400  001110          MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
 3770  032374  012700  036514                  MOV     #36514,R0       ;RELOAD DATA PATTERN IN R0
 3771  032400  012737  030340  177776  9$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3772  032406  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 3773  032412  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 60000
 3774  032414  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
 3775  032416  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 3776  032420  001401                          BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
 3777  032422  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
 3778                                                                  ;FOR TIGHTER SCOPE LOOP
 3779                                                                  ;REPLACE ERROR CALL WITH
 3780                                                                  ;"BR 9$" = 000766
 3781  032424                          10$:    ;THE FOLLOWING WILL TEST DSTM=2 MFPI.
 3782  032424  012737  032432  001110          MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
 3783  032432  012737  030340  177776  11$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3784  032440  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 3785  032444  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 60000
 3786  032446  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
 3787  032450  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 3788  032452  001401                          BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
 3789  032454  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
 3790                                                                  ;FOR TIGHTER SCOPE LOOP
 3791                                                                  ;REPLACE ERROR CALL WITH
 3792                                                                  ;"BR 11$" = 000766
 3793  032456                          12$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
```



```
 3794  032456  012737  032464  001110          MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
 3795  032464  012737  030340  177776  13$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3796  032472  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 60000
 3797  032476  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
 3798  032500  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 3799  032502  001401                          BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
 3800  032504  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
 3801                                                                  ;FOR TIGHTER SCOPE LOOP
 3802                                                                  ;REPLACE ERROR CALL WITH
```

```
                                                        ;"BR 13$" = 000767
032506                                  14$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
032506  012737  032514  001110                MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
032514  012737  030340  177776  15$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032522  012702  100002                        MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
032526  006542                                MFPI    -(R2)           ;READ FROM PHYSICAL 60000
032530  012601                                MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
032532  020001                                CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
032534  001401                                BEQ     16$             ;BRANCH IF CORRECT DATA WAS FETCHED
032536  104046                                ERROR   46              ;WRONG DATA WAS FETCHED
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 15$" = 000766
032540                                  16$:
                                                ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
                                                ;
032540  012737  032546  001110                MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
032546  012737  030340  177776  17$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032554  012737  100000  001202                MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
032562  012702  001204                        MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF $TMP2+2 INTO R2
032566  006552                                MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
032570  012601                                MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
032572  020001                                CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
032574  001401                                BEQ     '8$             ;BRANCH IF CORRECT DATA WAS FETCHED
032576  104046                                ERROR   46              ;WRONG DATA WAS FETCHED
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 17$" = 000763
032600                                  18$:    ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
                                                ;
032600  012737  032606  001110                MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
032606  012737  030340  177776  19$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032614  005002                                CLR     R2              ;MAKE REGISTER 2 A ZERO
032616  006562  100000                        MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
032622  012601                                MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
032624  020001                                CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
032626  001401                                BEQ     20$             ;BRANCH IF CORRECT DATA WAS FETCHED
032630  104046                                ERROR   46              ;WRONG DATA WAS FETCHED
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 19$" = 000766
032632                                  20$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
                                                ;
032632  012737  032640  001110                MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
032640  012737  030340  177776  21$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032646  012737  100000  001202                MOV     #100000,$TMP2   ;LOAD TEST LOC. V.A. INTO $TMP2
032654  012702  001202                        MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
032660  006572  000000                        MFPI    @0(R2)          ;USE $TMP2 TO FETCH VIRTUAL
                                                                        ;ADDRESS OF 60000
032664  012601                                MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
032666  020001                                CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
032670  001401                                BEQ     22$             ;BRANCH IF CORRECT DATA WAS FETCHED
032672  104046                                ERROR   46              ;WRONG DATA WAS FETCHED
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;"BR 21$" = 000762
```



```
032674  012737  002400  000250  22$:    MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
032702  012737  032114  001110           MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
032710  000423                           BR      TST47           ;;BRANCH TO NEXT TEST

032712  012637  001356          23$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
032716  012637  001360                   MOV     (KSP)+,TRAPPS
032722  013737  177572  001366           MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
032730  013737  177576  001370           MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
032736  042737  160000  177572           BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0 AND LEAVE
032744  104051                           ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
                                                                 ;FOR TIGHTER SCOPE LOOP
                                                                 ;REPLACE ERROR CALL WITH
                                                                 ;A "NOP" = 000240
032746  013746  001360                   MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
032752  013746  001356                   MOV     TRAPPC,-(KSP)
032756  000002                           RTI


                                 ;;*************************************************************
                                 ;*TEST 47       MOVE TO PREVIOUS (USER) I-SPACE
                                 ;*
                                 ;*      THIS TEST USES THE 'MTPI' INSTRUCTION TO ENSURE THAT THE
                                 ;*      PREVIOUS MODE IS CLOCKED CORRECTLY
                                 ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED.
                                 ;*
                                 ;*
                                 ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
                                 ;*      WILL OCCUR AND TRAP TO 20$, WHERE THE ERRORS ARE REPORTED.
                                 ;*
                                 ;;*************************************************************
000004                           TST47:  SCOPE
032762  012737  077406  172310   1$:     MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
032770  012737  077406  177610           MOV     #77406,UIPDR4   ;USER I-SPACE PAGE 4 READ/WRITE
032776  012737  000600  172350           MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
033004  012737  000600  177650           MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
033012  012737  033572  000250           MOV     #20$,MMVEC      ;SET M.M. VECTOR TO 20$
                                         ;THE FOLLOWING WILL TEST DSTM=0 MTPI
                                         ;
033020  012737  030340  177776   2$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
033026  012746  007777                   MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
033032  006606                           MTPI    USP             ;LOAD USER STACK POINTER
033034  006506                           MFPI    USP             ;READ USER STACK POINTER
033036  012601                           MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
033040  022701  007777                   CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED
033044  001401                           BEQ     3$              ;BRANCH IF IT WAS
033046  104050                           ERROR   50              ;USER STACK POINTER NOT CHANGED
                                                                 ;FOR TIGHTER SCOPE LOOP
                                                                 ;REPLACE ERROR CALL WITH
                                                                 ;"BR 2$" = 000764
033050  012737  030340  177776   3$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
033056  012746  000700                   MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER S. POINT
033062  006606                           MTPI    USP             ;RESTORE USER STACK POINTER
033064                           4$:     ;THIS WILL TEST DSTM = 1 MTPI.
033064  012737  033102  001110           MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
033072  012702  100000                   MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
```

```
 3915  033076  012700  125252              MOV     #125252,R0      ;LOAD TEST DATA INTO R0
 3916  033102  010046                5$:   MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
 3917  033104  105037  172310              CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
 3918  033110  006612                      MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
 3919  033112  112737  000006  172310      MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
 3920  033120  011201                      MOV     (R2),R1         ;READ FROM ADDRESS 60000
 3921  033122  020001                      CMP     R0,R1           ;SEE IF DATA WAS STORED AT CORRECT PLACE
 3922  033124  001401                      BEQ     6$              ;BRANCH IF STORE WAS CORRECT
 3923  033126  104047                      ERROR   47              ;INCORRECT STORE
 3924                                                              ;FOR TIGHTER SCOPE LOOP
 3925                                                              ;REPLACE ERROR CALL WITH
 3926                                                              ;"BR 5$" = 000765
 3927  033130                      6$:     ;THE FOLLOWING WILL TEST DSTM=2 MTPI.
 3928                                      ;
 3929  033130  012737  033154  001110      MOV     #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
 3930  033136  012737  030340  177776      MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3931  033144  012700  125252              MOV     #125252,R0      ;LOAD TEST DATA INTO R0
 3932  033150  012702  100000              MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 3933  033154  010046                8$:   MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
 3934  033156  105037  172310              CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
 3935  033162  006612                      MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
 3936  033164  112737  000006  172310      MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESISENT
 3937  033172  013701  100000              MOV     @#100000,R1     ;READ FROM ADDRESS 60000
 3938  033176  020001                      CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
 3939  033200  001401                      BEQ     9$              ;BRANCH IF STORE WAS CORRECT
 3940  033202  104047                      ERROR   47              ;INCORRECT STORE
 3941                                                              ;FOR TIGHTER SCOPE LOOP
 3942                                                              ;REPLACE ERROR CALL WITH
 3943                                                              ;"BR 8$" = 000764
 3944  033204                      9$:     ;THIS WILL TEST DSTM = 3 MTPI.
 3945  033204  012737  033224  001110      MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
 3946  033212  012737  030340  177776      MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3947  033220  012700  052525              MOV     #52525,R0       ;LOAD TEST DATA INTO R0
 3948  033224  010046                10$:  MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
 3949  033226  105037  172310              CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
 3950  033232  006637  100000              MTPI    @#100000        ;LOAD TEST DATA INTO PHYSICAL 60000
 3951  033236  112737  000006  172310      MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
 3952  033244  013701  100000              MOV     @#100000,R1     ;READ FROM ADDRESS 60000
 3953  033250  020001                      CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
```



```
 3954  033252  001401                      BEQ     11$             ;BRANCH IF STORE WAS CORRECT
 3955  033254  104047                      ERROR   47              ;INCORRECT STORE
 3956                                                              ;FOR TIGHTER SCOPE LOOP
 3957                                                              ;REPLACE ERROR CALL WITH
 3958                                                              ;"BR 10$" = 000763
 3959  033256                      11$:    ;THIS WILL TEST DSTM = 4 MTPI.
 3960  033256  012737  033276  001110      MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
 3961  033264  012737  030340  177776      MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
 3962  033272  012700  125252              MOV     #125252,R0      ;LOAD TEST DATA INTO R0
 3963  033276  010046                12$:  MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
 3964  033300  012702  100002              MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
```

```
3965  033304  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
3966  033310  006642                  MTPI    -(R2)           ;LOAD TEST DATA INTO PHYSICAL 60000
3967  033312  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3968  033320  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3969  033324  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3970  033326  001401                  BEQ     13$             ;BRANCH IF STORE WAS CORRECT
3971  033330  104047                  ERROR   47              ;INCORRECT STORE
3972                                                          ;FOR TIGHTER SCOPE LOOP
3973                                                          ;REPLACE ERROR CALL WITH
3974                                                          ;"BR 12$" = 000762
3975  033332                  13$:    ;THE FOLLOWING WILL TEST DSTM=5 MTPI.
3976                                  ;
3977  033332  012737  033364  001110  MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
3978  033340  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3979  033346  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
3980  033352  012702  001204          MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF LOC. $TMP2+2 INTO R2
3981  033356  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOC. INTO $TMP2
3982  033364  010046          14$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3983  033366  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
3984  033372  006652                  MTPI    @-(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
3985  033374  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3986  033402  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3987  033406  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3988  033410  001401                  BEQ     15$             ;BRANCH IF STORE WAS CORRECT
3989  033412  104047                  ERROR   47              ;INCORRECT STORE
3990                                                          ;FOR TIGHTER SCOPE LOOP
3991                                                          ;REPLACE ERROR CALL WITH
3992                                                          ;"BR 14$" = 000764
3993  033414                  15$:    ;THIS WILL TEST DSTM = 6 MTPI.
3994                                  ;
3995  033414  012737  033436  001110  MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
3996  033422  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3997  033430  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
3998  033434  005002                  CLR     R2              ;MAKE REGISTER 2 ZERO
3999  033436  010046          16$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
4000  033440  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
4001  033444  006662  100000          MTPI    100000(R2)      ;LOAD TEST DATA INTO PHYSICAL 60000
4002  033450  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
4003  033456  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
4004  033462  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
4005  033464  001401                  BEQ     17$             ;BRANCH IF STORE WAS CORRECT
4006  033466  104047                  ERROR   47              ;INCORRECT STORE
4007                                                          ;FOR TIGHTER SCOPE LOOP
4008                                                          ;REPLACE ERROR CALL WITH
4009                                                          ;"BR 16$" = 000763
4010  033470                  17$:    ;THE FOLLOWING WILL TEST DSTM=7 MTPI.
4011                                  ;
4012  033470  012737  033522  001110  MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
4013  033476  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
4014  033504  012700  125252          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
4015  033510  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOCATION
4016                                                          ;INTO LOCATION $TMP2
4017  033516  012702  001202          MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
4018  033522  010046          18$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
4019  033524  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
4020  033530  006672  000000          MTPI    @0(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
```



```
4021  033534  112737  000006  172310          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
4022  033542  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 60000
4023  033546  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
4024  033550  001401                          BEQ     19$             ;BRANCH IF STORE WAS CORRECT
4025  033552  104047                          ERROR   47              ;INCORRECT STORE
4026                                                                  ;FOR TIGHTER SCOPE LOOP
4027                                                                  ;REPLACE ERROR CALL WITH
4028                                                                  ;"BR 18$" = 000763
4029  033554  012737  032762  001110  19$:    MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
4030  033562  012737  002400  000250          MOV     #MGMERR,MMVEC   ;RESTORE M.M. VECTOR TO NORMAL ROUTINE
4031  033570  000423                          BR      TST50           ;;BRANCH TO NEXT TEST
4032
4033
4034  033572  012637  001356          20$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
4035  033576  012637  001360                  MOV     (KSP)+,TRAPPS
4036  033602  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
4037  033610  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
4038  033616  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
4039  033624  104051                          ERROR   51              ;TRIED TO LOAD A N.R. PAGE 4
4040                                                                  ;FOR TIGHTER SCOPE LOOP
4041                                                                  ;REPLACE ERROR CALL WITH
4042                                                                  ;A "NOP" = 000240
4043  033626  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
4044  033632  013746  001356                  MOV     TRAPPC,-(KSP)
4045  033636  000002                          RTI                     ;RETURN TO TEST
4046
4047
4048
4049                                  ;;*************************************************************
4050                                  ;*TEST 50       MOVE FROM PREVIOUS (KERNEL) I-SPACE TO USER MODE
4051                                  ;*
4052                                  ;*      THIS TEST CHECKS THAT IF THE PREVIOUS MODE IS KERNEL THE
4053                                  ;*      FETCH IS FROM KERNEL SPACE.
4054                                  ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED.
4055                                  ;*
4056                                  ;*
4057                                  ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
4058                                  ;*      WILL OCCUR AND TRAP TO 21$, WHERE THE ERRORS ARE REPORTED.
4059                                  ;*
4060                                  ;;*************************************************************
4061  033640  000004          TST50:  SCOPE
4062  033642  012700  077406  1$:     MOV     #77406,R0       ;MAKE ALL USER I-SPACE PAGES RESIDENT
4063                                                          ;READ/WRITE, LENGTH 200 BLOCKS
4064  033646  012702  000010          MOV     #10,R2          ;SET LOOP COUNTER TO 8
4065  033652  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR IN R1
4066  033656  010021          2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
4067  033660  077202                  SOB     R2,2$           ;LOOP UNTIL 8 USER PDRS LOADED
4068  033662  012737  033670  001110  MOV     #3$,$LPERR      ;SET LOOP ON ERROR TO 3$
4069  033670  012737  140340  177776  3$:     MOV     #140340,PSW     ;GO TO USER MODE FOR THIS TEST
4070  033676  012737  077406  172310          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
4071  033704  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
4072  033712  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
4073  033720  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
4074  033724  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
4075  033730  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
4076                                  ;THE FOLLOWING WILL TEST DSTM=0 MFPI
```

```
 4077                                                   ;
 4078  033734  012737  034336  000250                   MOV     #21$,MMVEC      ;SET M.M. VECTOR TO 21$
 4079  033742  105037  177610                           CLRB    UIPDR4          ;MAKE USER I-SPACE PAGE 4 NON-RESIDENT
 4080  033746  012737  140340  177776                   MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4081  033754  006506                           4$:     MFPI    KSP             ;PUT KERNEL STACK POINTER ON USER STACK
 4082  033756  022706  000700                           CMP     #USESTK,USP     ;WAS SOMETHING PUSHED ON STACK AT 1$
 4083  033762  001407                                   BEQ     5$              ;BRANCH IF NOTHING WAS PUSHED
 4084  033764  012600                                   MOV     (USP)+,R0       ;POP USER STACK INTO R0
 4085  033766  012701  001100                           MOV     #KERSTK,R1      ;EXPECTING 1100 AS KSP
 4086  033772  020001                                   CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
 4087  033774  001403                                   BEQ     6$              ;BRANCH IF YOU DID
 4088  033776  104046                                   ERROR   46              ;WRONG THING WAS PUSHED ON STACK
 4089                                                                           ;FOR TIGHTER SCOPE LOOP
 4090                                                                           ;REPLACE ERROR CALL WITH
 4091                                                                           ;"BR 4$" = 000766
 4092  034000  000401                                   BR      6$              ;BRANCH TO NEXT TRY
 4093  034002  104050                           5$:     ERROR   50              ;NOTHING PUSHED ON STACK
 4094                                                                           ;FOR TIGHTER SCOPE LOOP
 4095                                                                           ;REPLACE ERROR CALL WITH
 4096                                                                           ;"BR 4$" = 000764
 4097  034004                                   6$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
 4098  034004  012737  034012  001110                   MOV     #7$,$LPERR      ;SET LOOP ON ERROR POINTER TO 7$
 4099  034012  012737  140340  177776           7$:     MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4100  034020  012700  036514                           MOV     #36514,R0       ;LOAD DATA EXPECTED INTO R0
 4101  034024  012702  100000                           MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 4102  034030  006512                                   MFPI    (R2)            ;READ FROM PHYSICAL 60000
 4103  034032  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4104  034034  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4105  034036  001401                                   BEQ     8$              ;BRANCH IF CORRECT DATA WAS FETCHED
 4106  034040  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4107                                                                           ;FOR TIGHTER SCOPE LOOP
 4108                                                                           ;REPLACE ERROR CALL WITH
 4109                                                                           ;"BR 7$" = 000764
 4110  034042                                   8$:     ;THE FOLLOWING WILL TEST DSM=2 MFPI.
 4111  034042  012737  034050  001110                   MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
 4112  034050  012737  140340  177776           9$:     MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4113  034056  012702  100000                           MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 4114  034062  006522                                   MFPI    (R2)+           ;READ FROM PHYSICAL 60000
 4115  034064  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4116  034066  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4117  034070  001401                                   BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
 4118  034072  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4119                                                                           ;FOR TIGHTER SCOPE LOOP
 4120                                                                           ;REPLACE ERROR CALL WITH
 4121                                                                           ;"BR 9$" = 000766
 4122  034074                                   10$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
 4123  034074  012737  034102  001110                   MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
 4124  034102  012737  140340  177776           11$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4125  034110  006537  100000                           MFPI    @#100000        ;READ FROM PHYSICAL 60000
 4126  034114  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4127  034116  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4128  034120  001401                                   BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
 4129  034122  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4130                                                                           ;FOR TIGHTER SCOPE LOOP
 4131                                                                           ;REPLACE ERROR CALL WITH
 4132                                                                           ;"BR 11$" = 000767
```



```
 4133  034124                                   12$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
 4134  034124  012737  034132  001110                   MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
 4135  034132  012737  140340  177776           13$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE DERNEL PRESENT USER
 4136  034140  012702  100002                           MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
 4137  034144  006542                                   MFPI    -(R2)           ;READ FROM PHYSICAL 60000
 4138  034146  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4139  034150  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4140  034152  001401                                   BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
 4141  034154  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4142                                                                           ;FOR TIGHTER SCOPE LOOP
 4143                                                                           ;REPLACE ERROR CALL WITH
 4144                                                                           ;"BR 13$" = 000766
 4145  034156                                   14$:    ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
 4146                                                   ;
 4147  034156  012737  034164  001110                   MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
 4148  034164  012737  140340  177776           15$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4149  034172  012737  100000  001202                   MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
 4150  034200  012702  001204                           MOV     #<$TMP2+2>,R2   ;LOAD ADDRESS OF $TMP2+2 INTO R2
 4151  034204  006552                                   MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
 4152  034206  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4153  034210  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4154  034212  001401                                   BEQ     16$             ;BRANCH IF CORRECT DATA FETCHED
 4155  034214  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4156                                                                           ;FOR TIGHTER SCOPE LOOP
 4157                                                                           ;REPLACE ERROR CALL WITH
 4158                                                                           ;"BR 15$" = 000763
 4159  034216                                   16$:    ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
 4160                                                   ;
 4161  034216  012737  034224  001110                   MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$.
 4162  034224  012737  140340  177776           17$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4163  034232  005002                                   CLR     R2              ;MAKE REGISTER 2 A ZERO
 4164  034234  006562  100000                           MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
 4165  034240  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4166  034242  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4167  034244  001401                                   BEQ     18$             ;BRANCH IF CORRECT DATA FETCHED
 4168  034246  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4169                                                                           ;FOR TIGHTER SCOPE LOOP
 4170                                                                           ;REPLACE ERROR CALL WITH
 4171                                                                           ;"BR 17$" = 000766
 4172  034250                                   18$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
 4173                                                   ;
 4174  034250  012737  034256  001110                   MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
 4175  034256  012737  140340  177776           19$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
 4176  034264  012737  100000  001202                   MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR. INTO $TMP2
 4177  034272  012702  001202                           MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
 4178  034276  006572  000000                           MFPI    @0(R2)          ;READ FROM PHYSICAL 60000
 4179  034302  012601                                   MOV     (USP)+,R1       ;POP USER STACK INTO R1
 4180  034304  020001                                   CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
 4181  034306  001401                                   BEQ     20$             ;BRANCH IF CORRECT DATA FETCHED
 4182  034310  104046                                   ERROR   46              ;WRONG DATA WAS FETCHED
 4183                                                                           ;FOR TIGHTER SCOPE LOOP
 4184                                                                           ;REPLACE ERROR CALL WITH
 4185                                                                           ;"BR 19$" = 000762
 4186  034312  012737  002400  000250  20$:     MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
 4187  034320  012737  000340  177776           MOV     #00340,PSW      ;GO BACK TO KERNEL MODE, PREVIOUS KERNEL
 4188  034326  012737  033642  001110           MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
```

```
 4189  034334  000423                          BR      TST51           ;;BRANCH TO NEXT TEXT
 4190
 4191
 4192  034336  012637  001356          21$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
 4193  034342  012637  001360                  MOV     (KSP)+,TRAPPS
 4194  034346  013737  177572  001366          MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
 4195  034354  013737  177576  001370          MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
 4196  034362  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
 4197  034370  104051                          ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
 4198                                                                  ;FOR TIGHTER SCOPE LOOP
 4199                                                                  ;REPLACE ERROR CALL WITH
 4200                                                                  ;A "NOP" = 000240
 4201  034372  013746  001360                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
 4202  034376  013746  001356                  MOV     TRAPPC,-(KSP)
 4203  034402  000002                          RTI                     ;RETURN TO TEST
 4204
 4205                                  ;;*****************************************************************
 4206                                  ;*TEST 51        MOVE FROM/TO D-SPACE = MOVE FROM/TO I-SPACE
 4207                                  ;*
 4208                                  ;*      THIS TEST CHECKS THAT SINCE THERE IS NO DISTINCTION
 4209                                  ;*      BETWEEN INSTRUCTION AND DATA SPACE IN THE 11/34
 4210                                  ;*      MFPD & MTPD SHOULD BE DECODED THE SAME AS MFPI & MTPI.
 4211                                  ;*
 4212                                  ;;*****************************************************************
 4213  034404  000004                  TST51:  SCOPE
 4214  034406  012737  030340  177776  1$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE=USER,CURRENT=KERNEL
 4215  034414  106506                          MFPD    USP             ;MFPD SHOULD ACT LIKE MFPI PUTTING
 4216                                                                  ;USER STACK POINTER ON THE KERNEL STACK
 4217  034416  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON KERNEL STACK?
 4218  034422  001407                          BEQ     2$              ;BRANCH IF NO
 4219  034424  012600                          MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
 4220  034426  012701  000700                  MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
 4221  034432  020001                          CMP     R0,R1           ;DID GET RIGHT POINTER VALUE?
 4222  034434  001403                          BEQ     3$              ;BRANCH IF YES
 4223  034436  104053                          ERROR   53              ;WRONG THING WAS PUSHED ON STACK
 4224                                                                  ;FOR TIGHTER SCOPE LOOP
 4225                                                                  ;REPLACE ERROR CALL WITH
 4226                                                                  ;"BR 1$" = 000763
 4227  034440  000401                          BR      3$              ;BRANCH TO NEXT TRY
 4228  034442  104054                  2$:     ERROR   54              ;NOTHING PUSHED ON STACK
 4229                                                                  ;FOR TIGHTER SCOPE LOOP
 4230                                                                  ;REPLACE ERROR CALL WITH
 4231                                                                  ;"BR 1$" = 000761
 4232  034444  012737  034452  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
 4233  034452  012746  007777          4$:     MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
 4234  034456  106606                          MTPD    USP             ;LOAD THE USER STACK POINTER
 4235  034460  106506                          MFPD    USP             ;READ USER STACK POINTER
 4236  034462  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
 4237  034464  022701  007777                  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED?
 4238  034470  001401                          BEQ     5$              ;BRANCH IF YES
 4239  034472  104054                          ERROR   54              ;USER STACK POINTER NOT CHANGED
 4240                                                                  ;FOR TIGHTER SCOPE LOOP
 4241                                                                  ;REPLACE ERROR CALL WITH
 4242                                                                  ;"BR 4$" = 000767
 4243  034474  012746  000700          5$:     MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER STK. PTR.
 4244  034500  106606                          MTPD    USP             ;RESTORE USER STACK POINTER
```



```
 4245  034502  012737  034406  001110          MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
 4246
 4247                                  ;;*****************************************************************
 4248                                  ;*TEST 52        MOVE FROM PREVIOUS I-SPACE (PREVIOUS=CURRENT=KERNEL)
 4249                                  ;*
 4250                                  ;*      THIS TEST CHECKS THAT IF BOTH PREVIOUS AND CURRENT MODES
 4251                                  ;*      ARE KERNEL, AND THE SOURCE MODE IS 0, THE DESTINATION
 4252                                  ;*      STACK IS NOT DECREMENTED BEFORE ACCESS.
 4253                                  ;*      "MFPI KSP" SHOULD PUSH THE NON-DECREMENTED VALUE
 4254                                  ;*      OF KSP (1100) ONTO THE STACK (AT LOC. 1076).
 4255                                  ;;*****************************************************************
 4256  034510  000004                  TST52:  SCOPE
 4257  034512  005037  177776          1$:     CLR     @#PSW           ;SET PREVIOUS = CURRENT = KERNEL
 4258  034516  012700  001100                  MOV     #STACK,R0       ;SETUP VALUE FOR STACK POINTER
 4259  034522  010006                          MOV     R0,KSP          ;LOAD STACK POINTER
 4260  034524  006506                          MFPI    KSP             ;THE VALUE "STACK" SHOULD BE PUSHED
 4261                                                                  ;BEFORE BEING DECREMENTED
 4262  034526  011601                          MOV     (KSP),R1        ;READ DATA WHICH WAS PUSHED
 4263  034530  020001                          CMP     R0,R1           ;WAS THE ORIGINAL VALUE OF THE
 4264                                                                  ;STACK POINTER PUSHED?
 4265  034532  001401                          BEQ     2$              ;BRANCH IF YES
 4266  034534  104046                          ERROR   46              ;MFPI FETCHED WRONG DATA
 4267                                                                  ;FOR TIGHTER SCOPE LOOP
 4268                                                                  ;REPLACE ERROR CALL WITH
 4269                                                                  ;"BR 1$" = 000766
 4270  034536  005740                  2$:     TST     -(R0)           ;SETUP EXPECTED STACK POINTER VALUE
 4271  034540  020600                          CMP     KSP,R0          ;WAS THE STACK POINTER DECREMENTED?
 4272  034542  001401                          BEQ     3$              ;BRANCH IF YES
 4273  034544  104050                          ERROR   50              ;STACK NOT PUSHED BY THE MFPI
 4274                                                                  ;FOR TIGHTER SCOPE LOOP
 4275                                                                  ;REPLACE ERROR CALL WITH
 4276                                                                  ;"BR 1$" = 000762
 4277  034546  012706  001100          3$:     MOV     #STACK,KSP      ;RESTORE STACK POINTER
 4278
 4279
 4280
 4281
 4282
 4283                                  .SBTTL  ***********************************************************
 4284
```

```
                                        .SBTTL  END OF PASS ROUTINE

                                        ;;*****************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*TYPE "END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY"
                                        ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
                                        ;*IF SW12=1 INHIBIT TRACE TRAP
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO LOOP

034552                                  $EOP:
034552  000004                                  SCOPE
034554  005037  001102                         CLR     $TSTNM          ;;ZERO THE TEST NUMBER
034560  005037  001212                         CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
034564  005237  001234                         INC     $PASS           ;;INCREMENT THE PASS NUMBER
034570  042737  100000  001234                BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
034576  005327                                  DEC     (PC)+           ;;LOOP?
034600  000001                          $EOPCT: .WORD   1
034602  003072                                  BGT     $DOAGN          ;;YES
034604  012737                                  MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
034606  000001                          $ENDCT: .WORD   1
034610  034600                                  $EOPCT
034612  104401  034620                         TYPE    ,65$            ;;TYPE ASCIZ STRING
034616  000407                                  BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <12><15>/END PASS #/
034636                                  64$:
034636  013746  001234                         MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                                                                        ;;TYPE PASS NUMBER
034642  104405                                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
034644  104401  034652                         TYPE    ,67$            ;;TYPE ASCIZ STRING
034650  000421                                  BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /
034714                                  66$:
034714  013746  001112                         MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
                                                                        ;;TOTAL NUMBER OF ERRORS
034720  104405                                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
034722  104401  001223                         TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
034726  005037  001112                         CLR     $ERTTL          ;;CLEAR ERROR TOTAL
034732  013700  000042                  $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
034736  001414                                  BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
034740  005046                                  CLR     -(SP)           ;;INSURE THE "T" BIT IS CLEAR
034742  012746  034750                         MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
034746  000426                                  BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                                                        ;;WITH A CLEARED "T" BIT
034750                                  $CLR.T:
034750  013700  000042                         MOV     @#42,R0         ;;INSURE R0 CONTAINS THE MONITORS
034754  001405                                  BEQ     $DOAGN          ;;RETURN ADDRESS
034756  000005                                  RESET                   ;;CLEAR THE WORLD
034760  004710                          $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
034762  000240                                  NOP                     ;;SAVE ROOM
034764  000240                                  NOP                     ;;FOR
034766  000240                                  NOP                     ;;ACT11
034770                                  $DOAGN:
034770  104400                                  TRAP                    ;;PUSH OLD PSW AND PC ON STACK
034772  042716  000020                         BIC     #20,(SP)        ;;CLEAR THE "T" BIT
034776  032777  010000  144134                BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
```



```
035004  001005                                  BNE     1$              ;;BR IF NO
035006  005137  035032                         COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
035012  100402                                  BMI     1$              ;;BR IF NO
035014  052716  000020                         BIS     #20,(SP)        ;;SET TRACE TRAP
035020  012746  035026                  1$:     MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
035024  000002                          $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
                                                                        ;;AN "RTT" IF "RTT" IS A LEGAL
                                                                        ;;INSTRUCTION
035026                                  $LOOP:
035026  000137                                  JMP     @(PC)+          ;;RETURN
035030  020466                          $RTNAD: .WORD   LOOP
035032  000000                          $TBIT:  .WORD   0               ;;"T" BIT STATE INDICATOR
035034     377     377     000          $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
        035040                                  .EVEN
                                        .SBTTL  SCOPE HANDLER ROUTINE

                                        ;;*****************************************************************
                                        ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                        ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                        ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                        ;*SW14=1        LOOP ON TEST
                                        ;*SW11=1        INHIBIT ITERATIONS
                                        ;*SW09=1        LOOP ON ERROR
                                        ;*SW08=1        LOOP ON TEST IN SWR<7:0>
                                        ;*CALL
                                        ;*      SCOPE           ;;SCOPE=IOT

035040                                  $SCOPE:
035040  104410                                  CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
035042  032777  040000  144070          1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
035050  001114                                  BNE     $OVER           ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
035052  000416                          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
035054  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
035060  012737  035100  000004                 MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
035066  005737  177060                         TST     @#177060        ;;TIME OUT ON XOR?
035072  012637  000004                         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
035076  000453                                  BR      $SVLAD          ;;GO TO THE NEXT TEST
035100  022626                          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
035102  012637  000004                         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
035106  000423                                  BR      7$              ;;LOOP ON THE PRESENT TEST
035110                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
035110  032777  000400  144022                 BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
035116  001404                                  BEQ     2$              ;;BR IF NO
035120  127737  144014  001102                 CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
035126  001465                                  BEQ     $OVER           ;;BR IF YES
035130  105737  001103                  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
035134  001421                                  BEQ     3$              ;;BR IF NO
035136  123737  001115  001103                 CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
035144  101015                                  BHI     3$              ;;BR IF NO
035146  032777  001000  143764                 BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
035154  001404                                  BEQ     4$              ;;BR IF NO
035156  013737  001110  001106          7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
035164  000446                                  BR      $OVER
```

```
 4397  035166  105037  001103          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
 4398  035172  005037  001212                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
 4399  035176  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
 4400  035200  032777  004000  143732  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
 4401  035206  001011                          BNE     1$              ;;BR IF YES
 4402  035210  005737  001234                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
 4403  035214  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
 4404  035216  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
 4405  035222  023737  001212  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
 4406  035230  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
 4407  035232  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
 4408  035240  013737  035316  001212          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
 4409  035246  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
 4410  035252  113737  001102  001232          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
 4411  035260  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 4412  035264  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 4413  035270  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 4414  035274  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 4415  035302  013777  001102  143632  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 4416  035310  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 4417  035314  000002                          RTI                     ;;FIXES PS
 4418  035316  000200                  $MXCNT: 200                     ;;MAX. NUMBER OF ITERATIONS
 4419                                  .SBTTL  ERROR HANDLER ROUTINE
 4420
 4421                                  ;;**************************************************************
 4422                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
 4423                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 4424                                  ;*AND GO TO ERRTYP ON ERROR
 4425                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 4426                                  ;*SW15=1         HALT ON ERROR
 4427                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
 4428                                  ;*SW10=1         BELL ON ERROR
 4429                                  ;*SW09=1         LOOP ON ERROR
 4430                                  ;*CALL
 4431                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 4432
 4433  035320                  $ERROR:
 4434  035320  104410                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
 4435  035322  010037  001162                  MOV     R0,$REG0        ;SAVE THE CONTENTS OF R0
 4436  035326  010137  001164                  MOV     R1,$REG1        ;SAVE THE CONTENTS OF R1
 4437  035332  010237  001166                  MOV     R2,$REG2        ;SAVE THE CONTENTS OF R2
 4438  035336  010337  001170                  MOV     R3,$REG3        ;SAVE THE CONTENTS OF R3
 4439  035342  010437  001172                  MOV     R4,$REG4        ;SAVE THE CONTENTS OF R4
 4440  035346  010537  001174                  MOV     R5,$REG5        ;SAVE THE CONTENTS OF R5
 4441  035352  113737  001102  001352          MOVB    $TSTNM,TESTNO   ;SAVE THE TEST NUMBER
 4442  035360  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
 4443  035364  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
 4444  035366  013777  001102  143546          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
 4445  035374  032777  002000  143536          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
 4446  035402  001402                          BEQ     1$              ;;NO - SKIP
 4447  035404  104401  001216                  TYPE    ,$BELL          ;;RING BELL
 4448  035410  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
 4449  035414  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
 4450  035420  162737  000002  001116          SUB     #2,$ERRPC
 4451  035426  117737  143464  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
 4452  035434  032777  020000  143476          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
```



```
 4453  035442  001004                          BNE     20$             ;;SKIP TYPEOUTS
 4454  035444  004737  035556                  JSR     PC,ERRTYP       ;;GO TO USER ERROR ROUTINE
 4455  035450  104401  001223                  TYPE    .$CRLF
 4456  035454                          20$:
 4457  035454  122737  000001  001246          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
 4458  035462  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
 4459  035464  113737  001114  035476          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
 4460  035472  004737  040110                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
 4461  035476     000                  21$:    .BYTE   0
 4462  035477     000                          .BYTE   0
 4463  035500  000777                  22$:    BR      22$             ;;APT ERROR LOOP
 4464  035502  005777  143432          2$:     TST     @SWR            ;;HALT ON ERROR
 4465  035506  100002                          BPL     3$              ;;SKIP IF CONTINUE
 4466  035510  000000                          HALT                    ;;HALT ON ERROR!
 4467  035512  104410                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
 4468  035514  032777  001000  143416  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
 4469  035522  001402                          BEQ     4$              ;;BR IF NO
 4470  035524  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
 4471  035530  005737  001214          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
 4472  035534  001402                          BEQ     5$              ;;BR IF NONE
 4473  035536  013716  001214                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
 4474  035542                          5$:
 4475  035542  022737  034760  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
 4476  035550  001001                          BNE     6$              ;;BRANCH IF NO
 4477  035552  000000                          HALT                    ;;YES
 4478  035554                          6$:
 4479  035554  000002                          RTI                     ;;RETURN
                                      .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
 4480
 4481
 4482                                  ;;**************************************************************
 4483                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
 4484                                  ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
 4485                                  ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
 4486                                  ;*
 4487                                  ;*NOTES:
 4488                                  ;*1)    THIS ROUTINE PROVIDES AN AUTOMATIC "CARRIAGE RETURN-LINE FEED"
 4489                                  ;*      FOR "EM", "DH", AND "DT".
 4490                                  ;*2)    TWO SPACES ARE TYPED AFTER EACH NUMBER FOR "DT"
 4491                                  ;*3)    FOR $ITEMB=0, JUST THE ERROR PC IS TYPED
 4492                                  ;*4)    THE AVAILABLE FORMATS FOR TYPING DATA ARE:
 4493                                  ;*      DF      FORMAT
 4494                                  ;*      0       TYPE A 6 DIGIT OCTAL NUMBER (FROM 16-BIT BINARY)
 4495                                  ;*      1       TYPE A DECIMAL NUMBER WITHOUT LEADING ZEROS
 4496                                  ;*      2       TYPE A 16 DIGIT BINARY NUMBER
 4497                                  ;*      3       TYPE A 6 DIGIT OCTAL NUMBER (FROM 18-BIT BINARY)
 4498                                  ;*
 4499
 4500  035556                  ERRTYP:
 4501  035556  104401  001223                  TYPE    ,$CRLF          ;"CARRIAGE RETURN" & "LINE FEED"
 4502  035562  010046                          MOV     R0,-(SP)        ;SAVE R0
 4503  035564  005000                          CLR     R0              ;PICKUP THE ITEM INDEX
 4504  035566  153700  001114                  BISB    @#$ITEMB,R0
 4505  035572  001004                          BNE     1$              ;IF ITEM NUMBER IS ZERO, JUST
 4506                                                                  ;TYPE THE PC OF THE ERROR
 4507  035574  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
 4508                                                                  ;;ERROR ADDRESS
```

```
4509  035600  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4510  035602  000471                  BR      13$             ;GET OUT
4511  035604  005300          1$:     DEC     R0              ;ADJUST THE INDEX SO THAT IT WILL
4512  035606  006300                  ASL     R0              ;       WORK FOR THE ERROR TABLE
4513  035610  006300                  ASL     R0
4514  035612  006300                  ASL     R0
4515  035614  062700  001412          ADD     #$ERRTB,R0      ;FORM TABLE POINTER
4516  035620  012037  035630          MOV     (R0)+,2$        ;PICKUP "ERROR MESSAGE" POINTER
4517  035624  001404                  BEQ     3$              ;SKIP TYPEOUT IF NO POINTER
4518  035626  104401                  TYPE                    ;TYPE THE "ERROR MESSAGE"
4519  035630  000000          2$:     .WORD   0               ;"ERROR MESSAGE" POINTER GOES HERE
4520  035632  104401  001223          TYPE    ,$CRLF          ;"CARRIAGE RETURN" & "LINE FEED"
4521  035636  012037  035646  3$:     MOV     (R0)+,4$        ;PICKUP "DATA HEADER" POINTER
4522  035642  001404                  BEQ     5$              ;SKIP TYPEOUT IF 0
4523  035644  104401                  TYPE                    ;TYPE THE "DATA HEADER"
4524  035646  000000          4$:     .WORD   0               ;"DATA HEADER" POINTER GOES HERE
4525  035650  104401  001223          TYPE    ,$CRLF          ;"CARRIAGE RETURN" & "LINE FEED"
4526  035654  010146          5$:     MOV     R1,-(SP)        ;SAVE R1
4527  035656  012001                  MOV     (R0)+,R1        ;PICKUP "DATA TABLE" POINTER
4528  035660  001441                  BEQ     12$             ;BR IF NO DATA TO BE TYPED
4529  035662  012000                  MOV     (R0)+,R0        ;PICKUP "DATA FORMAT" POINTER
4530  035664  105710          6$:     TSTB    (R0)            ;IS IT FORMAT 0?
4531  035666  001003                  BNE     7$              ;BR IF NO
4532
4533                          ;*THIS CODE IS FOR OCTAL (16-BIT) FORMAT (DF=0)
4534  035670  013146                  MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4535  035672  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4536  035674  000425                  BR      11$
4537
4538                          ;*THIS CODE IS FOR DECIMAL FORMAT (DF=1)
4539  035676  121027  000001  7$:     CMPB    (R0),#1         ;IS IT FORMAT 1?
4540  035702  001003                  BNE     8$              ;BRANCH IF NO
4541  035704  013146                  MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4542  035706  104405                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
4543  035710  000417                  BR      11$
4544
4545                          ;*THIS CODE IS FOR BINARY FORMAT (DF=2)
4546  035712  121027  000002  8$:     CMPB    (R0),#2         ;IS IT FORMAT 2?
4547  035716  001003                  BNE     9$              ;BRANCH IF NO
4548  035720  013146                  MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4549  035722  104406                  TYPBN                   ;;GO TYPE--BINARY ASCII
4550  035724  000411                  BR      11$
4551
4552                          ;*THIS CODE IS FOR OCTAL (18-BIT) FORMAT (DF=3)
4553  035726  012146          9$:     MOV     (R1)+,-(SP)     ;PUT ADDRESS OF FIRST LOC. ON STACK
4554  035730  004737  041162          JSR     PC,$DB2O        ;CONVERT TWO LOCS. TO AN ASCII STRING
4555  035734  062716  000005          ADD     #5,(SP)         ;ONLY NEED 6 CHARACTERS NOT 11
4556  035740  012637  035746          MOV     (SP)+,10$       ;PUT ADDRESS OF ASCII CHARS. AT 10$
4557  035744  104401                  TYPE                    ;TYPE OCTAL VALUE OF 18-BIT BINARY NO.
4558  035746  000000          10$:    .WORD   0
4559
4560  035750  005711          11$:    TST     (R1)            ;IS THERE ANOTHER NUMBER?
4561  035752  001404                  BEQ     12$             ;BR IF NO
4562  035754  104401  035776          TYPE    ,14$            ;TYPE TWO(2) SPACES
4563  035760  105720                  TSTB    (R0)+           ;POINT TO NEW "DATA FORMAT"
4564  035762  000740                  BR      6$              ;LOOP
```



```
4565
4566  035764  012601          12$:    MOV     (SP)+,R1        ;RESTORE R1
4567  035766  012600          13$:    MOV     (SP)+,R0        ;RESTORE R0
4568  035770  104401  001223          TYPE    ,$CRLF          ;"CARRIAGE RETURN" & "LINE FEED"
4569  035774  000207                  RTS     PC              ;RETURN
4570  035776  020040  000     14$:    .ASCIZ  / /             ;TWO(2) SPACES
4571          036002                  .EVEN
4572
```

```
                                        .SBTTL  *****   SUBROUTINES USED BY THIS PROGRAM   *****

                                        .SBTTL  TURN OFF T-BIT AND SAVE CURRENT PSW
                                        ;;**************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS USED TO TURN OFF THE TRACE TRAP BIT IN THE PSW
                                        ;*      IF IT IS ON.  THE PROCESSOR STATUS IS SAVED IN "TBITPS" SO THAT
                                        ;*      THE PSW CAN BE RESTORED TO ITS PREVIOUS CONDITION WHEN CONDITIONS
                                        ;*      WARRANT T-BIT TRAPPING.
                                        ;*
                                        ;*
                                        ;;**************************************************************
036002  033727  177776  000020  TOFF:   BIT     PSW,#TBIT       ;IS THE T-BIT SET IN THE PSW?
036010  001411                          BEQ     1$              ;EXIT IF NO
036012  013746  177776                  MOV     PSW,-(SP)       ;PUSH PRESENT PSW ON THE STACK
036016  011637  001372                  MOV     (SP),TBITPS     ;ALSO SAVE IT IN "TBITPS" FOR
                                                                ;RESTORING LATER
036022  042716  000020                  BIC     #TBIT,(SP)      ;CLEAR THE T-BIT (BIT 4) IN THE PSW
036026  012746  036034                  MOV     #1$,-(SP)       ;PUSH PC OF "RTS" ON STACK
036032  000006                          RTT                     ;"RETURN" TO 1$ WITH T-BIT OFF
036034  000207              1$:         RTS     PC              ;RETURN TO PROGRAM

                                        .SBTTL  TURN ON T-BIT AND RESTORE PREVIOUS PSW
                                        ;;**************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS USED TO RESTORE THE PROCESSOR STATUS TO ITS
                                        ;*      PREVIOUS CONDITION BY RESTORING THE "T-BIT PSW" SAVED BY THE
                                        ;*      "TOFF" SUBROUTINE IN THE "TBITPS" LOCATION.
                                        ;*
                                        ;;**************************************************************
036036  033727  001372  000020  TON:    BIT     TBITPS,#TBIT    ;WAS T-BIT ON IN THE PREVIOUS PSW?
036044  001410                          BEQ     1$              ;EXIT IF NO
036046  013746  001372                  MOV     TBITPS,-(SP)    ;PUSH PREVIOUS PSW ON THE STACK
036052  012737  000340  001372          MOV     #340,TBITPS     ;RESET THE "TBITPS" LOCATION
036060  012746  036066                  MOV     #1$,-(SP)       ;PUSH PC OF "RTS" ON STACK
036064  000006                          RTT                     ;"RETURN" TO 1$ WITH T-BIT RESTORED
036066  000207              1$:         RTS     PC              ;RETURN TO PROGRAM

                                        .SBTTL  SET ALL WRITEABLE BITS IN ALL PAR/PDR'S
                                        ;;**************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS USED BY THE PAR/PDR DUAL ADDRESSING TEST
                                        ;*      TO SET ALL WRITEABLE BITS IN ALL KERNEL AND USE PAR'S AND
                                        ;*      PDR'S TO A 1.  THE "INITIAL STATE" OF HAVING ALL BITS=1 IS
                                        ;*      USED TO SEE THAT ONLY ONE REGISTER IS CLEARED IN RESPONSE TO
                                        ;*      A SINGLE PAR OR PDR ADDRESS.
                                        ;*
                                        ;;**************************************************************

036070  012702  000010          SETREG: MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
036074  012701  172300                  MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
036100  012721  177777          1$:     MOV     #-1,(R1)+       ;SET BITS IN KERNEL PDR TO 1
036104  077203                          SOB     R2,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S LOADED
036106  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
036112  012701  172340                  MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
036116  012721  177777          2$:     MOV     #-1,(R1)+       ;SET BITS IN A KERNEL PAR TO 1
036122  077203                          SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PAR'S LOADED
```



```
036124  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
036130  012701  177600                  MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
036134  012721  177777          3$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PDR TO 1
036140  077203                          SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL USER PDR'S LOADED
036142  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
036146  012701  177640                  MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
036152  012721  177777          4$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PAR TO 1
036156  077203                          SOB     R2,4$           ;LOOP TO 4$ UNTIL ALL USER PAR'S LOADED
036160  000207                          RTS     PC              ;RETURN TO TEST

                                        .SBTTL  READ & COMPARE KERNEL & USER PAR/PDR'S
                                        ;;**************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS USED BY PAR/PDR DUAL ADDRESSING TEST TO
                                        ;*      READ ALL THE PAR'S AND PDR'S TO SEE THAT ONLY ONE REGISTER
                                        ;*      WAS CLEARED IN RESPONSE TO A SINGLE PAR OR PDR ADDRESS.
                                        ;*      ANY FAILURES FOUND BY THE PAR/PDR DUAL ADDRESSING TEST WILL
                                        ;*      BE REPORTED BY THIS SUBROUTINE.
                                        ;*
                                        ;;**************************************************************
036162                                  CMPREG:
036162  012701  172300                  MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R1
036166  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
036172  012705  077416                  MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
036176  011102              1$:         MOV     (R1),R2         ;READ A KERNEL PDR INTO R2
036200  020205                          CMP     R2,R5           ;ARE ALL WRITEABLE BITS SET AL EXPECTED?
036202  001403                          BEQ     2$              ;BRANCH IF YES
036204  020100                          CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
036206  001401                          BEQ     2$              ;BRANCH IF YES
036210  104016                          ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;AN "RTS PC" = 000207
036212  062701  000002          2$:     ADD     #2,R1           ;FORM NEXT KERNEL PDR ADDRESS
036216  077411                          SOB     R4,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S CHECKED
036220  012701  172340                  MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R1
036224  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
036230  012705  007777                  MOV     #7777,R5        ;PUT EXPECTED PAR CONTENTS IN R5
036234  011102              3$:         MOV     (R1),R2         ;READ A KERNEL PAR INTO R2
036236  020205                          CMP     R2,R5           ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
036240  001403                          BEQ     4$              ;BRANCH IF YES
036242  020100                          CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
036244  001401                          BEQ     4$              ;BRANCH IF YES
036246  104016                          ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFENENT PAR/PDR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;AN "RTS PC" = 000207
036250  062701  000002          4$:     ADD     #2,R1           ;FORM NEXT KERNEL PAR ADDRESS
036254  077411                          SOB     R4,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
036256  012701  177600                  MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST USER PDR IN R1
036262  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
036266  012705  077416                  MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
036272  011102              5$:         MOV     (R1),R2         ;READ A USER PDR INTO R2
036274  020205                          CMP     R2,R5           ;ARE ALL WRITABLE BITS SET AS EXPECTED?
036276  001403                          BEQ     6$              ;BRANCH IF YES
036300  020100                          CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
```

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 4685  036302  001401                        BEQ     6$              ;BRANCH IF YES
 4686  036304  104016                        ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
 4687                                                                ;FOR TIGHTER SCOPE LOOP
 4688                                                                ;REPLACE ERROR CALL WITH
 4689                                                                ;AN "RTS PC" = 000207
 4690  036306  062701  000002          6$:     ADD     #2,R1          ;FORM NEXT USER PDR ADDRESS
 4691  036312  077411                        SOB     R4,5$           ;LOOP TO 5$ UNTIL ALL USER PDR'S CHECKED
 4692  036314  012701  177640                MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST USER PAR IN R1
 4693  036320  012704  000010                MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
 4694  036324  012705  007777                MOV     #7777,R5        ;PUT EXPECTED PAR CONTENTS IN R5
 4695  036330  011102                  7$:     MOV     (R1),R2         ;READ A USER PAR INTO R2
 4696  036332  020205                        CMP     R2,R5           ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
 4697  036334  001403                        BEQ     8$              ;BRANCH IF YES
 4698  036336  020000                        CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
 4699  036340  001401                        BEQ     8$              ;BRANCH IF YES
 4700  036342  104016                        ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
 4701                                                                ;FOR TIGHTER SCOPE LOOP
 4702                                                                ;REPLACE ERROR CALL WITH
 4703                                                                ;AN "RTS PC" = 000207
 4704  036344  062701  000002          8$:     ADD     #2,R1          ;FORM NEXT USER PAR ADDRESS
 4705  036350  077411                        SOB     R4,7$           ;LOOP TO 7$ UNTIL ALL USER PAR'S CHECKED
 4706  036352  000207                        RTS     PC              ;RETURN TO TEST
 4707
 4708                                  .SBTTL  CONVERT VIRTUAL ADDRESS TO PHYSICAL ADDRESS
 4709                                  ;;*****************************************************************
 4710                                  ;*
 4711                                  ;*      THIS SUBROUTINE IS USED TO FORM AN 18-BIT PHYSICAL ADDRESS
 4712                                  ;*      (PBA) FROM THE 16-BIT VIRTUAL ADDRESS (VBA) AND THE APPROPRIATE
 4713                                  ;*      PAGE ADDRESS REGISTER (PAR).  THE SAME METHOD USED BY THE MEMORY
 4714                                  ;*      MANAGEMENT LOGIC IS USED.  VBA <15:13> SELECTS WHICH PAR/PDR
 4715                                  ;*      IS TO BE USED, VBA <5:0>+PBA <5:0>, AND VBA <12:6> IS ADDED
 4716                                  ;*      TO PAR <11:00> TO GIVE PBA <17:6>.  BITS <17:16> OF THE
 4717                                  ;*      PHYSICAL ADDRESS ARE LEFT IN LOC. "PBAHI" AND BITS <15:00>
 4718                                  ;*      ARE LEFT IN LOC. "PBALO".  THE PSW'S "CURRENT MODE" BITS
 4719                                  ;*      ARE USED TO SELECT THE KERNEL OR USER PAR/PDR'S.  THE ROUTINE
 4720                                  ;*      IS ENTERED WITH LOC. "VIRT1" CONTAINING THE 16-BIT VIRTUAL
 4721                                  ;*      ADDRESS.
 4722                                  ;*
 4723                                  ;;*****************************************************************
 4724
 4725  036354  012702  172340          FORMPA: MOV     #KIPAR0,R2      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R2
 4726  036360  032737  140000  177776          BIT     #140000,PSW     ;IN USER MODE?
 4727  036366  001402                        BEQ     1$              ;BRANCH IF NO
 4728  036370  012702  177640                MOV     #UIPAR0,R2      ;LOAD ADDRESS OF FIRST USER PAR IN R2
 4729  036374  013700  001402          1$:     MOV     VIRT1,R0        ;LOAD VIRTUAL ADDR. (VBA) INTO R0
 4730  036400  072027  177764                ASH     #-14,R0         ;GET BITS <15:13> DOWN TO BITS <3:1>
 4731  036404  042700  177761                BIC     #177761,R0      ;MASK OF ALL BITS BUT BITS <3:1>
 4732  036410  060002                        ADD     R0,R2           ;ADD OFFSET TO BASE PAR ADDRESS
 4733  036412  011200                        MOV     (R2),R0         ;GET BITS <11:00> FROM APPROPRIATE PAR
 4734  036414  010002                        MOV     R0,R2           ;COPY PAR BITS <11:00> INTO R2
 4735  036416  013737  001402  001406        MOV     VIRT1,PBALO     ;PUT VIRTUAL ADDR. IN LOC. "PBALO"
 4736  036424  042737  160000  001400        BIC     #160000,PBALO   ;CLEAR OFF BITS <15:13> OF ORIGINAL VBA
 4737  036432  072227  177766                ASH     #-12,R2         ;GET PAR <11:00> DOWN TO BITS <1:0> OF R2
 4738  036436  042702  177774                BIC     #177774,R2      ;CLEAR OFF ALL BITS BUT BITS <1:0>
 4739  036442  072027  000006                ASH     #6,R0           ;SHIFT PAR<9:0> TO <15:6> OF R0
 4740  036446  042700  000077                BIC     #77,R0          ;CLEAR BITS <5:0> OF R0
```



```
 4741  036452  060037  001406                ADD     R0,PBALO        ;IN EFFECT, ADD VBA<12:0> TO PAR<9:0>
 4742                                                                ;(PAR<9:0> IN BITS <15:6> OF R0)
 4743  036456  005502                        ADC     R2              ;ADD ANY CARRY TO R2
 4744  036460  010237  001410                MOV     R2,PBAHI        ;PUT BITS <17:16> OF PHYSICAL ADDR. IN PBAHI
 4745  036464  000207                        RTS     PC              ;RETURN TO PROGRAM
 4746
```

```
                                        .SBTTL  TTY INPUT ROUTINE
                                        ;;*****************************************************************
                                        .ENABL  LSB
                                        ;;*****************************************************************
                                        ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                                        ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
                                        ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                                        ;*WHEN OPERATING IN TTY FLAG MODE.
036466  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
036474  001114                        BNE     15$             ;;BRANCH IF NO
036476  105777  142442                TSTB    @$TKS           ;;CHAR THERE?
036502  100111                        BPL     15$             ;;IF NO, DON'T WAIT AROUND
036504  117746  142436                MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
036510  042716  177600                BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
036514  022726  000007                CMP     #7,(SP)+        ;;IS IT A CONTROL G?
036520  001102                        BNE     15$             ;;NO, RETURN TO USER
036522  123727  001134  000001        CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
036530  001476                        BEQ     15$             ;;BRANCH IF YES

036532  104401  037430                TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
036536  104401  037435        $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
036542  013746  000176                MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
036546  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
036550  104401  037446                TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
036554  005046                19$:    CLR     -(SP)           ;;CLEAR COUNTER
036556  005046                        CLR     -(SP)           ;;THE NEW SWR
036560  105777  142360        7$:     TSTB    @$TKS           ;;CHAR THERE?
036564  100375                        BPL     7$              ;;IF NOT TRY AGAIN

036566  117746  142354                MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
036572  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII

036576  021627  000003                CMP     (SP),#3         ;;IS IT A CONTROL-C?
036602  001015                        BNE     9$              ;;BRANCH IF NOT
036604  104401  037416                TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
036610  062706  000006                ADD     #6,SP           ;;CLEAN UP STACK
036614  123727  001135  000001        CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
036622  001003                        BNE     8$              ;;BRANCH IF NO
036624  012777  000100  142312        MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
036632  000137  037460        8$:     JMP     CNTRLC          ;;CONTROL-C RESTART

036636  021627  000025        9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
036642  001005                        BNE     10$             ;;BRANCH IF NOT
036644  104401  037423                TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
036650  062706  000006        20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
036654  000737                        BR      19$             ;;LET'S TRY IT AGAIN

036656  021627  000015        10$:    CMP     (SP),#15        ;;IS IT A <CR>?
036662  001022                        BNE     16$             ;;BRANCH IF NO
036664  005766  000004                TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
036670  001403                        BEQ     11$             ;;BRANCH IF YES
036672  016677  000002  142240        MOV     2(SP),@SWR      ;;SAVE NEW SWR
```



```
036700  062706  000006        11$:    ADD     #6,SP           ;;CLEAR UP STACK
036704  104401  001223        14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
036710  123727  001135  000001        CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
036716  001003                        BNE     15$             ;;BRANCH IF NOT
036720  012777  000100  142216        MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
036726  000002                15$:    RTI                     ;;RETURN
036730  004737  040022        16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
036734  021627  000060                CMP     (SP),#60        ;;CHAR < 0?
036740  002420                        BLT     18$             ;;BRANCH IF YES
036742  021627  000067                CMP     (SP),#67        ;;CHAR > 7?
036746  003015                        BGT     18$             ;;BRANCH IF YES
036750  042726  000060                BIC     #60,(SP)+       ;;STRIP-OFF ASCII
036754  005766  000002                TST     2(SP)           ;;IS THIS THE FIRST CHAR
036760  001433                        BEQ     17$             ;;BRANCH IF YES
036762  006316                        ASL     (SP)            ;;NO, SHIFT PRESENT
036764  006316                        ASL     (SP)            ;;    CHAR OVER TO MAKE
036766  006316                        ASL     (SP)            ;;    ROOM FOR NEW ONE.
036770  005266  000002        17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
036774  056616  177776                BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
037000  000667                        BR      7$              ;;GET THE NEXT ONE
037002  104401  001222        18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
037006  000720                        BR      20$             ;;SIMULATE CONTROL-U
                                        .DSABL  LSB

                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*CALL:
                                        ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                        ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                        ;

037010  011646        $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
037012  016666  000004  000002        MOV     4(SP),2(SP)     ;;SAVE THE PS
037020  105777  142120        1$:     TSTB    @$TKS           ;;WAIT FOR
037024  100375                        BPL     1$              ;;A CHARACTER
037026  117766  142114  000004        MOVB    @$TKB,4(SP)     ;;READ THE TTY
037034  042766  177600  000004        BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
037042  026627  000004  000023        CMP     4(SP),#23       ;;IS IT A CONTROL-S?
037050  001013                        BNE     3$              ;;BRANCH IF NO
037052  105777  142066        2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
037056  100375                        BPL     2$              ;;LOOP UNTIL ITS THERE
037060  117746  142062                MOVB    @$TKB,-(SP)     ;;GET CHARACTER
037064  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
037070  022627  000021                CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
037074  001366                        BNE     2$              ;;IF NOT DISCARD IT
037076  000750                        BR      1$              ;;YES, RESUME
037100  026627  000004  000140  3$:    CMP     4(SP),#140      ;;IS IT UPPER CASE?
037106  002407                        BLT     4$              ;;BRANCH IF YES
037110  026627  000004  000175        CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
037116  003003                        BGT     4$              ;;BRANCH IF YES
037120  042766  000040  000004        BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
037126  000002                4$:     RTI                     ;;GO BACK TO USER
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
```

```
                                        ;*CALL:
                                        ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                        ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                        ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

037130  010346                 $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
037132  005046                         CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
037134  012703  037406         1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
037140  022703  037416         2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
037144  101467                         BLOS    4$              ;;BR IF YES
037146  104411                         RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
037150  112613                         MOVB    (SP)+,(R3)      ;;GET CHARACTER
037152  122713  000003               CMPB    #3,(R3)         ;;IS IT A CONTROL-C?
037156  001006                         BNE     10$             ;;BRANCH IF NO
037160  104401  037416               TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (^C)
037164  005726                         TST     (SP)+           ;;CLEAN RUBOUT KEY OFF OF THE STACK
037166  012603                         MOV     (SP)+,R3        ;;RESTORE R3
037170  000137  037460               JMP     CNTRLC          ;;GOTO CONTROL-C RESTART
037174  122713  000177         10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
037200  001022                         BNE     5$              ;;BR IF NO
037202  005716                         TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
037204  001007                         BNE     6$              ;;BR IF NO
037206  112737  000134  037404       MOVB    #'\,9$          ;;TYPE A BACK SLASH
037214  104401  037404               TYPE    ,9$
037220  012716  177777               MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
037224  005303                 6$:     DEC     R3              ;;BACKUP BY ONE
037226  020327  037406               CMP     R3,#$TTYIN      ;;STACK EMPTY?
037232  103434                         BLO     4$              ;;BR IF YES
037234  111337  037404               MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
037240  104401  037404               TYPE    ,9$             ;;GO TYPE
037244  000735                         BR      2$              ;;GO READ ANOTHER CHAR.
037246  005716                 5$:     TST     (SP)            ;;RUBOUT KEY SET?
037250  001406                         BEQ     7$              ;;BR IF NO
037252  112737  000134  037404       MOVB    #'\,9$          ;;TYPE A BACK SLASH
037260  104401  037404               TYPE    ,9$
037264  005016                         CLR     (SP)            ;;CLEAR THE RUBOUT KEY
037266  122713  000025         7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
037272  001003                         BNE     8$              ;;BR IF NO
037274  104401  037423               TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
037300  000715                         BR      1$              ;;GO START OVER
037302  122713  000022         8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "^R"?
037306  001011                         BNE     3$              ;;BRANCH IF NO
037310  105013                         CLRB    (R3)            ;;CLEAR THE CHARACTER
037312  104401  001223               TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
037316  104401  037406               TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
037322  000706                         BR      2$              ;;GO PICKUP ANOTHER CHACTER
037324  104401  001222         4$:     TYPE    ,$QUES          ;;TYPE A '?'
037330  000701                         BR      1$              ;;CLEAR THE BUFFER AND LOOP
037332  111337  037404         3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
037336  104401  037404               TYPE    ,9$
037342  122723  000015               CMPB    #15,(R3)+       ;;CHECK FOR RETURN
037346  001274                         BNE     2$              ;;LOOP IF NOT RETURN
037350  105063  177777               CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
037354  104401  001224               TYPE    ,$LF            ;;TYPE A LINE FEED
037360  005726                         TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
037362  012603                         MOV     (SP)+,R3        ;;RESTORE R3
```



```
037364  011646                         MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
037366  016666  000004  000002         MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
037374  012766  037406  000004         MOV     #$TTYIN,4(SP)
037402  000002                         RTI                     ;;RETURN
037404     000                 9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
037405     000                         .BYTE   0               ;;TERMINATOR
037406  000010                 $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
037416  041536  005015     000 $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL "C"
037423     136  006525  000012 $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
037430  043536  005015     000 $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
037435     015  051412  051127 $MSWR:  .ASCIZ  <15><12>/SWR = /
037442  036440  000040
037446  020040  042516  020127 $MNEW:  .ASCIZ  /  NEW = /
037454  020075     000
                037460                  .EVEN

                                        .SBTTL  CONTROL-C SERVICING ROUTINE

                                        ;*      THE FOLLOWING CODE IS EXECUTED WHEN A CONTROL-C HAS
                                        ;*      BEEN TYPED INSTEAD OF A NEW SWITCH REG. VALUE.
```

```
                                        ;*      (IN OTHER WORDS, AFTER A CONTROL-G WAS TYPED).
                                        ;*      A NEW SWITCH REG. VALUE WILL BE ASKED FOR,
                                        ;*      THE TEST NUMBER AND PASS NUMBER WILL BE TYPED,
                                        ;*      AND THEN THE PROGRAM WILL GO TO "END-OF-PASS" AND CONTINUE

037460  013737  001234  001210  CNTRLC: MOV     $PASS,$TMP5     ;GET THE VALUE OF "$PASS"
037466  005237  001210                  INC     $TMP5           ;FORM CURRENT PASS NO.
037472  104401  037537                  TYPE    ,CMSG           ;TYPE THE TEST STOPS MESSAGE
037476  113737  001102  037532          MOVB    $TSTNM,1$       ;SAVE THE TEST NUMBER
037504  013746  037532                  MOV     1$,-(SP)        ;;SAVE 1$ FOR TYPEOUT
037510  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
037512  104401  037534                  TYPE    ,2$             ;TYPE 2 SPACES
037516  013746  001210                  MOV     $TMP5,-(SP)     ;;SAVE $TMP5 FOR TYPEOUT
037522  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
037524  104407                          GTSWR                   ;ASK FOR NEW SWR VALUE
037526  000137  034554                  JMP     $EOP+2          ;CONTINUE AT $EOP+2
037532  000000          1$:     .WORD   0               ;BUFFER FOR TEST NUMBER
037534  020040  000     2$:     .ASCIZ  / /             ;TWO SPACES AND THE STOP MESSAGE
037537  112     046525  044520  CMSG:   .ASCII  /JUMPING TO END-OF-PASS/<15><12>
037544  043516  052040  020117
037552  047105  026504  043117
037560  050055  051501  006523
037566  012
037567  124     051505  047124          .ASCIZ  'TESTNO  PASSNO/<15><12>
037574  020117  050040  051501
037602  047123  006517  000012
                                        .EVEN
                                .SBTTL  TYPE ROUTINE

                                        ;;*****************************************************************
                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                        ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                        ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                        ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                        ;*
                                        ;*CALL:
                                        ;*1) USING A TRAP INSTRUCTION
                                        ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*      TYPE
                                        ;*      MESADR
                                        ;*

037610  105737  001157  $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
037614  100002                  BPL     1$              ;;BR IF YES
037616  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
037620  000430                  BR      3$              ;;LEAVE
037622  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
037624  017600  000002          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
037630  122737  000001  001246  CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
037636  001011                  BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
037640  132737  000100  001247  BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
037646  001405                  BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
037650  010037  037660          MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
037654  004737  040100          JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
```



```
037660  000000          61$:    .WORD   0               ;;MESSAGE ADDRESS
037662  132737  000040  001247  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
037670  001003                  BNE     60$             ;;YES,SKIP TYPE OUT
037672  112046          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
037674  001005                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
037676  005726                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
037700  012600          60$:    MOV     (SP)+,R0        ;;RESTORE R0
037702  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
037706  000002                  RTI                     ;;RETURN
037710  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
037714  001430                  BEQ     8$
037716  122716  000200          CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
037722  001006                  BNE     5$
037724  005726                  TST     (SP)+           ;;POP  <CR><LF> EQUIV
037726  104401                  TYPE                    ;;TYPE A CR AND LF
037730  001223                  $CRLF
037732  105037  040066          CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
037736  000755                  BR      2$              ;;GET NEXT CHARACTER
037740  004737  040022          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
037744  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
037750  001350                  BNE     2$              ;;IF NO GO GET NEXT CHAR.
037752  013746  001154          MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                        ;;AND THE NULL CHAR.
037756  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
037762  002770                  BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
037764  004737  040022          JSR     PC,$TYPEC       ;;GO TYPE A NULL
037770  105337  040066          DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
037774  000770                  BR      7$              ;;LOOP

                                ;HORIZONTAL TAB PROCESSOR

037776  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
040002  004737  040022          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
040006  132737  000007  040066          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
040014  001372                  BNE     9$              ;;TAB STOP
040016  005726                  TST     (SP)+           ;;POP SPACE OFF STACK
040020  000724                  BR      2$              ;;GET NEXT CHARACTER
040022  105777  141122  $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
040026  100375                  BPL     $TYPEC
040030  116677  000002  141114  MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
040036  122766  000015  000002  CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
040044  001003                  BNE     1$              ;;BRANCH IF NO
040046  105037  040066          CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
040052  000406                  BR      $TYPEX          ;;EXIT
040054  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
040062  001402                  BEQ     $TYPEX          ;;BRANCH IF YES
040064  105227                  INCB    (PC)+           ;;COUNT THE CHARACTER
040066  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
040070  000207          $TYPEX: RTS     PC

                                .SBTTL  APT COMMUNICATIONS ROUTINE

                                        ;;*****************************************************************
040072  112737  000001  040336  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
040100  112737  000001  040334  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
040106  000403                  BR      $ATYC
```

```
5047  040110  112737  000001  040336  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
5048  040116                          $ATYC:
5049  040116  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
5050  040120  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
5051  040122  105737  040334                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
5052  040126  001450                          BEQ     5$              ;;IF NOT:  BR
5053  040130  122737  000001  001246          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
5054  040136  001031                          BNE     3$              ;;IF NOT:  BR
5055  040140  132737  000100  001247          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
5056  040146  001425                          BEQ     3$              ;;IF NOT:  BR
5057  040150  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
5058  040154  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
5059  040162  005737  001226          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
5060  040166  001375                          BNE     1$              ;;IF NOT:  WAIT
5061  040170  010037  001242                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
5062  040174  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
5063  040176  001376                          BNE     2$
5064  040200  163700  001242                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
5065  040204  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
5066  040206  010037  001244                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
5067  040212  012737  000004  001226          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
5068  040220  000413                          BR      5$
5069  040222  017637  000004  040246  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
5070  040230  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
5071  040236  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
5072  040242  004737  037610                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
5073  040246  000000                  4$:     .WORD   0
5074  040250                          5$:
5075  040250  105737  040336          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
5076  040254  001416                          BEQ     12$             ;;IF NOT:  BR
5077  040256  005737  001246                  TST     $ENV            ;;RUNNING UNDER APT?
5078  040262  001413                          BEQ     12$             ;;IF NOT:  BR
5079  040264  005737  001226          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
5080  040270  001375                          BNE     11$             ;;IF NOT:  WAIT
5081  040272  017637  000004  001230          MOV     @4(SP),$FATAL   ;;GET ERROR #
5082  040300  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
5083  040306  005237  001226                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
5084  040312  105037  040336          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
5085  040316  105037  040335                  CLRB    $LFLG           ;;CLEAR LOG FLAG
5086  040322  105037  040334                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
5087  040326  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
5088  040330  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
5089  040332  000207                          RTS     PC              ;;RETURN
5090  040334     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
5091  040335     000          $LFLG:  .BYTE   0               ;;LOG FLAG
5092  040336     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
5093                                  .EVEN
5094                          APTSIZE=200
5095                          APTENV=001
5096                          APTSPOOL=100
5097                          APTCSUP=040
5098                          .SBTTL  BINARY TO ASCII AND TYPE ROUTINE
5099
5100                          ;;**************************************************************
5101                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
5102                          ;*BINARY-ASCII NUMBER AND TYPE IT.
```



```
5103                          ;*CALL:
5104                          ;*      MOV     NUMBER,-(SP)    ;;NUMBER TO BE TYPED
5105                          ;*      TYPBN                   ;;TYPE IT
5106
5107  040340  010146          $TYPBN: MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
5108  040342  016601  000006          MOV     6(SP),R1        ;;GET THE INPUT NUMBER
5109  040346  000261                  SEC                     ;;SET "C" SO CAN KEEP TRACK OF THE NUMBER OF BITS
5110  040350  112737  000060  040412  1$:     MOVB    #'0,$BIN        ;;SET CHARACTER TO AN ASCII "0".
5111  040356  006101                  ROL     R1              ;;GET THIS BIT
5112  040360  001406                  BEQ     2$              ;;DONE?
5113  040362  105537  040412          ADCB    $BIN            ;;NO--SET THE CHARACTER EQUAL TO THIS BIT
5114  040366  104401  040412          TYPE    ,$BIN           ;;GO TYPE THIS BIT
5115  040372  000241                  CLC                     ;;CLEAR "C" SO CAN KEEP TRACK OF BITS
5116  040374  000765                  BR      1$              ;;GO DO THE NEXT BIT
5117  040376  012601          2$:     MOV     (SP)+,R1        ;;POP THE STACK INTO R1
5118  040400  016666  000002  000004  MOV     2(SP),4(SP)     ;;ADJUST THE STACK
5119  040406  012616                  MOV     (SP)+,(SP)
5120  040410  000002                  RTI                     ;;RETURN TO USER
5121  040412     000       000        $BIN:   .BYTE   0,0     ;;STORAGE FOR ASCII CHAR. AND TERMINATOR
5122                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
5123
5124                          ;;**************************************************************
5125                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
5126                          ;*OCTAL (ASCII) NUMBER AND TYPE IT.
5127                          ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
5128                          ;*CALL:
5129                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5130                          ;*      TYPOS                   ;;CALL FOR TYPEOUT
5131                          ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
5132                          ;*      .BYTE   M               ;;M=1 OR 0
5133                          ;*                                      ;;1=TYPE LEADING ZEROS
5134                          ;*                                      ;;0=SUPPRESS LEADING ZEROS
5135                          ;*
5136                          ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
5137                          ;*$TYPOS OR $TYPOC
5138                          ;*CALL:
5139                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5140                          ;*      TYPON                   ;;CALL FOR TYPEOUT
5141                          ;*
5142                          ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
5143                          ;*CALL:
5144                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
5145                          ;*      TYPOC                   ;;CALL FOR TYPEOUT
5146
5147  040414  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
5148  040420  116637  000001  040637          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
5149  040426  112637  040641                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
5150  040432  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
5151  040436  000406                          BR      $TYPON
5152  040440  112737  000001  040637  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
5153  040446  112737  000006  040641          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
5154  040454  112737  000005  040636  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
5155  040462  010346                          MOV     R3,-(SP)        ;;SAVE R3
5156  040464  010446                          MOV     R4,-(SP)        ;;SAVE R4
5157  040466  010546                          MOV     R5,-(SP)        ;;SAVE R5
5158  040470  113704  040641                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
```

```
                        NEG     R4
                        ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
                        MOVB    R4,$OMODE       ;;SAVE IT FOR USE
                        MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
                        MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
                        CLR     R3              ;;CLEAR :HE OUTPUT WORD
                1$:     ROL     R5              ;;ROTATE MSB INTO "C"
                        BR      3$              ;;GO DO MSB
                2$:     ROL     R5              ;;FORM THIS DIGIT
                        ROL     R5
                        ROL     R5
                        MOV     R5,R3
                3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
                        DECB    $OMODE          ;;TYPE THIS DIGIT?
                        BPL     7$              ;;BR IF NO
                        BIC     #177770,R3      ;;GET RID OF JUNK
                        BNE     4$              ;;TEST FOR 0
                        TST     R4              ;;SUPPRESS THIS 0?
                        BEQ     5$              ;;BR IF YES
                4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
                        BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
                5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
                        MOVB    R3,8$           ;;SAVE FOR TYPING
                        TYPE    ,8$             ;;GO TYPE THIS DIGIT
                7$:     DECB    $OCNT           ;;COUNT BY 1
                        BGT     2$              ;;BR IF MORE TO DO
                        BLT     6$              ;;BR IF DONE
                        INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
                        BR      2$              ;;GO DO THE LAST DIGIT
                6$:     MOV     (SP)+,R5        ;;RESTORE R5
                        MOV     (SP)+,R4        ;;RESTORE R4
                        MOV     (SP)+,R3        ;;RESTORE R3
                        MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
                        MOV     (SP)+,(SP)
                        RTI                     ;;RETURN
                8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
                $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
                $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
                $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

                ;;*****************************************************************
                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                ;*REPLACED WITH SPACES.
                ;*CALL:
                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                ;*      TYPDS                   ;;GO TO THE ROUTINE

                $TYPDS:
                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
```



```
                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
                        MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
                        MOV     20(SP),R5       ;;GET THE INPUT NUMBER
                        BPL     1$              ;;BR IF INPUT IS POS.
                        NEG     R5              ;;MAKE THE BINARY NUMBER POS.
                        MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
                1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
                        MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
                        MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
                2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
                        MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
                3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
                        BLT     4$              ;;BR IF DONE
                        INC     R2              ;;INCREASE THE BCD DIGIT BY 1
                        BR      3$
                4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
                        TST     R2              ;;CHECK IF BCD DIGIT=0
                        BNE     5$              ;;FALL THROUGH IF 0
                        TSTB    (SP)            ;;STILL DOING LEADING 0'S?
                        BMI     7$              ;;BR IF YES
                5$:     ASLB    (SP)            ;;MSD?
                        BCC     6$              ;;BR IF NO
                        MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
                6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
                7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
                        MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
                        TST     (R0)+           ;;JUST INCREMENTING
                        CMP     R0,#10          ;;CHECK THE TABLE INDEX
                        BLT     2$              ;;GO DO THE NEXT DIGIT
                        BGT     8$              ;;GO TO EXIT
                        MOV     R5,R2           ;;GET THE LSD
                        BR      6$              ;;GO CHANGE TO ASCII
                8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
                        BPL     9$              ;;BR IF NO
                        MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
                9$:     CLRB    (R3)            ;;SET THE TERMINATOR
                        MOV     (SP)+,R5        ;;POP STACK INTO R5
                        MOV     (SP)+,R3        ;;POP STACK INTO R3
                        MOV     (SP)+,R2        ;;POP STACK INTO R2
                        MOV     (SP)+,R1        ;;POP STACK INTO R1
                        MOV     (SP)+,R0        ;;POP STACK INTO R0
                        TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
                        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
                        MOV     (SP)+,(SP)
                        RTI                     ;;RETURN TO USER
                $DTBL:  10000.
                        1000.
                        100.
                        10.
                $DBLK:  .BLKW   4
                .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES

                ;;*****************************************************************
                ;*SAVE R0-R5
                ;*CALL:
```

```
                                ;*      SAVREG
                                ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
                                ;*
                                ;*TOP---(+16)
                                ;* +2---(+18)
                                ;* +4---R5
                                ;* +6---R4
                                ;* +8---R3
                                ;*+10---R2
                                ;*+12---R1
                                ;*+14---R0
                                
041066                          $SAVREG:
041066  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
041070  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
041072  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
041074  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
041076  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
041100  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
041102  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
041106  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
041112  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
041116  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
041122  000002                          RTI
                                
                                ;*RESTORE R0-R5
                                ;*CALL:
                                ;*      RESREG
041124                          $RESREG:
041124  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
041130  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
041134  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
041140  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
041144  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
041146  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
041150  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
041152  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
041154  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
041156  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
041160  000002                          RTI
                                .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
                                
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
                                ;*UNSIGNED OCTAL ASCIZ NUMBER.
                                ;*CALL
                                ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
                                ;*      JSR     PC,@#$DB2O      ;;CALL THE ROUTINE
                                ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
                                
                                
041162  104413                  $DB2O:  SAVREG                  ;;SAVE ALL REGISTERS
041164  016601  000002                  MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
041170  012705  041301                  MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
041174  012704  000014                  MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
041200  012703  177770                  MOV     #^C7,R3         ;;MASK
```



```
                                
                                        MOV     (R1)+,R0        ;;LOWER WORD
                                        MOV     (R1)+,R1        ;;HIGH WORD
                                        CLR     R2              ;;TERMINATOR
                                1$:     MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
                                        MOV     R0,R2           ;;GET THIS DIGIT
                                        DEC     R4              ;;COUNT THIS CHARACTER
                                        BGT     3$              ;;BR IF NOT THE LAST DIGIT
                                        BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
                                        INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
041226  010566  000002                  MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
041232  104414                          RESREG                  ;;RESTORE ALL REGISTERS
041234  000207                          RTS     PC              ;;RETURN TO USER
041236  006203                  2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
041240  006001                  3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
041242  006000                          ROR     R0              ;;      THE NEXT OCTAL DIGIT
041244  006001                          ROR     R1
041246  006000                          ROR     R0
041250  006001                          ROR     R1
041252  006000                          ROR     R0
041254  040302                          BIC     R3,R2           ;;MASK OUT ALL JUNK
041256  062702  000060                  ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
041262  000753                          BR      1$              ;;GO PUT IT IN THE DATA TABLE
041264  000016                  $OCTVL: .BLKB   14.             ;;RESERVE DATA TABLE
```

```
                                .SBTTL  TRAP DECODER

                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                ;*GO TO THAT ROUTINE.

041302  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
041304  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
041310  005740                          TST     -(R0)           ;;BACKUP BY 2
041312  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
041314  006300                          ASL     R0              ;;POSITION FOR INDEXING
041316  016000  041336                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
041322  000200                          RTS     R0              ;;GO TO ROUTINE


                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

041324  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
041326  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
041334  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;       ROUTINE
                                ;       -------
041336  041324                  $TRPAD: .WORD   $TRAP2
041340  037610                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
041342  040440                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
041344  040514                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
041346  040454                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
041350  040642                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
041352  040340                          $TYPBN  ;;CALL=TYPBN    TRAP+6(104406)  TYPE BINARY (ASCII) NUMBER

041354  036536                          $GTSWR  ;;CALL=GTSWR    TRAP+7(104407)  GET SOFT-SWR SETTING

041356  036466                          $CKSWR  ;;CALL=CKSWR    TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
041360  037010                          $RDCHR  ;;CALL=RDCHR    TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
041362  037130                          $RDLIN  ;;CALL=RDLIN    TRAP+12(104412) TTY TYPEIN STRING ROUTINE
041364  041066                          $SAVREG ,;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
041366  041124                          $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;*****************************************************************
                                ;POWER DOWN ROUTINE
041370  012737  041546  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
041376  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
041404  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
041406  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
041410  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
041412  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
041414  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
```



```
041416  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
041420  017746  137514                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
041424  010637  041552                  MOV     SP,$SAVR6       ;;SAVE SP
041430  012737  041442  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
041436  000000                          HALT
041440  000776                          BR      .-2             ;;HANG UP

                                ;;*****************************************************************
                                ;POWER UP ROUTINE
041442  012737  041546  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
041450  013706  041552                  MOV     $SAVR6,SP       ;;GET SP
041454  005037  041552                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
041460  005237  041552          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
041464  001375                          BNE     1$              ;;OF  WORD
041466  012677  137446                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
041472  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
041474  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
041476  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
041500  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
041502  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
041504  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
041506  012737  041370  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
041514  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
041522  104401                          TYPE                    ;;REPORT THE POWER FAILURE
041524  041554          $PWRMG: .WORD   PWRMSG          ;;POWER FAIL MESSAGE POINTER
041526  012716                          MOV     (PC)+,(SP)      ;;RESTART AT START
041530  020000          $PWRAD: .WORD   START           ;;RESTART ADDRESS
041532  042766  000020  000002          BIC     #20,2(SP)       ;;CLEAR "T" BIT
041540  005037  035032                  CLR     $TBIT           ;;CLEAR THE "T" BIT FLAG
041544  000002                          RTI
041546  000000          $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
041550  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
041552  000000          $SAVR6: 0                       ;;PUT THE SP HERE
041554  006412  050040  053517  PWRMSG: .ASCIZ  <12><15>? POWER FAILURE - RESTARTING ?<12><15>
041562  051105  043040  044501
041570  052514  042522  026440
041576  051040  051505  040524
041604  052122  047111  020107
041612  006412     000
        041616                  .EVEN
```

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                                        .SBTTL  ERROR MESSAGES, DATA HEADERS-TABLES & FORMATS
041616  047125  054105  042520  EM1:    .ASCIZ  /UNEXPECTED CPU TRAP TO LOC. 004/
041624  052103  042105  041440
041632  052520  052040  040522
041640  020120  047524  046040
041646  041517  020056  030060
041654  000064
041656  047125  054105  042520  EM2:    .ASCIZ  /UNEXPECTED MEM. MGMT. TRAP TO LOC. 250/
041664  052103  042105  046440
041672  046505  020056  043515
041700  052115  020056  051124
041706  050101  052040  020117
041714  047514  027103  031040
041722  030065    000
041725    120   044522  051117  EM3:    .ASCIZ  /PRIORITY BITS SET WRONG IN PSW/
041732  052111  020131  044502
041740  051524  051440  052105
041746  053440  047522  043516
041754  044440  020116  051520
041762  000127
041764  047515  042504  041040  EM4:    .ASCIZ  /MODE BITS SET WRONG IN PSW/
041772  052111  020123  042523
042000  020124  051127  047117
042006  020107  047111  050040
042014  053523    000
042017    104   040525  020114  EM5:    .ASCIZ  /DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW/
042024  042101  051104  051505
042032  044523  043516  041040
042040  052105  042527  047105
042046  044040  023111  047514
042054  041040  052131  051505
042062  047440  020106  051520
042070  000127
042072  042513  047122  046105  EM6:    .ASCIZ  /KERNEL R6 CHANGED BY WRITING USER R6/
042100  051040  020066  044103
042106  047101  042507  020104
042114  054502  053440  044522
042122  044524  043516  052440
042130  042523  020122  033122
042136    000
042137    101   046440  046505  EM7:    .ASCIZ  /A MEMORY MGMT. REG. TIMED OUT/
042144  051117  020131  043515
042152  052115  020056  042522
042160  027107  052040  046511
042166  042105  047440  052125
042174    000
042175    123   046525  040515  EM10:   .ASCIZ  /SUMMARY OF MEM. MGMT. REG. TIMEOUTS/
042202  054522  047440  020106
042210  042515  027115  046440
042216  046507  027124  051040
042224  043505  020056  044524
042232  042515  052517  051524
042240    000
042241    115   046505  020056  EM11:   .ASCIZ  /MEM. MGMT. REG. WOULD NOT CLEAR/
042246  043515  052115  020056
042254  042522  027107  053440
```



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042262  052517  042114  047040
042270  052117  041440  042514
042276  051101    000
042301    115   046505  020056  EM12:   .ASCIZ  /MEM. MGMT. REG. BITS NOT SET CORRECTLY/
042306  043515  052115  020056
042314  042522  027107  041040
042322  052111  020123  047516
042330  020124  042523  020124
042336  047503  051122  041505
042344  046124  000131
042350  051123  020060  043105  EM13:   .ASCIZ  /SR0 EFFECTED BY WRITE TO PSW/
042356  042506  052103  042105
042364  041040  020131  051127
042372  052111  020105  047524
042400  050040  053523    000
042405    123   030522  042040  EM14:   .ASCIZ  /SR1 DID NOT READ ALL ZEROS/
042412  042111  047040  052117
042420  051040  040505  020104
042426  046101  020114  042532
042434  047522  000123
042440  052504  046101  040440  EM15:   .ASCIZ  /DUAL ADDRESSING BETWEEN BYTES OF PAR OR PDR/
042446  042104  042522  051523
042454  047111  020107  042502
042462  053524  042505  020116
042470  054502  042524  020123
042476  043117  050040  051101
042504  047440  020122  042120
042512  000122
042514  052504  046101  040440  EM16:   .ASCIZ  /DUAL ADDRESSING BETWEEN PAR-PDR'S/
042522  042104  042522  051523
042530  047111  020107  042502
042536  053524  042505  020116
042544  040520  026522  042120
042552  023122  000123
042556  044120  051531  020056  EM17:   .ASCIZ  /PHYS. ADDR. FORMED WRONG IN MAINT. MODE/
042564  042101  051104  020056
042572  047506  046522  042105
042600  053440  047522  043516
042606  044440  020116  040515
042614  047111  027124  046440
042622  042117  000105
042626  044120  051531  020056  EM20:   .ASCIZ  /PHYS. ADDR. FORMED WRONG IN RELOCATE MODE/
042634  042101  051104  020056
042642  047506  046522  042105
042650  053440  047522  043516
042656  044440  020116  042522
042664  047514  040503  042524
042672  046440  042117  000105
042700  026527  044502  020124  EM21:   .ASCIZ  /W-BIT DID NOT GET SET IN PDR/
042706  044504  020104  047516
042714  020124  042507  020124
042722  042523  020124  047111
042730  050040  051104    000
042735    127   041055  052111  EM22:   .ASCIZ  /W-BIT SET IN MORE THAN ONE PDR/
042742  051440  052105  044440
042750  020116  047515  042522
```

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5560  042756  052040  040510  020116
5561  042764  047117  020105  042120
5562  042772  000122
5563  042774  026527  044502  020124  EM23:   .ASCIZ  /W-BIT NOT CLEARED BY WRITING TO PDR/
5564  043002  047516  020124  046103
5565  043010  040505  042522  020104
5566  043016  054502  053440  044522
5567  043024  044524  043516  052040
5568  043032  020117  042120  000122
5569  043040  051127  052111  047111  EM24:   .ASCIZ  /WRITING SR0 SET W-BIT IN KIPDR7/
5570  043046  020107  051123  020060
5571  043054  042523  020124  026527
5572  043062  044502  020124  047111
5573  043070  045040  050111  051104
5574  043076  000067
5575  043100  026527  044502  020124  EM25:   .ASCIZ  /W-BIT GOT SET DURING ODD ADDR. ABORT/
5576  043106  047507  020124  042523
5577  043114  020124  052504  044522
5578  043122  043516  047440  042104
5579  043130  040440  042104  027122
5580  043136  040440  047502  052122
5581  043144     000
5582  043145     115  046505  051117  EM26:   .ASCIZ  /MEMORY MGMT. ACCESS ABORT DID NOT OCCUR/
5583  043152  020131  043515  052115
5584  043160  020056  041501  042503
5585  043166  051523  040440  047502
5586  043174  052122  042040  042111
5587  043202  047040  052117  047440
5588  043210  041503  051125     000
5589  043215     101  041503  051505  EM27:   .ASCIZ  /ACCESS ERROR DID NOT ABORT INSTRUCTION/
5590  043222  020123  051105  047522
5591  043230  020122  044504  020104
5592  043236  047516  020124  041101
5593  043244  051117  020124  047111
5594  043252  052123  052522  052103
5595  043260  047511  000116
5596  043264  051123  020060  044504  EM30:   .ASCIZ  /SR0 DID NOT REPORT ACCESS ERROR CORRECTLY/
5597  043272  020104  047516  020124
5598  043300  042522  047520  052122
5599  043306  040440  041503  051505
5600  043314  020123  051105  047522
5601  043322  020122  047503  051122
5602  043330  041505  046124  000131
5603  043336  044504  020104  047516  EM31:   .ASCIZ  /DID NOT LOCKUP CORRECT VIRTUAL ADDR./
5604  043344  020124  047514  045503
5605  043352  050125  041440  051117
5606  043360  042522  052103  053040
5607  043366  051111  052524  046101
5608  043374  040440  042104  027122
5609  043402     000
5610  043403     120  043501  020105  EM32:   .ASCIZ  /PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE/
5611  043410  043514  044124  020052
5612  043416  041101  051117  020124
5613  043424  041517  052503  051122
5614  043432  042105  053440  042510
5615  043440  020116  052111  051440
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5616  043446  047510  046125  047104
5617  043454  052047  044040  053101
5618  043462  000105
5619  043464  040520  042507  046040  EM33:   .ASCIZ  /PAGE LGTH. ABORT DID NOT OCCUR WHEN IT SHOULD HAVE/
5620  043472  052107  027110  040440
5621  043500  047502  052122  042040
5622  043506  042111  047040  052117
5623  043514  047440  041503  051125
5624  043522  053440  042510  020116
5625  043530  052111  051440  047510
5626  043536  046125  020104  040510
5627  043544  042526     000
5628  043547     123  030122  042040  EM34:   .ASCIZ  /SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY/
5629  043554  042111  047040  052117
5630  043562  051040  050105  051117
5631  043570  020124  040520  042507
5632  043576  046040  052107  027110
5633  043604  040440  047502  052122
5634  043612  041440  051117  042522
5635  043620  052103  054514     000
5636  043625     123  030122  047440  EM37:   .ASCIZ  /SR0 OR SR2 CHANGED BY A SECOND ABORT/
5637  043632  020122  051123  020062
5638  043640  044103  047101  042507
5639  043646  020104  054502  040440
5640  043654  051440  041505  047117
5641  043662  020104  041101  051117
5642  043670  000124
5643  043672  051123  020060  051117  EM40:   .ASCIZ  /SR0 OR SR2 WERE NOT "RESET" BY A RESET/
5644  043700  051440  031122  053440
5645  043706  051105  020105  047516
5646  043714  020124  051042  051505
5647  043722  052105  020042  054504
5648  043730  040440  051040  051505
5649  043736  052105     000
5650  043741     123  031122  047040  EM41:   .ASCIZ  /SR2 NOT TRACKING CORRECTLY/
5651  043746  052117  052040  040522
5652  043754  045503  047111  020107
5653  043762  047503  051122  041505
5654  043770  046124  000131
5655  043774  044504  020104  047516  EM42:   .ASCIZ  /DID NOT TRAP THRU KERNEL SPACE/
5656  044002  020124  051124  050101
5657  044010  052040  051110  020125
5658  044016  042513  047122  046105
5659  044024  051440  040520  042503
5660  044032     000
5661  044033     113  020124  051105  EM43:   .ASCIZ  /KT ERROR SERVICED ON ODD ADDR. ERROR/
5662  044040  047522  020122  042523
5663  044046  053122  041511  042105
5664  044054  047440  020116  042117
5665  044062  020104  042101  051104
5666  044070  020056  051105  047522
5667  044076  000122
5668  044100  051123  020060  051117  EM44:   .ASCIZ  /SR0 OR SR2 CHANGED BY ODD ADDR. ERROR/
5669  044106  051440  031122  041440
5670  044114  040510  043516  042105
5671  044122  041040  020131  042117
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5672  044130  020104  042101  051104
5673  044136  020056  051105  047522
5674  044144  000122
5675  044146  051105  047522  020122  EM45:   .ASCIZ  /ERROR DURING "DOUBLE ERROR" (KT & ODD ADDR.)/
5676  044154  052504  044522  043516
5677  044162  021040  047504  041125
5678  044170  042514  042440  051122
5679  044176  051117  020042  045450
5680  044204  020124  020046  042117
5681  044212  020104  042101  051104
5682  044220  024456     000
5683  044223     115  050106  020111  EM46:   .ASCIZ  /MFPI INSTRUCTION PUSHED WRONG DATA/
5684  044230  047111  052123  052522
5685  044236  052103  047511  020116
5686  044244  052520  044123  042105
5687  044252  053440  047522  043516
5688  044260  042040  052101  000101
5689  044266  052115  044520  044440  EM47:   .ASCIZ  /MTPI INSTRUCTION LOADED WRONG DATA/
5690  044274  051516  051124  041525
5691  044302  044524  047117  046040
5692  044310  040517  042504  020104
5693  044316  051127  047117  020107
5694  044324  040504  040524     000
5695  044331     123  040524  045503  EM50:   .ASCIZ  /STACK NOT PUSHED BY MFPI-MTPI/
5696  044336  047040  052117  050040
5697  044344  051525  042510  020104
5698  044352  054502  046440  050106
5699  044360  026511  052115  044520
5700  044366     000
5701  044367     113  051105  042516  EM51:   .ASCIZ  /KERNEL PAGE ACCESS INSTEAD OF USER: MFPI-MTPI/
5702  044374  020114  040520  042507
5703  044402  040440  041503  051505
5704  044410  020123  047111  052123
5705  044416  040105  020104  043117
5706  044424  052440  042523  035122
5707  044432  046440  050106  026511
5708  044440  052115  044520     000
5709  044445     127  047522  043516  EM52:   .ASCIZ  /WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE/
5710  044452  050040  051104  051447
5711  044460  051040  043105  051105
5712  044466  047105  042503  020104
5713  044474  044127  046111  020105
5714  044502  047111  051040  046105
5715  044510  041517  052101  020105
5716  044516  047515  042504     000
5717  044523     115  050106  020104  EM53:   .ASCIZ  /MFPD INSTRUCTION PUSHED WRONG DATA/
5718  044530  047111  052123  052522
5719  044536  052103  047511  020116
5720  044544  052520  044123  042105
5721  044552  053440  047522  043516
5722  044560  042040  052101  000101
5723  044566  052123  041501  020113  EM54:   .ASCIZ  /STACK NOT PUSHED BY MFPD-MTPD/
5724  044574  047516  020124  052520
5725  044602  044123  042105  041040
5726  044610  020131  043115  042120
5727  044616  046455  050124  000104
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5728  044624  040520  020122  051117  EM55:   .ASCIZ  /PAR OR PDR CHANGED BY A RESET/
5729  044632  050040  051104  041440
5730  044640  040510  043516  042105
5731  044646  041040  020131  020101
5732  044654  042522  042523  000124
5733  044662  046111  042514  040507  EM56:   .ASCIZ  /ILLEGAL MODE 01 NOT ABORTED/
5734  044670  020114  047515  042504
5735  044676  030040  020061  047516
5736  044704  020124  041101  051117
5737  044712  042524  000104
5738  044716  051123  020060  044504  EM57:   .ASCIZ  /SR0 DID NOT REPORT ILLEGAL MODE 01 CORRECTLY/
5739  044724  020104  047516  020124
5740  044732  042522  047520  052122
5741  044740  044040  046114  043505
5742  044746  046101  046440  042117
5743  044754  020105  030460  041440
5744  044762  051117  042522  052103
5745  044770  054514     000
5746  044773     120  053523  041440  EM60:   .ASCIZ  /PSW CHANGED BY AN RTI IN USER MODE/
5747  045000  040510  043516  042105
5748  045006  041040  020131  047101
5749  045014  051040  044524  044440
5750  045022  020116  051525  051105
5751  045030  046440  042117  000105
5752  045036  040515  047111  027124  EM61:   .ASCIZ  /MAINT. MODE (SR0 <8>) NOT DISABLED BY A RESET/
5753  045044  046440  042117  020105
5754  045052  051450  030122  036040
5755  045060  037070  020051  047516
5756  045066  020124  044504  040523
5757  045074  046102  042105  041040
5758  045102  020131  020101  042522
5759  045110  042523  000124
5760  045114  040504  040524  044440  EM62:   .ASCIZ  /DATA INCORRECT AFTER A MAINT. MODE WRITE/
5761  045122  041516  051117  042522
5762  045130  052103  040440  052106
5763  045136  051105  040440  046440
5764  045144  044501  052116  020056
5765  045152  047515  042504  053440
5766  045160  044522  042524     000
5767  045165     123  052517  041522  EM63:   .ASCIZ  /SOURCE RELOCATED IN MAINT. MODE/
5768  045172  020105  042522  047514
5769  045200  040503  042524  020104
5770  045206  047111  046440  044501
5771  045214  052116  020056  047515
5772  045222  042504     000
5773  045225     116  047117  051040  EM64:   .ASCIZ  /NON RESIDENT ABORT DID NOT OCCUR/
5774  045232  051505  042111  047105
5775  045240  020124  041101  051117
5776  045246  020124  044504  020104
5777  045254  047516  020124  041517
5778  045262  052503  000122
5779  045266  051105  047522  020122  EM65:   .ASCIZ  /ERROR FLAG FOR NR ABORT (BIT15) IN SR0 DID NOT SET/
5780  045274  046106  043501  043040
5781  045302  051117  047040  020122
5782  045310  041101  051117  020124
5783  045316  041050  052111  032461
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5784  045324  020051  047111  051440
5785  045332  030122  042040  042111
5786  045340  047040  052117  051440
5787  045346  052105     000
5788  045351     123  031122  042040  EM66:   .ASCIZ  /SR2 DID NOT FREEZE THE VIRTUAL ADDRS OF THE ABORTD INTR/
5789  045356  042111  047040  052117
5790  045364  043040  042522  055105
5791  045372  020105  044124  020105
5792  045400  044526  052122  040525
5793  045406  020114  042101  051104
5794  045414  020123  043117  052040
5795  045422  042510  040440  047502
5796  045430  052122  020104  047111
5797  045436  051124     000
5798  045441     062  042116  047040  EM67:   .ASCIZ  /2ND NON RESIDENT ABORT DID NOT OCCUR/
5799  045446  047117  051040  051505
5800  045454  042111  047105  020124
5801  045462  041101  051117  020124
5802  045470  044504  020104  047516
5803  045476  020124  041517  052503
5804  045504  000122
5805  045506  047062  020104  047516  EM70:   .ASCIZ  /2ND NON RESIDENT ABORT CAUSED SR2 TO CHANGE/
5806  045514  020116  042522  044523
5807  045522  042504  052116  040440
5808  045530  047502  052122  041440
5809  045536  052501  042523  020104
5810  045544  051123  020062  047524
5811  045552  041440  040510  043516
5812  045560  000105
5813  045562  051123  020060  040527  EM71:   .ASCIZ  /SR0 WAS NOT CLEARED BY INIT. /
5814  045570  020123  047516  020124
5815  045576  046103  040505  042524
5816  045604  020104  054502  044440
5817  045612  044516  027124  000040
5818
5819  045620  046117  020104  041520  DH1:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC/
5820  045626  020040  046117  020104
5821  045634  051520  020127  033122
5822  045642  053440  051501  020040
5823  045650  042524  052123  047516
5824  045656  020040  051105  047522
5825  045664  050122  000103
5826  045670  046117  020104  041520  DH2:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC/
5827  045676  020040  046117  020104
5828  045704  051520  020127  033122
5829  045712  053440  051501  020040
5830  045720  051123  020060  020040
5831  045726  020040  051123  020062
5832  045734  020040  020040  042524
5833  045742  052123  047516  020040
5834  045750  051105  047522  050122
5835  045756  000103
5836  045760  051127  052117  020103  DH3:    .ASCIZ  /WROTE   READ    TESTNO  ERRORPC/
5837  045766  020040  042522  042101
5838  045774  020040  020040  042524
5839  046002  052123  047516  020040
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5840  046010  051105  047522  050122
5841  046016  000103
5842  046020  042101  051104  051505  DH7:    .ASCIZ  /ADDRESS TESTNO  ERRORPC/
5843  046026  020123  042524  052123
5844  046034  047516  020040  051105
5845  046042  047522  050122  000103
5846  046050  042522  044507  052123  DH10:   .ASCII  /REGISTER-ADDRS  NUM  OF/<CRLF>
5847  046056  051105  040455  042104
5848  046064  051522  020040  052516
5849  046072  020115  047440  100106
5850  046100  047101  026504  042105          .ASCIZ  /AND-ED  OR-ED   TIMOUTS TESTNO  ERRORPC/
5851  046106  020040  051117  042456
5852  046114  020104  020040  044524
5853  046122  047515  052125  020123
5854  046130  042524  052123  047516
5855  046136  020040  051105  047522
5856  046144  050122  000103
5857  046150  042522  044507  052123  DH11:   .ASCII  /REGISTR READ    READ-(BINARY)/<CRLF>
5858  046156  020122  042522  042101
5859  046164  020040  020040  042522
5860  046172  042101  024055  044502
5861  046200  040516  054522  100051
5862  046206  042101  051104  051505          .ASCIZ  /ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC/
5863  046214  020123  047450  052103
5864  046222  046101  020051  032065
5865  046230  031063  030061  034071
5866  046236  033067  032065  031063
5867  046244  030061  020040  042524
5868  046252  052123  047516  020040
5869  046260  051105  047522  050122
5870  046266  000103
5871  046270  042522  044507  052123  DH12:   .ASCII  /REGISTR WROTE   READ    READ-(BINARY)/<CRLF>
5872  046276  020122  051127  052117
5873  046304  020105  020040  042522
5874  046312  042101  020040  020040
5875  046320  042522  042101  024055
5876  046326  044502  040516  054522
5877  046334  100051
5878  046336  042101  051104  051505          .ASCIZ  /ADDRESS (OCTAL) (OCTAL) 5432109876543210  TESTNO  ERRORPC/
5879  046344  020123  047450  052103
5880  046352  046101  020051  047450
5881  046360  052103  046101  020051
5882  046366  032065  031063  030061
5883  046374  034071  033067  032065
5884  046402  031063  030061  020040
5885  046410  042524  052123  047516
5886  046416  020040  051105  047522
5887  046424  050122  000103
5888  046430  042522  042101  020040  DH13:   .ASCIZ  /READ    TESTNO  ERRORPC/
5889  046436  020040  042524  052123
5890  046444  047516  020040  051105
5891  046452  047522  050122  000103
5892  046460  040520  026522  042120  DH16:   .ASCII  /PAR-PDR PAR-PDR/<CRLF>
5893  046466  020122  040520  026522
5894  046474  042120  100122
5895  046500  046103  040505  042522          .ASCIZ  /CLEARED EFFECTD EXPECTD RECEIVD TESTNO  ERRORPC/
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5896  046506  020104  043105  042506
5897  046514  052103  020104  054105
5898  046522  042520  052103  020104
5899  046530  042522  042503  053111
5900  046536  020104  042524  052123
5901  046544  047516  020040  051105
5902  046552  047522  050122  000103
5903  046560  044120  051531  041511  DH17:   .ASCII  /PHYSICL VIRTUAL/<CRLF>
5904  046566  020114  044526  052122
5905  046574  040525  100114
5906  046600  042101  051104  051505          .ASCIZ  /ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC/
5907  046606  020123  042101  051104
5908  046614  051505  020123  044513
5909  046622  040:20  032122  020040
5910  046630  042524  052123  047516
5911  046636  020040  051105  047522
5912  046644  050122  000103
5913  046650  044120  051531  041511  DH20:   .ASCII  /PHYSICL PAR 4   PAR 5/<CRLF>
5914  046656  020114  040520  020122
5915  046664  020064  020040  040520
5916  046672  020122  100065
5917  046676  042101  051104  051505          .ASCIZ  /ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO  ERRORPC/
5918  046704  020123  041126  020101
5919  046712  020040  020040  041126
5920  046720  020101  020040  020040
5921  046726  040520  020122  020064
5922  046734  020040  040520  020122
5923  046742  020065  020040  051520
5924  046750  020127  020040  020040
5925  046756  042524  052123  047516
5926  046764  020040  051105  047522
5927  046772  050122  000103
5928  046776  042120  020122  020040  DH21:   .ASCII  /PDR     VIRTUAL/<CRLF>
5929  047004  020040  044526  052122
5930  047012  040525  100114
5931  047016  042524  052123  042105          .ASCIZ  /TESTED  ADDRESS TESTNO  ERRORPC/
5932  047024  020040  042101  051104
5933  047032  051505  020123  042524
5934  047040  052123  047516  020040
5935  047046  051105  047522  050122
5936  047054  000103
5937  047056  042120  020122  047111  DH22:   .ASCII  /PDR IN  PDR     VIRTUAL/
5938  047064  020040  042120  020122
5939  047072  020040  020040  044526
5940  047100  052122  040525      114
5941  047105      105  051122  051117          .ASCIZ  /ERROR   TESTED  ADDRESS TESTNO  ERRORPC/
5942  047112  020040  052040  051505
5943  047120  042524  020104  040440
5944  047126  042104  042522  051523
5945  047134  052040  051505  047124
5946  047142  020117  042440  051122
5947  047150  051117  041520      00
5948  047155      120  051104  020040  DH23:   .ASCIZ  /PDR     TESTNO  ERRORPC/
5949  047162  020040  052040  051505
5950  047170  047124  020117  042440
5951  047176  051122  051117  041520
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5952  047204      000
5953  047205      120  051104  053440  DH24:   .ASCIZ  /PDR WAS EXPECTD TESTNO  ERRORPC/
5954  047212  051501  042440  050130
5955  047220  041505  042124  052040
5956  047226  051505  047124  020117
5957  047234  042440  051122  051117
5958  047242  041520      000
5959  047245      120  051104  032040  DH26:   .ASCIZ  /PDR 4   PSW     TESTNO  ERRORPC/
5960  047252  020040  050040  053523
5961  047260  020040  020040  052040
5962  047266  051505  047124  020117
5963  047274  042440  051122  051117
5964  047302  041520      000
5965  047305      123  030122  053440  DH30:   .ASCIZ  /SR0 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
5966  047312  051501  042440  050130
5967  047320  041505  042124  050040
5968  047326  051104  032040  020040
5969  047334  050040  053523  020040
5970  047342  020040  052040  051505
5971  047350  047124  020117  042440
5972  047356  051122  051117  041520
5973  047364      000
5974  047365      123  031122  053440  DH31:   .ASCIZ  /SR2 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
5975  047372  051501  042440  050130
5976  047400  041505  042124  050040
5977  047406  051104  032040  020040
5978  047414  050040  053523  020040
5979  047422  020040  052040  051505
5980  047430  047124  020117  042440
5981  047436  051122  051117  041520
5982  047444      000
5983  047445      126  041056  040456  DH32:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC/
5984  047452  020056  045440  050111
5985  047460  051104  020064  051440
5986  047466  030122  053440  051501
5987  047474  051440  031122  053440
5988  047502  051501  052040  051505
5989  047510  047124  020117  042440
5990  047516  051122  051117  041520
5991  047524      000
5992  047525      126  041056  040456  DH33:   .ASCIZ  /V.B.A.  KIPDR4  TESTNO  ERRORPC/
5993  047532  020056  045440  050111
5994  047540  051104  020064  052040
5995  047546  051505  047124  020117
5996  047554  042440  051122  051117
5997  047562  041520      000
5998  047565      126  041056  040456  DH34:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC/
5999  047572  020056  045440  050111
6000  047600  051104  020064  051440
6001  047606  030122  053440  051501
6002  047614  042440  050130  041505
6003  047622  042124  052040  051505
6004  047630  047124  020117  042440
6005  047636  051122  051117  041520
6006  047644      000
6007  047645      126  041056  040456  DH35:   .ASCIZ  /V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC/
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 6008  047652  020056  045440  050111
 6009  047660  051104  020064  051440
 6010  047666  031122  053440  051501
 6011  047674  042440  050130  041505
 6012  047702  042124  052040  051505
 6013  047710  047124  020117  042440
 6014  047716  051122  051117  041520
 6015  047724     000
 6016  047725     123  031122  053440  DH36:   .ASCIZ  /SR2 WAS EXPECTD TESTNO  ERRORPC/
 6017  047732  051501  042440  050130
 6018  047740  041505  042124  052040
 6019  047746  051505  047124  020117
 6020  047754  042440  051122  051117
 6021  047762  041520     000
 6022  047765     106  051111  052123  DH37:   .ASCII  /FIRST ABORT     SECOND ABORT/<CRLF>
 6023  047772  040440  047502  052122
 6024  050000  020040  020040  051440
 6025  050006  041505  047117  020104
 6026  050014  041101  051117  100124
 6027  050022  051123  020060  040527          .ASCIZ  /SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC/
 6028  050030  020123  051123  020062
 6029  050036  040527  020123  051123
 6030  050044  020060  040527  020123
 6031  050052  051123  020062  040527
 6032  050060  020123  042524  052123
 6033  050066  047516  020040  051105
 6034  050074  047522  050122  000103
 6035  050102  051123  020060  040527  DH40:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
 6036  050110  020123  051123  020062
 6037  050116  040527  020123  042524
 6038  050124  052123  047516  020040
 6039  050132  051105  047522  050122
 6040  050140  000103
 6041  050142  051020  020127  040527  DH42:   .ASCIZ  /PSW WAS R6 WAS  TESTNO  ERRORPC/
 6042  050150  020123  033122  053440
 6043  050156  051501  020040  042524
 6044  050164  052123  047516  020040
 6045  050172  051105  047522  050122
 6046  050200  000103
 6047  050202  054105  042520  052103  DH44:   .ASCII  /EXPECTED          RECEIVED/<CRLF>
 6048  050210  042105  020040  020040
 6049  050216  020040  020040  051040
 6050  050224  041505  044505  042526
 6051  050232  100104
 6052  050234  051123  020060  020040          .ASCIZ  /SR0     SR2     SR0 WAS SR2 WAS TESTNO  ERRORPC/
 6053  050242  020040  051123  020062
 6054  050250  020040  020040  051123
 6055  050256  020060  040527  020123
 6056  050264  051123  020062  040527
 6057  050272  020123  042524  052123
 6058  050300  047516  020040  051105
 6059  050306  047522  050122  000103
 6060  050314  054105  042520  052103  DH45:   .ASCII  /EXPECTED:/<CRLF>
 6061  050322  042105  100072
 6062  050326  051520  020127  020040          .ASCII  /PSW     PC      SR0     SR2/<CRLF>
 6063  050334  020040  041520  020040
```



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 6064  050342  020040  020040  051123
 6065  050350  020060  020040  020040
 6066  050356  051123  100062
 6067  050362  033461  030060  033461          .ASCII  /170017  (3$+4)  020147  (3$)/<CRLF>
 6068  050370  020040  031450  025444
 6069  050376  024464  020040  031060
 6070  050404  030460  033464  020040
 6071  050412  031450  024444     200
 6072  050417     122  041505  044505          .ASCII  /RECEIVED:/<CRLF>
 6073  050424  042526  035104     200
 6074  050431     120  053523  020040          .ASCIZ  /PSW     PC      SR0     SR2     TESTNO  ERRORPC/
 6075  050436  020040  050040  020103
 6076  050444  020040  020040  051440
 6077  050452  030122  020040  020040
 6078  050460  051440  031122  020040
 6079  050466  020040  052040  051505
 6080  050474  047124  020117  042440
 6081  050502  051122  051117  041520
 6082  050510     000
 6083  050511     104  052101  020101  DH46:   .ASCII  /DATA    DATA/<CRLF>
 6084  050516  020040  042040  052101
 6085  050524  100101
 6086  050526  054105  042520  052103          .ASCIZ  /EXPECTD RECEIVD TESTNO  ERRORPC/
 6087  050534  020104  042522  042503
 6088  050542  053111  020104  042524
 6089  050550  052123  047516  020040
 6090  050556  051105  047522  050122
 6091  050564  000103
 6092  050566  042524  052123  047516  DH50:   .ASCIZ  /TESTNO  ERRORPC/
 6093  050574  020040  051105  047522
 6094  050602  050122  000103
 6095  050606  051123  020060  040527  DH51:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
 6096  050614  020123  051123  020062
 6097  050622  040527  020123  042524
 6098  050630  052123  047516  020040
 6099  050636  051105  047522  050122
 6100  050644  000103
 6101  050646  044120  051531  041511  DH52:   .ASCII  /PHYSICL PAR 4/<CRLF>
 6102  050654  020114  040520  020122
 6103  050662  100064
 6104  050664  042101  051104  051505          .ASCIZ  /ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW     TESTNO  ERRORPC/
 6105  050672  020123  027126  027102
 6106  050700  027101  020040  040520
 6107  050706  020122  020064  020040
 6108  050714  051123  020060  040527
 6109  050722  020123  051123  020062
 6110  050730  040527  020123  051520
 6111  050736  020127  020040  020040
 6112  050744  042524  052123  047516
 6113  050752  020040  051105  047522
 6114  050760  050122  000103
 6115  050764  051123  020060  040527  DH57:   .ASCIZ  /SR0 WAS EXPECTD TESTNO  ERRORPC/
 6116  050772  020123  054105  042520
 6117  051000  052103  020104  042524
 6118  051006  052123  047516  020040
 6119  051014  051105  047522  050122
```

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6120  051022  000103
6121  051024  051520  020127  040527  DH60:   .ASCIZ  /PSW WAS EXPECTD TESTNO  ERRORPC/
6122  051032  020123  054105  042520
6123  051040  052103  020104  042524
6124  051046  052123  047516  020040
6125  051054  051105  047522  050122
6126  051062  000103
6127  051064  051123  020060  020040  DH61:   .ASCIZ  /SR0     SR2   TESTNO  ERRORPC/
6128  051072  020040  051123  020062
6129  051100  020040  042524  052123
6130  051106  047516  020040  051105
6131  051114  047522  050122  000103
6132  051122  051123  020062  054105  DH62:   .ASCIZ  /SR2 EXP SR2 REC TESTNO ERRORPC/
6133  051130  020120  051123  020062
6134  051136  042522  020103  042524
6135  051144  052123  047516  042440
6136  051152  051122  051117  041520
6137  051160     000
6138  051161     123  030122  042440  DH63:   .ASCIZ  /SR0 EXP SR0 REC TESTNO ERRORPC/
6139  051166  050130  051440  030122
6140  051174  051040  041505  052040
6141  051202  051505  047124  020117
6142  051210  051105  047522  050122
6143  051216  000103
6144
6145                                          .EVEN
6146
6147  051220  001356  001360  001354  DT1:    .WORD   TRAPPC,TRAPPS,WASR6,TESTNO,$ERRPC,0
6148  051226  001352  001116  000000
6149  051234  001356  001360  001354  DT2:    .WORD   TRAPPC,TRAPPS,WASR6,WASSR0,WASSR2,TESTNO,$ERRPC,0
6150  051242  001366  001370  001352
6151  051250  001116  000000
6152  051254  001162  001164  001352  DT3:    .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
6153  051262  001116  000000
6154  051266  001162  001352  001116  DT7:    .WORD   $REG0,TESTNO,$ERRPC,0
6155  051274  000000
6156  051276  001374  001376  001400  DT10:   .WORD   ANDADR,ORADR,TONUM,TESTNO,$ERRPC,0
6157  051304  001352  001116  000000
6158  051312  001162  001164  001164  DT11:   .WORD   $REG0,$REG1,$REG1,TESTNO,$ERRPC,0
6159  051320  001352  001116  000000
6160  051326  001162  001164  001166  DT12:   .WORD   $REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
6161  051334  001166  001352  001116
6162  051342  000000
6163  051344  001162  001352  001116  DT13:   .WORD   $REG0,TESTNO,$ERRPC,0
6164  051352  000000
6165  051354  001162  001164  001174  DT16:   .WORD   $REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
6166  051362  001166  001352  001116
6167  051370  000000
6168  051372  001406  001402  001172  DT17:   .WORD   PBALO,VIRT1,$REG4,TESTNO,$ERRPC,0
6169  051400  001352  001116  000000
6170  051406  001406  001402  001404  DT20:   .WORD   PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
6171  051414  001172  001174  001176
6172  051422  001352  001116  000000
6173  051430  001174  001170  001352  DT21:   .WORD   $REG5,$REG3,TESTNO,$ERRPC,0
6174  051436  001116  000000
6175  051442  001162  001174  001170  DT22:   .WORD   $REG0,$REG5,$REG3,TESTNO,$ERRPC,0
```



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6176  051450  001352  001116  000000
6177  051456  001174  001352  001116  DT23:   .WORD   $REG5,TESTNO,$ERRPC,0
6178  051464  000000
6179  051466  001166  001164  001352  DT24:   .WORD   $REG2,$REG1,TESTNO,$ERRPC,0
6180  051474  001116  000000
6181  051500  001166  001176  001352  DT26:   .WORD   $REG2,$TMP0,TESTNO,$ERRPC,0
6182  051506  001116  000000
6183  051512  001366  001170  001166  DT30:   .WORD   WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
6184  051520  001176  001352  001116
6185  051526  000000
6186  051530  001370  001172  001166  DT31:   .WORD   WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
6187  051536  001176  001352  00111€
6188  051544  000000
6189  051546  001162  001172  001366  DT32:   .WORD   $REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
6190  051554  001370  001352  001116
6191  051562  000000
6192  051564  001162  001172  001352  DT33:   .WORD   $REG0,$REG4,TESTNO,$ERRPC,0
6193  051572  001116  000000
6194  051576  001162  001172  001366  DT34:   .WORD   $REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
6195  051604  001166  001352  001116
6196  051612  000000
6197  051614  001162  001172  001370  DT35:   .WORD   $REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
6198  051622  001170  001352  001116
6199  051630  000000
6200  051632  001370  001164  001352  DT36:   .WORD   WASSR2,$REG1,TESTNO,$ERRPC,0
6201  051640  001116  000000
6202  051644  001176  001202  001366  DT37:   .WORD   $TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
6203  051652  001370  001352  001116
6204  051660  000000
6205  051662  001366  001370  001352  DT40:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
6206  051670  001116  000000
6207  051674  001164  001166  001352  DT42:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
6208  051702  001116  000000
6209  051706  001162  001164  001366  DT44:   .WORD   $REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
6210  051714  001370  001352  001116
6211  051722  000000
6212  051724  001164  001170  001366  DT45:   .WORD   $REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
6213  051732  001370  001352  001116
6214  051740  000000
6215  051742  001162  001164  001352  DT46:   .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
6216  051750  001116  000000
6217  051754  001352  001116  000000  DT50:   .WORD   TESTNO,$ERRPC,0
6218  051762  001366  001370  001352  DT51:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
6219  051770  001116  000000
6220  051774  001406  001402  001172  DT52:   .WORD   PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
6221  052002  001366  001370  001176
6222  052010  001352  001116  000000
6223  052016  001366  001164  001352  DT57:   .WORD   WASSR0,$REG1,TESTNO,$ERRPC,0
6224  052024  001116  000000
6225  052030  001164  001166  001352  DT60:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
6226  052036  001116  000000
6227  052042  001370  001172  001352  DT64:   .WORD   WASSR2,$REG4,TESTNO,$ERRPC,0
6228  052050  001116  000000
6229  052054  001366  001370  001352  DT65:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
6230  052062  001116  000000
6231  052066  001364  001370  001352  DT66:   .WORD   CORSR2,WASSR2,TESTNO,$ERRPC,0
```

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  6232  052074  001116  000000
  6233  052100  001362  001366  001352  DT67:   .WORD   CORSR0,WASSR0,TESTNO,$ERRPC,0
  6234  052106  001116  000000
  6235
  6236  052112      000     000     000  DF1:    .BYTE   0,0,0,0,0
  6237  052115      000     000
  6238  052117      000     000     000  DF2:    .BYTE   0,0,0,0,0,0,0
  6239  052122      000     000     000
  6240  052125      000
  6241  052126      000     000     000  DF3:    .BYTE   0,0,0,0
  6242  052131      000
  6243  052132      000     000     000  DF7:    .BYTE   0,0,0
  6244  052135      000     000     001  DF10:   .BYTE   0,0,1,0,0
  6245  052140      000     000
  6246  052142      000     000     002  DF11:   .BYTE   0,0,2,0,0
  6247  052145      000     000
  6248  052147      000     000     000  DF12:   .BYTE   0,0,0,2,0,0
  6249  052152      002     000     000
  6250  052155      000     000     000  DF13:   .BYTE   0,0,0
  6251  052160      000     000     000  DF16:   .BYTE   0,0,0,0,0,0
  6252  052163      000     000     000
  6253  052166      003     000     000  DF17:   .BYTE   3,0,0,0,0
  6254  052171      000     000
  6255  052173      003     000     000  DF20:   .BYTE   3,0,0,0,0,0,0,0,0
  6256  052176      000     000     000
  6257  052201      000     000
  6258  052203      000     000     000  DF21:   .BYTE   0,0,0,0
  6259  052206      000
  6260  052207      000     000     000  DF22:   .BYTE   0,0,0,0,0
  6261  052212      000     000
  6262  052214      000     000     000  DF23:   .BYTE   0,0,0
  6263  052217      000     000     000  DF24:   .BYTE   0,0,0,0
  6264  052222      000
  6265  052223      000     000     000  DF30:   .BYTE   0,0,0,0,0,0
  6266  052226      000     000     000
  6267  052231      000     000     000  DF46:   .BYTE   0,0,0,0
  6268  052234      000
  6269  052235      000     000          DF50:   .BYTE   0,0
  6270  052237      000     000     000  DF51:   .BYTE   0,0,0,0
  6271  052242      000
  6272  052243      003     000     000  DF52:   .BYTE   3,0,0,0,0,0,0,0
  6273  052246      000     000     000
  6274  052251      000     000
  6275  052253      000     000     000  DF57:   .BYTE   0,0,0,0
  6276  052256      000
  6277  052257      000     000     000  DF60:   .BYTE   0,0,0,0
  6278  052262      000
  6279  052263      000     000     000  DF61:   .BYTE   0,0,0,0
  6280  052266      000
  6281
  6282          000001                       .END
```



```
ABASE  = 000000            815     856
ACDW1  = 000000            815     858
ACDW2  = 000000            815     859
ACPUOP= 000000             815     830
ADDW0  = 000000            815     860
ADDW1  = 000000            815     861
ADDW10= 000000             815     870
ADDW11= 000000             815     871
ADDW12= 000000             815     872
ADDW13= 000000             815     873
ADDW14= 000000             815     874
ADDW15= 000000             815     875
ADDW2  = 000000            815     862
ADDW3  = 000000            815     863
ADDW4  = 000000            815     864
ADDW5  = 000000            815     865
ADDW6  = 000000            815     866
ADDW7  = 000000            815     867
ADDW8  = 000000            815     868
ADDW9  = 000000            815     869
ADEVCT= 000000             815     821
ADEVM  = 000000            815     857
AENV   = 000000            815     826
AENVM  = 000000            815     827
AFATAL= 000000             815     818
AMADR1= 000000             815     843
AMADR2= 000000             815     847
AMADR3= 000000             815     850
AMADR4= 000000             815     853
AMAMS1= 000000             815     837
AMAMS2= 000000             815     845
AMAMS3= 000000             815     848
AMAMS4= 000000             815     851
AMSGAD= 000000             815     823
AMSGLG= 000000             815     824
AMSGTY= 000000             815     817
AMTYP1= 000000             815     838
AMTYP2= 000000             815     846
AMTYP3= 000000             815     849
AMTYP4= 000000             815     852
ANDADR  001374             890#   1580*  1602*  1620*  1642*  1680*  1682*  1700*  1722*  1740*  1762*  6156
APASS  = 000000            815     820
APRIOR= 000000             815
APTCSU= 000040            4992    5097#
APTENV= 000001            4457    4985   5053   5095#
APTSIZ= 000200            1398    5094#
APTSPD= 000100            4987    5055   5096#
ASWREG= 000000             815     828
ATESTN= 000000             815     819
AUNIT  = 000000            815     822
AUSWR  = 000000            815     829
AVECT1= 000000             815     854
AVECT2= 000000             815     855
BIT0   = 000001            628#
BIT00  = 000001            618#    628
BIT01  = 000002            617#    627
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```
BIT02 = 000004          616#    626
BIT03 = 000010          615#    625
BIT04 = 000020          614#    624
BIT05 = 000040          613#    623
BIT06 = 000100          612#    622
BIT07 = 000200          611#    621
BIT08 = 000400          610#    620    4385
BIT09 = 001000          609#    619    4393    4468
BIT1  = 000002          627#
BIT10 = 002000          608#   4445
BIT11 = 004000          607#   4400
BIT12 = 010000          606#   4340
BIT13 = 020000          605#   4452
BIT14 = 040000          604#   4371
BIT15 = 100000          603#   1799
BIT2  = 000004          626#
BIT3  = 000010          625#
BIT4  = 000020          624#    702
BIT5  = 000040          623#
BIT6  = 000100          622#    703
BIT7  = 000200          621#
BIT8  = 000400          620#   2207    2209    2260    2278    2344    2370    2396    2423    2446    2488    2514    2540
                       2566    2592
BIT9  = 001000          619#
BPTVEC= 000014          635#
CKSWR = 104410         4370    4434    4467    5390#
CMPREG  036162         2078    2087    2096    2105    4649#
CMSG    037537         4942    4953#
CNTRLC  037460         4788    4876    4940#
CORSR0  001362          885#   3480*   6233
CORSR2  001364          886#   3468*   6231
CR    = 000015          543#   5031    5041
CRLF  = 000200          544#   1422    5002    5041    5846    5857    5871    5892    5903    5913    5928    6022    6047
                       6060    6062    6067    6072    6083    6101
DDISP = 177570          550#    782    1386
DF1     052112          917    6236#
DF10    052135          960    6244#
DF11    052142          967    1199    6246#
DF12    052147          974     993    6248#
DF13    052155          980     986    6250#
DF16    052160         1000    6251#
DF17    052166         1007    6253#
DF2     052117          923    1235    6238#
DF20    052173         1014    6255#
DF21    052203         1021    6258#
DF22    052207         1028    6260#
DF23    052214         1034    1130    6262#
DF24    052217         1040    1046    1052    1058    1082    1099    1112    1118    1124    1241    6263#
DF3     052126          929     935     941     947    1229    6241#
DF30    052223         1064    1070    1076    1088    1093    1106    1137    1147    6265#
DF46    052231         1154    1161    1186    6267#
DF50    052235         1167    1192    1205    1223    6269#
DF51    052237         1173    6270#
DF52    052243         1180    6272#
DF57    052253         1211    6275#
DF60    052257         1217    6277#
```



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DF61    052263         1247    1253    1260    1267    1273    1279    6279#
DF7     052132          953    6243#
DH1     045620          915    5819#
DH10    046050          957    5846#
DH11    046150          964    1196    5857#
DH12    046270          971     990    5871#
DH13    046430          978     984    5888#
DH16    046460          997    5892#
DH17    046560         1004    5903#
DH2     045670          921    1233    5826#
DH20    046650         1011    5913#
DH21    046776         1018    5928#
DH22    047056         1025    5937#
DH23    047155         1032    1128    5948#
DH24    047205         1038    1044    5953#
DH26    047245         1050    1056    5959#
DH3     045760          927     933     939     945    1227    5836#
DH30    047305         1062    5965#
DH31    047365         1068    5974#
DH32    047445         1074    5983#
DH33    047525         1080    5992#
DH34    047565         1086    5998#
DH35    047645         1091    6007#
DH36    047725         1097    1116    1239    6016#
DH37    047765         1103    6022#
DH40    050102         1110    6035#
DH42    050142         1122    6041#
DH44    050202         1134    6047#
DH45    050314         1141    6060#
DH46    050511         1151    1158    1183    6083#
DH50    050566         1165    1190    1203    1221    6092#
DH51    050606         1171    6095#
DH52    050646         1177    6101#
DH57    050764         1209    6115#
DH60    051024         1215    6121#
DH61    051064         1245    1251    1258    1265    6127#
DH62    051122         1271    6132#
DH63    051161         1277    6138#
DH7     046020          951    5842#
DISPLA  001142          782#   1386*   1394*   4415*   4444*
DISPRE  000174          718#   1394
DSWR  = 177570          549#    781    1385
DT1     051220          916    6147#
DT10    051276          959    6156#
DT11    051312          966    1198    6158#
DT12    051326          973     992    6160#
DT13    051344          979     985    6163#
DT16    051354          999    6165#
DT17    051372         1006    6168#
DT2     051234          922    1234    6149#
DT20    051406         1013    6170#
DT21    051430         1020    6173#
DT22    051442         1027    6175#
DT23    051456         1033    1129    6177#
DT24    051466         1039    1045    6179#
DT26    051500         1051    1057    6181#
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DT3	051254	928	934	940	946	1228	6152#
DT30	051512	1063	6183#				
DT31	051530	1069	6186#				
DT32	051546	1075	6189#				
DT33	051564	1081	6192#				
DT34	051576	1087	6194#				
DT35	051614	1092	6197#				
DT36	051632	1098	1117	6200#			
DT37	051644	1105	6202#				
DT40	051662	1111	6205#				
DT42	051674	1123	6207#				
DT44	051706	1136	6209#				
DT45	051724	1146	6212#				
DT46	051742	1153	1160	1185	6215#		
DT50	051754	1166	1191	1204	1222	6217#	
DT51	051762	1172	6218#				
DT52	051774	1179	6220#				
DT57	052016	1210	6223#				
DT60	052030	1216	6225#				
DT61	052042	1240	6227#				
DT65	052054	1246	1252	1259	1266	6229#	
DT66	052066	1272	6231#				
DT67	052100	1278	6233#				
DT7	051266	952	6154#				
EMTVEC=	000030	638#	1355*	1356*			
EM1	041616	914	5449#				
EM10	042175	956	5494#				
EM11	042241	963	5501#				
EM12	042301	970	5507#				
EM13	042350	977	5514#				
EM14	042405	983	5519#				
EM15	042440	989	5524#				
EM16	042514	996	5532#				
EM17	042556	1003	5538#				
EM2	041656	920	5455#				
EM20	042626	1010	5545#				
EM21	042700	1017	5552#				
EM22	042735	1024	5557#				
EM23	042774	1031	5563#				
EM24	043040	1037	5569#				
EM25	043100	1043	5575#				
EM26	043145	1049	5582#				
EM27	043215	1055	5589#				
EM3	041725	926	5462#				
EM30	043264	1061	5596#				
EM31	043336	1067	1090	1096	1238	5603#	
EM32	043403	1073	5610#				
EM33	043464	1079	5619#				
EM34	043547	1085	5628#				
EM37	043625	1102	5636#				
EM4	041764	932	5468#				
EM40	043672	1109	5643#				
EM41	043741	1115	5650#				
EM42	043774	1121	5655#				
EM43	044033	1127	5661#				
EM44	044100	1133	5668#				

EM45	044146	1140	5675#										
EM46	044223	1150	5683#										
EM47	044266	1157	5689#										
EM5	042017	938	5473#										
EM50	044331	1164	5695#										
EM51	044367	1170	5701#										
EM52	044445	1176	5709#										
EM53	044523	1182	5717#										
EM54	044566	1189	5723#										
EM55	044624	1195	5728#										
EM56	044662	1202	5733#										
EM57	044716	1208	5738#										
EM6	042072	944	5481#										
EM60	044773	1214	5746#										
EM61	045036	1220	5752#										
EM62	045114	1226	5760#										
EM63	045165	1232	5767#										
EM64	045225	1244	5773#										
EM65	045266	1250	5779#										
EM66	045351	1257	5788#										
EM67	045441	1264	5798#										
EM7	042137	950	5488#										
EM70	045506	1270	5805#										
EM71	045562	1276	5813#										
ERRTYP	035556	4454	4500#										
ERRVEC=	000004	631#	1383	1384*	1395*	1426*	1427*	2890*	2900*	4376	4377*	4379*	4382*
FORMPA	036354	2353	2379	2405	2432	2455	2497	2523	2549	2575	2601	2672	2713 4725#
GNS =	****** U	717	1421	4309	4316	5381	5382	5383	5384	5385	5386	5388	5390 5391
		5392	5393	5394									
GTSWR =	104407	1416	4949	5388#									
HT =	000011	541#	5000	5041									
IOTVEC=	000020	636#	1353*	1354*									
KERSTK=	001100	704#	1537	1541	1543	2075	2084	2093	2102	2216	2892	3070	3142 3146
		3159	3217	3221	3234	3302	3364	3369	3431	3460	3519	3538	3598 3659
		3753	4085	4217									
KIPAR0=	172340	691#	1618	1877	1971	2083	2136	2324	3717*	4626	4664	4725	
KIPAR1=	172342	692#	3718*										
KIPAR2=	172344	693#	3719*										
KIPAR3=	172346	694#	2251*	2748	2928*	3289*	3720*						
KIPAR4=	172350	695#	2252*	2342*	2368*	2394*	2421*	2445*	2486*	2512*	2538*	2564*	2590* 2642*
		2692*	2699*	2929*	3290*	3587*	3721*	3741*	3893*	4071*			
KIPAR5=	172352	696#	2643*	2693*	2700*	3339*							
KIPAR6=	172354	697#											
KIPAR7=	172356	698#	2253*	3722*									
KIPDR0=	172300	680#	1658	1924	2019	2074	2125	2197	2205*	2331	2752	2756	2770 3726
		4622	4650										
KIPDR1=	172302	681#											
KIPDR2=	172304	682#											
KIPDR3=	172306	683#	2254*	2272*	2889*	2893	2932*	3135*	3291*				
KIPDR4=	172310	684#	2255*	2690*	2697*	2939*	3006*	3140*	3215*	3292*	3317*	3340*	3497* 3589*
		3619*	3740*	3746*	3891*	3917*	3919*	3934*	3936*	3949*	3951*	3965*	3967* 3983*
		3985*	4000*	4002*	4019*	4021*	4070*						
KIPDR5=	172312	685#	2691*	2698*	3136*	3341*	3420*	3498*					
KIPDR6=	172314	686#											
KIPDR7=	172316	687#	2256*	2878*	2881								
LF =	000012	542#	5035	5041									

```
LOOP    020466  1424#  4351
MGMERR  002400  1319#  1428   2218   2271   2703   2986   3047   3089   3195   3270   3318   3499   3618
                3692   3859   4030   4186
MGMFLG  002402  1320#  1334*  1432*
MMVEC = 000250   647#  1428*  1429*  2201*  2202*  2218*  2219*  2257*  2271*  2662*  2703*  2938*  2986*
                3005*  3047*  3062*  3089*  3139*  3152*  3195*  3214*  3227*  3270*  3295*  3318*  3361*
                3367*  3419*  3451*  3499*  3745*  3859*  3895*  4030*  4078*  4186*
ORADR   001376   891#  1581*  1600*  1621*  1640*  1661*  1680*  1701*  1720*  1741*  1760*  6156
PBAHI   001410   896#  4744*
PBALO   001406   895#  4735*  4736*  4741*  6168   6170   6220
PIRQ  = 177772   548#
PIRQVE= 000240   642#
PR0   = 000000   565#
PR1   = 000040   566#
PR2   = 000100   567#
PR3   = 000140   568#
PR4   = 000200   569#
PR5   = 000240   570#
PR6   = 000300   571#
PR7   = 000340   572#
PS    = 177776   545#  546
PSW   = 177776   546#  1472*  1473*  1474   1478*  1486*  1498*  1500*  1501   1506*  1512*  1514*  1515
                1519*  1536*  1538*  1540*  1836*  1846*  2417   2441   2639*  2663   2684   2694*  2696*
                2812*  2860*  2943   2976*  2982*  2984*  3010   3043*  3045*  3063*  3518*  3523*  3530
                3532*  3537*  3540*  3542*  3558*  3562   3564*  3649*  3658*  3660*  3662*  3750*  3771*
                3783*  3795*  3806*  3820*  3834*  3847*  3898*  3909*  3930*  3946*  2961*  3978*  3996*
                4013*  4069*  4080*  4099*  4112*  4124*  4135*  4148*  4162*  4175*  4187*  4214*  4257*
                4584   4586   4726
PWRMSG  041554  5430   5439#
PWRVEC= 000024   637#  1359*  1360*  5399*  5400*  5409*  5415*  5427*  5428*
RDCHR = 104411  4869   5391#
RDLIN = 104412  5392#
RESREG= 104414  5337   5394#
RESVEC= 000010   632#  1370*  1377*
SAVREG= 104413  5322   5393#
SETREG  036070  2076   2085   2094   2103   2123   4621#
SR0   = 177572   651#  1330   1332*  1434*  1578   1780   1837*  1839   1845*  2207*  2209   2211*  2217*
                2260*  2278*  2279   2284*  2344*  2370*  2396*  2423*  2446*  2488*  2514*  2540*  2566*
                2592*  2660*  2714   2716*  2879   2880*  2957   2972*  3024   3039*  3072   3088*  3160
                3176*  3183   3185*  3235   3251*  3258   3260*  3310*  3365   3370   3386   3400*  3425
                3432   3435   3445   3454   3467   3475   3479   3486*  3600   3616*  3655   3657*  3866
                3868*  4036   4038*  4194   4196*
SR1   = 177574   652#  1858
SR2   = 177576   653#  1331   1790   1811   2280   2715   2958   3025   3081   3161   3184   3236   3259
                3303   3343   3352   3366   3371   3390   3401   3426   3436   3441   3446   3455   3461
                3487   3601   3656   3867   4037   4195
SR3   = 172516   654#
STACK = 001100   536#  704    705    1351   1425   4258   4277
START   020000   721   1344#  5432
STKLMT= 177774   547#
SWR     001140   781#  1349   1385*  1387   1393*  1400*  1414   4340   4371   4385   4387   4393   4400
                4445   4452   4464   4468   4757   4802*  5407   5420*
SWREG   000176   719#  1393   1414   4757   4770
SW0   = 000001   600#
SW00  = 000001   590#  600
SW01  = 000002   589#  599
```



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SW02  = 000004   588#  598
SW03  = 000010   587#  597
SW04  = 000020   586#  596
SW05  = 000040   585#  595
SW06  = 000100   584#  594
SW07  = 000200   583#  593
SW08  = 000400   582#  592
SW09  = 001000   581#  591
SW1   = 000002   599#
SW10  = 002000   580#
SW11  = 004000   579#
SW12  = 010000   578#
SW13  = 020000   577#
SW14  = 040000   576#
SW15  = 100000   575#
SW2   = 000004   598#
SW3   = 000010   597#
SW4   = 000020   596#
SW5   = 000040   595#
SW6   = 000100   594#
SW7   = 000200   593#
SW8   = 000400   592#
SW9   = 001000   591#
TBIT  = 000020   702#  4584   4589   4602
TBITPS  001372   889#  1433*  4587*  4602   4604   4605*
TBITVE= 000014   633#  1367*  1368*
TESTNO  001352   881#  4441*  6147   6149   6152   6154   6156   6158   6160   6163   6165   6168   6170
                6173   6175   6177   6179   6181   6183   6186   6189   6192   6194   6197   6200   6202
                6205   6207   6209   6212   6215   6217   6218   6220   6223   6225   6227   6229   6231
                6233
TIMERR  002332  1292#  1426   1591   1631   1671   1711   1751   2900   3543   3617   3690
TIMFLG  002334  1293#  1304*  1431*
TKVEC = 000060   640#
TOFF    036002  2196   2249   2746   2813   2875   3516   3639   4584#
TON     036036  2221   2274   2792   2859   2902   3545   3695   4602#
TONUM   001400   892#  1582*  1588   1603*  1622*  1628   1643*  1662*  1668   1683*  1702*  1708   1723*
                1742*  1748   1763*  6156
TPVEC = 000064   641#
TRAPPC  001356   883#  1300*  1306   1327*  1336   2282*  2290   2707*  2723   3181*  3191   3256*  3266
                3864*  3874   4034*  4044   4192*  4202   6147   6149
TRAPPS  001360   884#  1301*  1305   1328*  1335   2283*  2289   2708*  2722   3182*  3190   3257*  3265
                3865*  3873   4035*  4043   4193*  4201   6147   6149
TRAPVE= 000034   639#  1357*  1358*
TRTVEC= 000014   634#
TST1    020550  1445#
TST10   021514  1672   1694#
TST11   021646  1712   1734#
TST12   022000  1752   1778#
TST13   022142  1834#
TST14   022200  1856#
TST15   022216  1859   1875#
TST16   022340  1922#
TST17   022462  1969#
TST2    020622  1469#
TST20   022612  2017#
TST21   022742  2070#
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TST22   023162          2120#
TST23   023332          2195#
TST24   023466          2248#
TST25   023724          2275    2322#
TST26   024454          2477#
TST27   025140          2637#
TST3    020706          1496#
TST30   025604          2705    2744#
TST31   026000          2811#
TST32   026206          2873#
TST33   026336          2925#
TST34   026632          2998#
TST35   027042          3060#
TST36   027166          3134#
TST37   027470          3211#
TST4    021030          1535#
TST40   027756          3288#
TST41   030144          3338#
TST42   031122          3515#
TST43   031310          3554#
TST44   031372          3586#
TST45   031570          3638#
TST46   032112          3716#
TST47   032760          3861    3890#
TST5    021076          1542    1574#
TST50   033640          4031    4061#
TST51   034404          4189    4213#
TST52   034510          4256#
TST6    021230          1592    1614#
TST7    021362          1632    1654#
TYPBN = 104406          4549    5386#
TYPDS = 104405          4313    4320    4542    4948    5385#
TYPE  = 104401          1408    4307    4314    4321    4447    4455    4501    4518    4520    4523    4525    4557    4562
                        4568    4768    4769    4772    4783    4793    4804    4823    4873    4882    4888    4893    4897
                        4902    4903    4905    4908    4912    4942    4946    5005    5114    5182    5257    5381#   5429
TYPOC = 104402          4509    4535    4771    4945    5382#
TYPON = 104404          5384#
TYPOS = 104403          5383#
UIPAR0= 177640           669#   1698    1907    2001    2101    2159    2644    3520*   3539*   3733*   4634    4692    4728
UIPAR1= 177642           670#   3734*
UIPAR2= 177644           671#   3735*
UIPAR3= 177646           672#   2815    2930*   3640*   3736*
UIPAR4= 177650           673#   2658*   2686*   2701*   2931*   3641*   3742*   3894*   4072*
UIPAR5= 177652           674#   2659*   2687*   2702*
UIPAR6= 177654           675#
UIPAR7= 177656           676#   1905    1999    3737*
UIPDR0= 177600           658#   1738    1954    2049    2092    2147    2651    2819    2823    2837    3730    4065    4630
                        4678
UIPDR1= 177602           659#
UIPDR2= 177604           660#
UIPDR3= 177606           661#   2933*   3642*   3693*
UIPDR4= 177610           662#   2656*   2688*   2940*   3007*   3643*   3892*   4079*
UIPDR5= 177612           663#   2657*   2689*
UIPDR6= 177614           664#
UIPDR7= 177616           665#   1952    2047
USESTK= 000700           705#   1539    3524    3541    3661    3756    3910    4082    4220    4243
```



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VIRT1   001402           893#   2352*   2378*   2404*   2431*   2454*   2496*   2522*   2548*   2574*   2600*   2671*   2679
                        2712*   4729    4735    6168    6170    6220
VIRT2   001404           894#   2670*   6170
WASR6   001354           882#   1302*   1329*   2281*   6147    6149
WASSR0  001366           887#   1330*   2279*   2714*   2957*   2959    3024*   3026    3072*   3074    3160*   3163    3183*
                        3235*   3238    3258*   3370*   3372    3386*   3387    3425*   3435*   3445*   3454*   3467*   3479*
                        3600*   3603    3655*   3674    3866*   4036*   4194*   6149    6183    6189    6194    6202    6205
                        6209    6212    6218    6220    6223    6229    6233
WASSR2  001370           888#   1331*   1790*   1792    1811*   1812    2280*   2715*   2958*   2966    3025*   3033    3081*
                        3082    3161*   3170    3184*   3236*   3245    3259*   3303*   3304    3343*   3345    3352*   3354
                        3371*   3375    3390*   3391    3401*   3403    3426*   3436*   3446*   3455*   3461*   3462    3487*
                        3488    3601*   3607    3656*   3677    3867*   4037*   4195*   6149    6186    6189    6197    6200
                        6202    6205    6209    6212    6218    6220    6227    6229    6231
WBIT  = 000100           703#   2762    2771    2782    2829    2838    2849
$APTHD  000204           741     747#
$ASTAT= ****** U        5075    5090
$ATYC   040116          5046    5048#
$ATY1   040072          5044#
$ATY3   040100          4990    5045#
$ATY4   040110          4460    5047#
$AUTOB  001134           778#   1418*   4765    4929
$BASE   001302           856#
$BDADR  001122           773#
$BDDAT  001126           775#
$BELL   001216           807#   4447    4480
$BIN    040412          5110*   5113*   5114    5121#
$CDW1   001306           858#
$CDW2   001310           859#
$CHARC  040066          5007*   5017*   5024    5033*   5038#
$CKSWR  036466          4757#   5390
$CLR.T  034750          4326    4329#
$CMTAG  001100           761#   1346    1347    1355    1361    1362    1363
$CM1  = 000006           793#    794#    795#    796#    797#    798#    799#
$CM2  = 000014           793#    794#    795#    796#    797#    798#    799#
$CM3  = 000006           791#    793
$CM4  = 000006           799#    800#    801#    802#    803#    804#    805#
$CNTLC  037416          4783    4873    4922#
$CNTLG  037430          4768    4924#
$CNTLU  037423          4793    4897    4923#
$CPUOP  001254           830#
$CRLF   001223           809#   4321    4455    4480    4501    4520    4525    4568    4804    4902    4922    5006    5041
$DBLK   041056          5223    5257    5265#
$DB2O   041162          4554    5322#
$DDW0   001312           860#
$DDW1   001314           861#
$DDW10  001336           870#
$DDW11  001340           871#
$DDW12  001342           872#
$DDW13  001344           873#
$DDW14  001346           874#
$DDW15  001350           875#
$DDW2   001316           862#
$DDW3   001320           863#
$DDW4   001322           864#
$DDW5   001324           865#
$DDW6   001326           866#
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$DDW7   001330          867#
$DDW8   001332          868#
$DDW9   001334          869#
$DEVCT  001236          821#
$DEVM   001304          857#
$DOAGN  034770         4303    4324    4331    4337#
$DTBL   041046         5226    5261#
$ENDAD  034760          728    1406    4333#   4475
$ENDCT  034606         1361    4305#
$ENULL  035034         4353#
$ENV    001246          826#   1412    4457    4985    5053    5077
$ENVM   001247          827#   1398    4987    4992    5055
$EOP    034552         4295#   4950
$EOPCT  034600         1361*   4302#   4306
$ERFLG  001103          764#   4360    4389    4391    4397*   4419    4442*   4480
$ERMAX  001115          770#   1364*   4391    4414*   4419
$ERROR  035320         1355    4433#
$ERRPC  001116          771#   4449*   4450*   4451    4480    4507    6147    6149    6152    6154    6156    6158    6160
                       6163    6165    6168    6170    6173    6175    6177    6179    6181    6183    6186    6189    6192
                       6194    6197    6200    6202    6205    6207    6209    6212    6215    6217    6218    6220    6223
                       6225    6227    6229    6231    6233
$ERRTB  001412          911#   4515
$ERTTL  001112          768#   4318    4322*   4448*   4480
$ESCAP  001214          806#   1363*   4413*   4471    4473    4480
$ETABL  001246          825#
$ETEND  001352          753     878#
$FATAL  001230          818#   5081*
$FFLG   040336         5044*   5047*   5075    5084*   5092#
$FILLC  001156          789#   5010    5041
$FILLS  001155          788#   5041
$GDADR  001120          772#
$GDDAT  001124          774#
$GET42  034732         4323#
$GTSWR  036536         4769#   5388
$HD   = 000000          521
$HIBTS  000204          748#
$ICNT   001104          765#   4404*   4405    4407*   4418
$ILLUP  041546         5399    5415    5436#
$INTAG  001135          779#   4785    4805    4929
$ITEMB  001114          769#   4451*   4459    4480    4504
$LF     001224          810#   4480    4912    4922    5041
$LFLG   040335         5085*   5091#
$LOOP   035026         4345    4349#
$LPADR  001106          766#   1379*   4395*   4411*   4416    4418
$LPERR  001110          767#   1380*   1446*   1461*   1470*   1485*   1497*   1511*   1524*   1576*   1587*   1616*   1627*
                       1656*   1667*   1696*   1707*   1736*   1747*   1789*   1798*   1822*   1879*   1888*   1909*   1926*
                       1935*   1956*   1972*   1985*   2003*   2020*   2033*   2051*   2072*   2081*   2090*   2099*   2108*
                       2206*   2220*   2250*   2273*   2337*   2363*   2389*   2416*   2440*   2463*   2481*   2507*   2533*
                       2559*   2585*   2611*   2661*   2704*   2755*   2791*   2822*   2858*   2877*   2888*   2901*   2941*
                       2985*   3008*   3046*   3061*   3090*   3141*   3145*   3151*   3194*   3216*   3220*   3226*   3269*
                       3296*   3316*   3342*   3351*   3360*   3421*   3496*   3517*   3544*   3556*   3571*   3592*   3620*
                       3648*   3694*   3738*   3749*   3769*   3782*   3794*   3805*   3819*   3833*   3846*   3860*   3913*
                       3929*   3945*   3960*   3977*   3995*   4012*   4029*   4068*   4098*   4111*   4123*   4134*   4147*
                       4161*   4174*   4188*   4232*   4245*   4395    4412*   4418    4470
$MADR1  001260          843#
$MADR2  001264          847#
```



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$MADR3  001270          850#
$MADR4  001274          853#
$MAIL   001226          749     753     816#    1397    1412    4410    4457    4985
$MAMS1  001256          837#
$MAMS2  001262          845#
$MAMS3  001266          848#
$MAMS4  001272          851#
$MBADR  000206          749#
$MFLG   040334         5045*   5051    5086*   5090#
$MNEW   037446         4772    4927#
$MSGAD  001242          823#   5061*   5064
$MSGLG  001244          824#   5066*
$MSGTY  001226          817#   5059    5067*   5079    5083*
$MSWR   037435         4769    4925#
$MTYP1  001257          838#
$MTYP2  001263          846#
$MTYP3  001267          849#
$MTYP4  001273          852#
$MXCNT  035316         4408    4418#
$NULL   001154          787#   5012    5041
$NWTST= 000001         1438#   1440    1463#   1465    1488#   1490    1526#   1528    1564#   1566    1606#   1608    1646#
                       1648    1686#   1688    1726#   1728    1766#   1768    1824#   1826    1848#   1850    1865#   1867
                       1911#   1913    1960#   1962    2005#   2007    2053#   2055    2110#   2112    2182#   2184    2235#
                       2237    2305#   2307    2465#   2467    2613#   2615    2727#   2729    2794#   2796    2862#   2864
                       2916#   2918    2989#   2991    3049#   3051    3122#   3124    3199#   3201    3274#   3276    3324#
                       3326    3503#   3505    3547#   3549    3574#   3576    3623#   3625    3704#   3706    3878#   3880
                       4049#   4051    4205#   4207    4247#   4249
$OCNT   040636         5154*   5183*   5196#
$OCTVL  041264         5324    5349#
$OMODE  040640         5149*   5153*   5158    5161*   5172*   5198#
$OVER   035302         4372    4388    4396    4406    4415#
$PASS   001234          820#   1397*   4299*   4300*   4311    4352    4402    4419    4940
$PASTM  000212          751#
$PWRAD  041530         5432#
$PWRDN  041370         1359    5399#   5427
$PWRMG  041524         5430#
$PWRUP  041442         5409    5415#
$QUES   001222          808#   4480    4823    4905    4922    5041
$RDCHR  037010         4836#   5391
$RDDEC= ****** U       5393
$RDLIN  037130         4864#   5392
$RDOCT= ****** U       5393
$RDSZ = 000010         4857#
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$REG0   001162          793#   4435*   6152    6154    6158    6160    6163    6165    6175    6189    6192    6194    6197
                       6209    6215
$REG1   001164          794#   4436*   6152    6158    6160    6165    6179    6200    6207    6209    6212    6215    6223
                       6225
$REG2   001166          795#   4437*   6160    6165    6179    6181    6183    6186    6194    6207    6225
$REG3   001170          796#   4438*   6173    6175    6183    6197    6212
$REG4   001172          797#   4439*   6168    6170    6186    6189    6192    6194    6197    6220    6227
$REG5   001174          798#   4440*   6165    6170    6173    6175    6177
$RESRE  041124         5299#   5394
$RTNAD  035030         4351#
$RTRN   035024         1367    1369*   1374*   4327    4346#
$R2A  = ****** U       5395
```

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$SAVR6  041552          5408*   5416    5417*   5418*   5438#
$SCOPE  035040          1353    4369#
$SETUP= 000137           711#   1352    1353    1355    1357    1359    1361    1362    1363    1365    1379    1406    1409
                        4297    4370    4434    4467    4475    4752    4929    5434
$STUP = 177777           711#
$SVLAD  035246          4380    4409#
$SVPC = 000204           726#    731
$SWR  = 177400           515#    521     525     526     527     528     529     530     531     532     805     806     807
                        1362    1363    1365    1379    1380    1446    1470    1497    1536    1575    1615    1655    1695
                        1735    1779    1835    1857    1876    1923    1970    2018    2071    2121    2196    2249    2323
                        2478    2638    2745    2812    2874    2926    2999    3061    3135    3212    3289    3339    3516
                        3555    3587    3639    3717    3891    4062    4214    4257    4291    4298    4325    4338    4352
                        4361    4362    4363    4364    4365    4371    4383    4385    4386    4389    4390    4391    4398
                        4399    4400    4412    4415    4418    4425    4426    4427    4428    4429    4445    4452    4464
                        4468    4480    5433
$SWREG  001250           828#   1400
$SWRMK= 000000           532     533    4365    4366    4387
$TBIT   035032          1378*   4342*   4352#   5434*
$TESTN  001232           819#   4410*
$TIMES  001212           805#   1362*   4298*   4398*   4405    4408*   4418
$TKB    001146           784#   4750    4761    4778    4840    4846
$TKS    001144           783#   4750    4759    4775    4787*   4807*   4838    4844
$TMP0   001176           799#   2343*   2348    2369*   2374    2395*   2400    2487*   2492    2513*   2518    2539*   2544
                        2565*   2570    2591*   2596    2663*   2943*   2973    3010*   3040    3365*   3372    3663*   3669*
                        3673*   3676*   3680*   3681    6170    6181    6183    6186    6202    6220
$TMP1   001200           800#   3362*   3374*   3377*   3378    3384*   3389*   3393*   3394    3422*   3424*   3430*   3434*
                        3440*   3444*   3450*   3453*   3459*   3466*   3473*   3478*   3485*   3491*   3599*   3605*   3609*
                        3610
$TMP2   001202           801#   3366*   3375    3821*   3822    3848*   3849    3980    3981*   4015*   4017    4149*   4150
                        4176*   4177    6202
$TMP3   001204           802#
$TMP4   001206           803#
$TMP5   001210           804#   4940*   4941*   4947
$TN   = 000053           515#    521    1438    1446#   1463    1470#   1488    1497#   1526    1536#   1542    1564    1575#
                        1592    1606    1615#   1632    1646    1655#   1672    1686    1695#   1712    1726    1735#   1752
                        1766    1779#   1824    1835#   1848    1857#   1859    1865    1876#   1911    1923#   1960    1970#
                        2005    2018#   2053    2071#   2110    2121#   2182    2196#   2235    2249#   2275    2305    2323#
                        2465    2478#   2613    2638#   2705    2727    2745#   2794    2812#   2862    2874#   2916    2926#
                        2989    2999#   3049    3061#   3122    3135#   3199    3212#   3274    3289#   3324    3339#   3503
                        3516#   3547    3555#   3574    3587#   3623    3639#   3704    3717#   3861    3878    3891#   4031
                        4049    4062#   4189    4205    4214#   4247    4257#
$TPB    001152           786#   5030*   5041
$TPFLG  001157           790#   4979    5041
$TPS    001150           785#   5028    5041
$TRAP   041302          1357    5358#
$TRAP2  041324          5369#   5380
$TRP  = 000015          5373#   5382#   5383#   5384#   5385#   5386#   5387#   5388    5389#   5390    5391#   5392#   5393#
                        5394#   5395#
$TRPAD  041336          5363    5380#
$TSTM   000210           750#
$TSTNM  001102           763#   4297*   4360    4387    4409*   4410    4415    4419    4441    4444    4480    4943
$TTYIN  037406          4866    4867    4885    4903    4917    4921#
$TYPBN  040340          5107#   5386
$TYPDS  040642          5211#   5385
$TYPE   037610          4979#   5072    5373    5381
```



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$TYPEC  040022          4809    5009    5016    5023    5028#   5029
$TYPEX  040070          5034    5036    5039#
$TYPOC  040440          5152#   5382
$TYPON  040454          5151    5154#   5384
$TYPOS  040414          5147#   5383
$UNIT   001240           822#
$UNITM  000214           752#
$USWR   001252           829#
$VECT1  001276           854#
$VECT2  001300           855#
$XTSTR  035052          4374#
$$GET4= 000001          4325#   4330
$OFILL  040637          5148*   5152*   5162    5197#
$40CAT= ****** U        4371    4454
.     = 052267           713#    717#    726     727#    729#    731#    737     738#    740#    742#    760#    811    1342#
                        1350    1379    1380    4310#   4352    4354#   4418    4419    4480    4571#   4750    4921#   4922
                        4929#   5041    5093#   5265#   5349#   5411    5437    5445#
.$ASTA= ****** U        5045    5048
.$X   = 000204           737#    742
```

```
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COMMEN     1#   643#
ENDCOM     1#   643#
ERROR    537#  1303  1333  1454  1479  1507  1520  1545  1590  1595  1630  1635  1670  1675  1710
        1715  1750  1755  1785  1794  1806  1815  1841  1860  1883  1896  1930  1943  1981  1993
        2029  2041  2130  2141  2152  2164  2212  2266  2285  2354  2380  2406  2433  2456  2498
        2524  2550  2576  2602  2673  2717  2764  2775  2784  2831  2842  2851  2884  2896  2945
        2953  2961  2968  3012  3020  3028  3035  3065  3076  3084  3154  3165  3172  3186  3229
        3240  3247  3261  3306  3347  3356  3380  3396  3405  3427  3437  3447  3456  3469  3481
        3493  3533  3567  3594  3612  3683  3759  3764  3777  3789  3800  3812  3827  3840  3855
        3869  3905  3923  3940  3955  3971  3989  4006  4025  4039  4088  4093  4106  4118  4129
        4141  4155  4168  4182  4197  4223  4228  4239  4266  4273  4658  4672  4686  4700
ESCAPE     1#   643#
GETPRI     1#   643#  4338
GETSWR     1#   643#  1409#
MSG1    1438#  1440
MSG10   1686#  1688
MSG11   1726#  1728
MSG12   1766#  1768
MSG13   1824#  1826
MSG14   1848#  1850
MSG15   1865#  1867
MSG16   1911#  1913
MSG17   1960#  1962
MSG2    1463#  1465
MSG20   2005#  2007
MSG21   2053#  2055
MSG21A  2110#  2112
MSG21B  2182#  2184
MSG21C  2235#  2237
MSG22   2305#  2307
MSG23   2465#  2467
MSG24   2613#  2615
MSG25   2727#  2729
MSG26   2794#  2796
MSG27   2862#  2864
MSG3    1488#  1490
MSG30   2916#  2918
MSG31   2989#  2991
MSG31A  3049#  3051
MSG32   3121#  3124
MSG33   3198#  3201
MSG34   3273#  3276
MSG35   3321#  3326
MSG36   3502#  3505
MSG36A  3547#  3549
MSG37   3573#  3576
MSG4    1526#  1528
MSG40   3622#  3625
MSG41   3704#  3706
MSG42   3878#  3880
MSG43   4049#  4051
MSG44   4205#  4207
MSG45   4247#  4249
MSG5    1563#  1566
MSG6    1606#  1608
```



```
MSG7    1646#  1648
MULT       1#   643#
NEWTST     1#   643#  1438  1463  1488  1526  1564  1606  1646  1686  1726  1766  1824  1848  1865
        1911  1960  2005  2053  2110  2182  2235  2305  2465  2613  2727  2794  2862  2916  2989
        3049  3122  3199  3274  3324  3503  3547  3574  3623  3704  3878  4049  4205  4247
PDP        1#   643#  5087  5088  5252  5304  5420  5421
PUSH       1#   643#  5048  5050  5071  5211  5284  5401  5407
REPORT     1#   643#
SAVR     710#  4435
SCOPE    538#  1445  1469  1496  1535  1574  1614  1654  1694  1734  1778  1834  1856  1875  1922
        1969  2017  2070  2120  2195  2248  2322  2477  2637  2744  2811  2873  2925  2998  3060
        3134  3211  3288  3338  3515  3554  3586  3638  3716  3890  4061  4213  4256  4296
SETPRI     1#   643#
SETTRA  5373#  5382  5383  5384  5385  5386  5388  5390  5391  5392  5393  5394
SETUP      1#   643#  1344
SKIP       1#   643#  1542  1592  1632  1672  1712  1752  1859  2275  2705  3861  4031  4189
SLASH      1#   643#
SPACE    643#
STARS      1#   643#   724   734   736   743   756   811   814  1284  1291  1311  1318  1438  1444
        1463  1468  1488  1495  1526  1534  1550  1561  1564  1573  1606  1613  1646  1653  1686
        1693  1726  1733  1766  1777  1824  1833  1848  1855  1865  1874  1911  1921  1960  1968
        2005  2016  2053  2069  2110  2119  2182  2194  2235  2247  2305  2321  2465  2476  2613
        2636  2727  2743  2794  2810  2862  2872  2904  2914  2916  2924  2989  2997  3049  3059
        3103  3118  3122  3133  3199  3210  3274  3287  3324  3337  3503  3514  3547  3553  3574
        3585  3623  3637  3696  3701  3704  3715  3878  3889  4049  4060  4205  4212  4247  4255
        4287  4357  4421  4482  4576  4583  4595  4601  4611  4619  4640  4648  4709  4723  4749
        4752  4828  4857  4964  5043  5100  5124  5201  5268  5313  5352  5397  5413
SWRSU      1#   643#  1381#
TIMMSG   710#  1608  1648  1688  1728
TIMTST   710#  1615  1655  1695  1735
TRMTRP  5373#
TYPBIN     1#   643#  4548
TYPDEC     1#   643#  4311  4318  4541  4947
TYPNAM     1#   643#  1402
TYPNUM     1#   643#
TYPOCS     1#   643#
TYPOCT     1#   643#  4507  4534  4770  4944
TYPTXT     1#   643#  4307  4314
USER     710#  880
WMSG     710#  2729  2796
WTST     710#  2745  2813
$$CMRE   754#   793   794   795   796   797   798
$$CMTM   754#   799   800   801   802   803   804
$$ESCA     1#   643#
$$NEWT     1#   643#  1438  1463  1488  1526  1564  1606  1646  1686  1726  1766  1824  1848  1865
        1911  1960  2005  2053  2110  2182  2235  2305  2465  2613  2727  2794  2862  2916  2989
        3049  3122  3199  3274  3324  3503  3547  3574  3623  3704  3878  4049  4205  4247
$$SET   5373#  5382  5383  5384  5385  5386  5388  5390  5391  5392  5393  5394
$$SETM  1397#
$$SETU  1365#
$$SKIP     1#   643#  1542  1592  1632  1672  1712  1752  1859  2275  2705  3861  4031  4189
.EQUAT     1#   515#   533
.HEADE     1#   515#   516
.KT11      1#   515#   643
.SETUP     1#   515#   711
.SWRHI     1#   515#   521
```

```
.SWRLO    533#
.$ACT1      1#    515#    722
.$APTB      1#    812#
.$APTH      1#    515#    732
.$APTY      1#    515#   5041
.$ASTA      1#
.$CATC      1#    515#    711
.$CMTA      1#    515#    754
.$DB2D      1#
.$DB2O      1#    515#   5311
.$DIV       1#
.$EOP       1#    515#   4285
.$ERRO      1#    515#   4419
.$ERRT      1#    515#
.$MULT      1#
.$POWE      1#    515#   5395
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$READ      1#    515#   4747
.$R2AZ      1#
.$SAVE      1#    515#   5266
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#    515#   4355
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#    515#   5350
.$TYPB      1#    515#   5098
.$TYPD      1#    515#   5199
.$TYPE      1#    515#   4962
.$TYPO      1#    515#   5122
.$40CA      1#
.1170       1#

. ABS.  052267     000

 ERRORS DETECTED:  0

 CFKTHB,CFKTHB.LST/CRF/SDL=CFKTHB.SML,CFKTHB.P11
 RUN-TIME: 22 30 2 SECONDS
 RUN-TIME RATIO: 266/55=4.8
 CORE USED:  39K  (77 PAGES)
```